SADHU VASWANI AUTONOMOUS COLLEGE
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of Political Science
Session – 2017-18

Class	:	B.A.
Year	:	I
Subject	:	Political Science
Title of Paper	:	Basic Principles of Political Science
Paper	:	I
Maximum marks	:	40+10 CCE
Course Code	:	AT-A33(A)

Course Out Comes

CO1 -Student will be able to understand Meaning and Significance of Political Theory.
CO2 -Assess the Theories of State (Origin, Nature, and Function) : Contract, Idealist Theory.
CO3 -Understanding basic concepts of Liberty, Equality, Rights, Law and Justice.
CO4 -Gives Information about the Types of Government.
CO5 -Types of Political Parties; Principles and Ideologies.

Unit-1	Political Science – Definition, Nature and Scope Methods: Traditional and Modern; Relations with other Social Science - Sociology, History, Economics, Psychology and Geography. राजनीतिविज्ञान–परिभाषा, प्रकृति एवं क्षेत्र। अध्ययन पद्धति–परंपरागत एवंआधुनिक।अन्य सामाजिकविज्ञान के साथसंबंध –इतिहास, अर्थशास्त्र, मनोविज्ञानऔरभूगोल।
Unit-2	State – Essential Elements, Functions & Principles of Origin of State. Concept of Nation and Nationality, Theory of Sovereignty, Separation of Powers, Citizenship & Civil Society. राज्य –आवश्यकतत्व, कार्य एवंउत्पत्ति के सिद्धांत।–राष्ट्र एवं–राष्ट्रीयता की अवधारणसंप्रभुता का सिद्धांत, शक्तिपृथक्करण, नागरिकता एवंनागरिकसमाज।
Unit-3	Rights and Duties: Liberty & Equality and Justice. Constitution:Meaning & Types Welfare State. अधिकारऔरकर्तव्य। स्वतंत्रताऔरसमानता, न्याय, संविधान का अर्थ एवंप्रकार, लोककल्याणकारीराज्य।
Unit-4	Types of Government: Unitary & Federal, Parliamentary & Presidential, Theories of Democracy. सरकार के प्रकार– एकात्मक एवंसंघात्मक, संसदात्मक एवं अध्यक्षात्मक, लोकतंत्र के सिद्धांत
Unit-5	Political Parties: National & Regional, Pressure Groups. राजनीतिकदल–राष्ट्रीय एवं क्षेत्रीय, दबावसमूह।

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Session – 2017-18

Class	:	B.A
Year	:	I
Subject	:	Political Science
Title of Paper	:	Indian Government & Politics
Paper	:	II
Maximum marks	:	40+10 CCE
Course Code	:	AT-A33 (B)

Course out Comes

CO1 -Develop the understanding of Indian National Movement.
CO2 -Develop the clear understanding of Fundamental Rights & Fundamental Duties
CO3 -Develop the understanding of the working of Lok Sabha & Rajya Sabha
CO4 -Develop the understanding of the Functions of Government
CO5 -Develop the understanding of Right to Information.

Unit-1	Brief History of Indian National Movement, The Making of Indian Constitution and its Sources. Preamble, and Basic Features. भारतीय राष्ट्रीय आंदोलन का संक्षिप्तइतिहास।भारतीय संविधान का निर्माण, स्त्रोत, प्रस्तावना, एवंप्रमुख विशेषतायें।
Unit-2	Fundamental Rights & Duties. Directive Principles of State Policy.Union Executive: President, Prime Minister & Cabinet. मौलिकअधिकार एवंकर्तव्य, राज्य के नीतिनिर्देशकतत्व।संघीय कार्यपालिका : राष्ट्रपतिप्रधानमंत्री, एवंमंत्रीमंडल।
Unit-3	Indian Parliament: Lok Sabha, Rajya Sabha. The Supreme Court:Election Commission. भारतीय संसद–लोकसभा, राज्य सभा।सर्वोच्चन्यायालय, निर्वाचनआयोग।
Unit-4	The State Executive: Governor, Chief Minister, Council of Ministers, State Legislative: Assembly & Legislative Council राज्य कार्यपालिका–राज्यपाल, मुख्यमंत्री एवंमंत्रीमंडल, राज्य व्यवस्थापिका–विधानसभा एवंविधानपरिषद्।
Unit-5	Judicial Activism, Public Court , Right to Information, Electoral Reforms. न्यायिकसक्रियता, लोकअदालत, सूचना का अधिकार, चुनावसुधार।

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Class	**:**	BA
Year	**:**	III
Subject	**:**	Political Science
Title of Subject Group	**:**	Indian Foreign Policy
Paper	**:**	I
Course Code	**:**	AT –A44(A)
Max. Marks	**:**	40+ 10 CCE

Course Out Comes

CO1- Students will acquire the bases on which Indian Foreign policy is determined.
CO2- Students will develop an understanding of the relationship of India with different Countries.
CO3- Students will acquire the knowledge of the main features of the International Politics.
CO4- Students will acquire the information about the various aspects of Regional Organizations.
CO5- Students will develop an understanding of the role of India in the International Affairs.

Unit-I	Indian Foreign Policy: Development, Salient Feature, Principles &eterminants. भारतीय विदेशनीति, विकास, विशेषताऐं, सिद्धांत एवं निर्धारकतत्व।
Unit-II	India's Relations with Neighboring Countries, Pakistan, Bangladesh, Bhutan, Sri Lanka, Afghanistan. भारत के पड़ौसीदेशों के साथसंबंध : पाकिस्तान, बांग्लादेश, श्रीलंका, भूटान एवंअफगानिस्तान।
Unit-III	Relations with Super Power s: America, Russia, China. भारत के महाशक्तियों के साथसंबंध : अमेरिका, रूस, चीन
Unit-IV	Regional Organizations: SAARC, ASEAN, OPEC, BRICS क्षैत्रीय संगठन : सार्क, आसियान, ओपेक, ब्रिक्स।
Unit-V	Contemporary International Issues -Human Rights, Globalization, Environment, Disarmament, Cross Border Terrorism. समकालीनअन्तर्राष्ट्रीय मुद्दे : मानवाधिकार, वैश्वीकरण, पर्यावरण, निशस्त्रीकरण, सीमापारआतंकवाद।

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Class	**:**	BA
Year	**:**	III
Subject	:	Political Science
Title of Subject Group	**:**	Public Administration
Paper	**:**	II
Course Code	**:**	AT –A44(B)
Max. Marks	**:**	40+ 10 CCE

Course Out Comes

CO1- Students will acquire the knowledge of Administrative Practices and functioning of Administration**.**

CO2- Students will learn about the key Concepts of Academic discipline of Public Administration**.**

CO3- Students will develop the Understanding of the Methods of Recruitment, promotion and Training of employees.

CO4- Students will develop the Understanding of the Budget making process and its Implementation in India.

CO5- Students will develop the Understanding of the role of Bureaucracy and good governance.

Unit-I	Public Administration: Meaning, Nature & Scope, Public and Private Administration, New Public Administration. लोकप्रशासन : अर्थ, प्रकृति एवं क्षेत्र, लोक एवंनिजीप्रशासन, नवीनलोकप्रशासन।
Unit-II	Principles of Organization. Line & Staff Agencies. Chief Executive. संगठन के सिद्धांत–स्टॉफ एवंसूत्र अभिकरण, मुख्य कार्यपालिका।
Unit-III	Personnel Administration: Recruitment, Training & Promotion, Union Public Service Commission, Settlement of Disputes, O & M. कार्मिकप्रशासन : भर्ती, प्रशिक्षण, पदोन्नति, संघलोकसेवाआयोग, विवादों का समाधान, ओ. एवं. एम.।
Unit-IV	Financial Administration: Budget. Accounting & Auditing. वित्तीय प्रशासन : बजट, लेखा एवंलेखा परीक्षण।
Unit-V	Development Administration; Role of Bureaucracy. Role of Panchayat Rajnstitutions. Lokpal &Lokayukt; Good Governance and e - Governance. विकासप्रशासन : नौकरशाही की भूमिका, पंचायती राज संस्थाओं की भूमिका : लोकपाल एवंलोकायुक्त, सुशासन एवंई- गवर्नेंस।

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Year	**:**	I
Paper	**:**	I
Subject	**:**	Sociology
Title of Subject	**:**	Basic Concept of Sociology
Course Code	**:**	AT-A34(A)
Max Marks	**:**	85+15 CCE

Course Outcomes

CO1- The Course is intended to introduce the students to a sociological way of thinking. It provides nature of sociology
CO2- Students will be able to acquaint themselves with the basic concepts of sociology like society, community, association, etc.
CO3- Students can understand social structure and culture.
CO4- Course explain social control, social stratification
CO5- Couse explain social change and the factors.

Unit 1	Sociology – Meaning Definition, Nature of Sociology, Subject matter, scope and importance origin and development of sociology, sociology and other social science. समाजशास्त्र –अर्थपरिभाषासमाजशास्त्र की प्रकृतिविषय वस्तुविषय क्षेत्र एवंमहत्व।समाजशास्त्र की उत्पत्ति एवंविकाससमाजशास्त्र एवंअन्य सामाजिकविज्ञान।
Unit 2	Society, Social Groups Community, Institutions, Association. समाज, सामाजिकसमूह, समुदाय संस्थासमिति।
Unit 3	Social structure , Status, Role Culture Socialization. सामाजिकसंरचना, प्रस्थिति, भूमिकासंस्कृतिसमाजीकरण
Unit 4	Social control, values, Norms, Social stratification, social mobility. सामाजिकनियंत्रण, मूल्य, आदर्शनियम, सामाजिकस्तरीकरण, सामाजिकगतिशीलता।
Unit 5	Social change- Meaning Types, Evolution, Development, Progress, Revolution. सामाजिकपरिवर्तन–अर्थ, प्रकार, उदविकास, विकास, प्रगति, क्रांति

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Class	:	I Year
Paper	:	II
Subject	:	Sociology
Title of Subject	:	Indian Society
Course Code	:	AT-A34(B)
Max Marks	:	85+15 CCE

Course Outcomes

CO1- The course is intended to introduce the student about religion Karma and Sanskar.
CO2- Caste Kinship family and marriage.
CO3- Students an understand about the structure of Indian society like village, city
CO4- Students can understand about family problem dowry Divorce problem of the Elderly
CO5- Various Social Problems in India like casteism, communalism, cybercrime

Unit-1	Dharma, Verna- System, Ashram-System, Purushartha, Karma, Sanskar धर्म,वर्णव्यवस्था. आश्रमव्यवस्था, पुरूषार्थ, कर्म,संस्कार
Unit-2	Caste, Class, Family, Marriage, Kinship जाति, वर्ग,परिवार, विवाह, नातेदारी।
Unit-3	Structure of Indian Society, Village, City, Rural-Urban Continunm, Diversity of Indian Society-Demographic, Cultural, Religious and Linguistic भारतीय समाज की संरचना, ग्राम, नगर, ग्रामीण–नगरीय सातत्य, भारतीय समाज की जनांकिकीय, सांस्कृतिक, धार्मिक एवंभाषाईविविधता।
Unit-4	Family Problems- Dowry, Divorce, Domestic Violence, Problems of the Elderly, Youth Tension पारिवारिकसमस्याएँ––दहेज,तलाक घरेलूहिंसा.वृद्धों की समस्या, युवातनाव ।
Unit-5	Social Problems. Castism, Regionalism, Cummunalism. Cyber- Crime, Gender Inequality सामाजिकसमस्यायें–जातिवाद,क्षेत्रवाद, साम्प्रदायिकता,साइबरक्राइम, लिंगअसमानता।

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Class	:	II Year
Paper	:	I
Subject	:	Sociology
Title of Subject	:	Social Processes and Change
Course Code	:	AT-A40(A)
Max Marks	:	85+15CCE

Course Outcomes

CO1- Course teaches structure concept and characteristics of structure explain by Redcliff brown and T parsons.

CO2- Helps understanding concepts, Characteristics and process of social organization

CO3- Helps understanding concepts, Characteristics and process of social Dis- organization

CO4- Helps understanding the law behind social process by studying about right to information 2005 Act human right Act 1993 Gives students a overview of now society has changed over period of time.

CO5- Helps to understand how planning, urbanization, modernization has bought social change in the society.

Unit I	Social Structure- Concept and Characteristics, Function- Concept and Characteristics, Social Structure and Function, (According to Radcliffe-brown and T. Parsons) सामाजिकसंरचना–अवधारणा एवंविशेषताएं प्रकार्य–अवधारणा एवंविशेषताएं समाजिकसंरचना एवंप्रकार्य–रेडक्लिफब्राउन एवंटीपारसन्स के अनुसार
Unit 2	Social Organization - Concept and Characteristics, Social Process- Cooperation Accommodation, Assimiliation, Adaptation, Adjustment सामाजिकसंगठन की अवधारणा एवंविशेषताएं सामाजिकसंगठन की प्रक्रियाएं–सहयोग, व्यवस्थापन, सात्मीकरण, अनुकूलनसामंजस्य
Unit 3	Social Disorganization- Concept and Characteristics, Process of Social Disorganization- Competition, Conflict, Devient behavior, War सामाजिकविघटन की अवधारणा एवंविशेषताएं सामाजिकविघटन की प्रक्रियाएं–प्रतिस्पर्धा, संघर्ष, विचलितव्यवहार, युद्ध
Unit 4	Social Legislation- Domestic Violance Act 2005, The Scheduled Caste and tribes (Prevention of Atrocities Act 1989) Human Right Act 1993.Right to information 2005. Protection of women under Indian constitution and criminal law. सामाजिकविधान– घरेलूहिंसाअधिनियम 2005 अनुसूचितजाति एव जनजातिअत्याचारनिरोधकअधिनियम 1989 मानवअधिकारसंरक्षणअधिनियम 1993 सूचना का अधिकारअधिनियम 2005 भारतीय संविधान एवंअपराधिकनियमो के अंतर्गतमहिलाओकोप्राप्तसुरक्षा ।
Unit 5	Process of Social Change- Social Movement. Planning Urbanization Industrialization Modernization सामाजिकपरिवर्तन की प्रक्रियाएं–सामाजिकआदोलन, नियोजन, नगरीकरणऔद्योगीकरण, आधुनिकीकरण

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Class	**:**	II Year
Paper	**:**	II
Subject	**:**	Sociology
Title of Subject	**:**	Rural Urban and Tribal Society
Course Code	**:**	AT-A40(B)
Max Marks	**:**	85+15CCE

Course Outcomes

CO1- Gives understanding of rural family, jajmani system
CO2- Defines changing status of rural woman, Rural leadership
CO3- Urban Society Slums, Juvenile. Delinquency Environmental Pollution
CO4- Urban Society-Poverty and unemployment
CO5- Helps in understanding the characteristics of tribal society identify tribal probes, life style of Gond, Korku, Bbilala tribes.

Unit I	Characteristies of Rural and Peasant Societies, Rural Family, Caste Occupation and its Changing Status jaimani System. ग्रामीण एवं कृषकसमाज की विशेषताएं, ग्रामीणपरिवार, जाति, व्यवसाय एवंउनकीपरिवर्तितस्थितिजजमाानीव्यवस्था
Unit 2	Rural Leadership and Factions, Peasant Tensions, Cooperatives, Changing Status of Rural Women Migration ग्रामीणनेतृत्व एवंगुटबंदी कृषकतनाव, सहकारिता, ग्रामीणमहिलाओ की परिवर्तननशीलस्थिति, प्रवास
Unit 3	Urban Society Housing Slums, Juvenile Delinquencey, Alcoholism, Drug, Addiction Environmental Pollution. नगरीय समाज–आवाजगन्दीबस्तियांबालअपराध मद्यपान एवंमादकद्रव्य व्यसन, पर्यावरणप्रदूषण
Unit 4	Urban Society – Social Disorganization – Meaning, Characteristics and Causes, Crime, Poverty and unemployment, Impact of information technology on society. नगरीय समाज– सामाजिकविघटन–अर्थ, लक्षणतथाकारण अपराध, निर्धनतातथाबेरोजगारी समाजपरसूचनाप्रौद्योगिकी का प्रभाव
Unit 5	Tribes – Meaning and Characteristics, Tribal Problems, Indebtedness, Land Alienation, Life Style of Gond Bhil, Bhilala and Korku tribes जनजाति : अर्थ एवंविशेषताएं जनजातिय समस्याएं– ऋणग्रस्तता, भूमिपृथवकरण गौड, भील, भिलाला एवंकोरकूजनजातियो की जीवन शैली

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Class	**:**	III Year
Paper	**:**	I
Subject	**:**	Sociology
Title of Subject	**:**	Basic of Sociological Thought
Course Code	**:**	AT-A45(A)
Max Marks	**:**	85+15CCE

Course Outcomes

CO1- Define Sociological theory of culture change as per Pitirim Sorokin understand its features and describe and illustrate theory in building sociological knowledge

CO2- Introduce themselves to the classical theories of sociology and contributions of different thinker like Max weber and Thorstein Veblen

CO3- Understand theory of functions by R.K Merton Study of circulation of elites by vilfredo Pareto

CO4- Study of Non –violence social justice by Mahatma Gandhi and Dr. B.R. Ambedkar respectively

CO5- Know the contribution of Indian sociologists like Yogendra Singh in Modernization of Indian tradition

Unit-1	Auguste Comte –Hierarchy of sciences, Law of Three Stages. Emile Durkheim – Theory of Suicide, Theory of Religion Pitrim Sorokin – Theory of Culural Change. अगस्तकाम्टे–विज्ञानों का संस्तरण, तीनस्तारों का नियम इमाइलदुर्खीम–आत्महत्या का सिद्धांत, धर्म का सिद्धांत पिट्रिमसोरोकिन–सांस्कृतिकपरिवर्तन का सिद्धांत
Unit-2	Max Weber – Theory of Authority, Bureaucracy Karl Marx – Class Struggle, Theory of Surplus Value. Thorstein Veblen – Technological Change, Theory of Leisure Class मैक्सबेवर–सत्ता, नौकरशाही कार्लमार्क्स–वर्ग संधर्ष, अतिरिक्तमूल्य का सिद्धांत थ्रस्टिनबैब्लिन–प्रोद्योगिकीय परिवर्तन, विलासीवर्ग का सिद्धांत
Unit-3	R.K. Merton – Theory of Functionalism, Reference Group, Vilfredo Pareto – Circulation of Elites, resdues and Derivers Talcott Parsons – Theory of Social Action, Social System. आर. के. मर्टन–प्रकार्यवाद का सिद्धांत , संदर्भसमूह विल्फ्रेडोपेरेटो–अभिजातवर्ग का परिभ्रमण, विशिष्टचालक एवंभ्रांततर्क टॉलकाटपारसन्स–सामाजिकक्रिया का सिद्धांत, सामाजिकव्यवस्था
Unit-4	Mahatama Gandhi – Non – Violance, Satyagraha, Trusteeship.\RadhakamalMukerjee- Sociology of Values Dr. B.R. Ambedkar – Social Justice, Casteless Equalitarian Society. महात्मागांधी–अहिंसा, सत्याग्रह, संरक्षकता राधाकमलमुखर्जी–मूल्यों का समाजशास्त्र डॉ. बी.आर. अम्बेडकर–सामाजिकन्याय, जातिविहीनसमतामूलकसमाज

Unit-5	M.N. Srinivas – Sanskritization, Westernization, Secularization. A.R.Desai - Social background of Nationalism in india. Yogendra Singh – Modernization of IndianTradition. एम.एन. श्रीनिवास–संस्कृतिकरण, पश्चिमीकरण, लौकिकीकरण ए.आर. देसाई–भारतमेंराष्ट्रवाद की सामाजिकपृष्टभूमि योगेन्द्र सिंह –भारतीय परंपरा का आधुनिकीकरण

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Syllabus recommended by Board of studies of sociology
Session 2019-20,2020-21

Class	:	III Year
Paper	:	II
Subject	:	Sociology
Title of Subject	:	Methods of Social Research
Course Code	:	AT-A45(B)
Max Marks	:	85+15 CCE

Course Outcomes

CO-1 Focus in how the research is done in sociology and understand importance and data analysis of scientific method

CO2- Study different – Techniques of Data collection

CO3- Learn characteristic Classification and tabulation of data for report writing

CO4- Learning classification of data by using different measure of central tendency like mean median mode and make conclusions based on those patterns.

CO5- Learn using graphical presentation and different diagrams in reports and get fact based clarity on sociology

Unit-1	Social Research – meaning, Importance and characteristics, Basic steps of scientific research , Importance of Scientific Method, Formualtion of Hypothesis, Research Design, Social Survey – Meaning Definition, Characteristics, Objectives, Types. समाजिकअनुसंधान–अर्थ, महत्व, विशेषताएं वैज्ञानिकशोध के प्रमुख चरण, वैज्ञानिकपद्धति का महत्व , उपकल्पनानिर्माण, शोध प्ररचना, सामाजिकसर्वेक्षण–अर्थ, परिभाषा, विशेषाताएं, उद्देश्य, प्रकार
Unit-2	Research Methodology- case Study Method, Sampling Method Techniques of Data Collection- Questionnaire, Schedule, Interview, Observation. अनुसंधानपद्धति–वैयक्तिक अध्ययन पद्धति, निदर्शनपद्धतितथ्य संकलन की प्रविधियां–प्रश्नावली, अनुसूची, साक्षात्कार, अवलोकन
Unit-3	Scaling Techniques- Types of Scales: Likert and Bogardus Scales, Classification and Tabulation of Data – Meaning, Charateristics, Objectives and Basis.Report Writing. अनुमापनप्रविधियाँ–अनुमापन के प्रकार : लिकर्ट एवंबोगार्डस के पैमाने, तथ्यों का वर्गीकरण एवंसारणीयन–अर्थ, विशेषताएं, उददेश्य, आधार, प्रतिवेदनलेखन।
Unit -4	Meaning of Statistics, Utility and Limitations Central tendency- Meaning, Characterstics and Importance Measure of Central Tendency- Mean, Median, Mode. सांख्यिकी का अर्थ, उपयोगिता एवंसीमाएं केन्द्रीय प्रवृति का अर्थ, विशेषताएं, महत्व केन्द्रीय प्रवृति का मापन–माध्य, माध्यिका, बहुलक
Unit-5	Presentation of Data, Diagrammatic and Graphic Presentation, Use of Computer in Social Research. तथ्यों का प्रस्तुतिकरण–चित्रमय एवंरेखाचित्र के माध्यम से प्रस्तुति, सामाजिकअनुसंधानमेंसंगणक का उपयोग।

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Syllabus recommended by Board of studies of Economics
Session 2017-18 To 2020-21

Class	:	B.A.
Year	:	I
Subject	:	Economics
Title of Subject Group	:	Micro Economics.
Paper	:	I
Course Code	:	AT-A35(A)
Maximum marks	:	40+10 C.C.E

Course Outcomes

CO1- Economics Definition And Scopes
CO2- Law Of Demand And Supply, Elasticity Of Demand
CO3- Production, Return To Scale, Iso – Production Curve
CO4- Market, Price Determination Under Perfect Competition And Monopoly
CO5- Factor Pricing : Wages, Interest, Profit, Rent

Unit-1	Definition, scope and nature of economics, methods of economic analysis- Inductive and Deductive, Basic Concepts: - Micro Economics, Utility, Demand, supply, Commodity, Free goods, Value and Price, Market Administered Price. अर्थशास्त्र की परिभाषा, अर्थशास्त्र का क्षेत्र एवंप्रकृति, आर्थिकविश्लेषण की पद्यतियां आगमन एवंनिगमनविधि, व्यष्टिअर्थशास्त्र की आधारभूतअवधारणाएं, उपयोगिता, मांग, पूर्ति स्वतंत्र वस्तुएं, मूल्य एवंकीमत, बाजार, प्रशासितमूल्य।
Unit-2	Law of demand and its exceptions,Giffin goods, Elasticity of demand;- Price, Incomeand Cross. Law of Supply, Law of diminishing marginal utility and Equi Marginal Utility, Consumer's Surplus, Indifference curves-characteristics and consumers equilibriums. मांग का नियमऔरइसकेअपवाद, गिफिनवस्तुएं, मांग की लोचः कीमत, आय ओरआड़ीलोच,पूर्ति का नियम,ह्रासमानसीमांतउपयोगितानियम, समसीमांतउपयोगिता का सिद्धांतऔरसीमांत उपयोगिता, उपभोक्ता की बचत, तटस्थतावक्र–विशेषताएंऔरउपभोक्ता का संतुलन।
Unit-3	Production-Law of Production, Law of Variable Proportions, Returns to Scale,Economies of Scale, Iso Product curves, Characteristics and producer's equilibrium, Concepts of Cost and Revenue-Total, Marginal & Average. उत्पादन–उत्पादन के नियम, परिवर्तशीलअनुपातों का नियम, पैमाने के प्रतिफलपैमाने की बचत,समोत्पादवक्रः विशेषताएं एवंउत्पादक का संतुलन, लागत एवंआगम की अवधारणाएंः कुल, सीमांत एवंऔसत।
Unit-4	Market Meaning, Type of markets. Demand and Supply, Equilibrium, Price and Output Determination for Firm and Industry under Perfect Competition Monopoly and Monopolistic. बाजार का अर्थ, बाजार के प्रकार, मांग एवंपूर्तिसंतुलन, कीमत एवंउत्पादन का निर्धारण, फर्म एवं उघोग के अंतर्गत–अपूर्णप्रतियोगिता, पूर्ण–प्रतियोगिता एकाधिकार एवं एकाधिकृतप्रतियोगिता ।
Unit-5	Factor Pricing : Marginal Productivity Theory, Adding up theorem, Modern theories of Wages, Interest, Profit and Rent. साधनकीमतः सीमांतउत्पादकतासिद्वांत, योगप्रमेय, आधुनिकसिद्वांतः मजदूरी, ब्याज, लाभ एवंलागतसिद्वांत

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Class	:	B.A.
Year	:	I
Subject	:	Economics
Title of Subject Group	:	Indian Economy
Paper	:	II
Course Code	:	AT- A35(B)

Course Outcome

CO1- Indian economy, nature resources and demographic features
CO2- Agriculture: Nature, importance,green revolution, agriculture marketing, agriculture mechanization
CO3- industrial policy in India 1991, small and cottage industries, Start-up-India, make – in- India
CO4- Infrastructure for Indian economy, FDI, Forien trade of India
CO5- Planning in India, problems of Indian economy, regional Disparities in Indian economy

Unit-1	Structure of Indian economy. Basic features: Natural Resources:-land, water,forest and mineral resources, Demographic Features: Population, size, sex, rural-urban classification, Population Distribution. Composition of Gross Domestic Product. भारतीय अर्थव्यवस्था का ढांचा, मूलभूतविशेषताएं–प्राकृतिकसंसाधन, भूमि, जल, वन एवं खनिज, जनांकिकीविशेषताएं, जनसंख्याः आकार, लिंग, ग्रामीण–शहरीवर्गीकरण, जनसंख्या वितरण, सकल घरेलूउत्पाद की संरचना।
Unit-2	Agriculture: Nature and Importance, Land Use Pattern, Changes in Cropping Pattern of Madhya Pradesh. Trends in Agriculture Production and Productivity, Green revolution, Agriculture Marketing and Mechanisation. कृषि–प्रकृतिऔरमहत्व, भूउपयोगपद्धति, मध्यप्रदेश की फसलपद्यतिमेंपरिवर्तन, कृषिउत्पादऔरउत्पादकता की प्रवृत्ति, हरितक्रांति, कृषिविपणन एवं यंत्रीकरण।
Unit-3	Industrial Policy of 1956, New Industrial Poliy of 1991 and changes there in. Role of Public Sector in industrialization. Industrial Policy of Madhya Pradesh. Concepts of small scale industries (SSI) and cottage industries, problems and prospects of SSI in Indian economy. Start Up India and Make in India. 1956 की औद्योगिकनीति : 1991 की नईऔद्योगिकनीतिऔर उस मेंपरिवर्तन, औद्योगिकरणमें सार्वजनिक क्षेत्र की भूमिका, मध्यप्रदेश की औद्योगिकनीति, लघु एवंकुटीरउद्योगों की अवधारणा, भारतीय अर्थव्यवस्थामेंलघुउद्योगों की समस्याएंऔरसंभावनाएं।स्टार्ट अप इण्डिया एवंमेकइन इण्डिया ।
Unit-4	Infrastructure for Indian Economy: Power, Transportation and Communication. India's foreign Trade:- composition and direction, Balance of Payment, Role of Foreign Direct Investment and multinational corporation. भारतीय अर्थव्यवस्थाहेतुआधारभूतसंरचना– शक्ति, परिवहनऔरसंचार।भारतवर्ष का विदेशी व्यापार–संरचनाऔरदिशा।भुगतानसंतुलन, प्रत्यक्ष विदेशीनिवेश की भूमिका एवंबहुराष्ट्रीयनिगम ।
Unit-5	Planning in India:- objectives, strategy, achievements and failure, NITI Ayog, Problems of Indian Economy-Poverty, Unemployment, Inflation and Black Money. भारतवर्षमेंनियोजनः उद्देश्य, व्यूहरचना, सफलताएं एवंविफलताएं, नीति (NITI)आयोग, भारतीय अर्थव्यवस्था की समस्याएं–निर्धनता, बेरोजगारी, मुद्रास्फीति एवंकाला धन ।

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Syllabus recommended by Board of studies of Economics
Session 2018-19 To 2020-21

Class	:	B.A.
Year	:	II
Subject	:	Economics
Title of Subject Group	:	Macro Economics
Paper	:	I
Course Code	:	AT- A41(A)
Max. Marks	:	40+ 10 C.C.E

Course Outcomes

CO1- Concept of macro economic, national income
CO2- Classical theory of employment, Modern theory of Keynesian employment.
CO3- investment function, theory of liquidity preference
CO4- Quantity theory of money, inflation, Deflation
CO5- CBI and its functions, monetary policy, commercial bank and credit creation, black money

Unit-1	Concept of Macro Economics, Interrelation between Micro and Macro Economics, Macro variable – Stock and Flow, Circular flow of income Concept of National Income, Gross National Product (G.N.P.) and Gross Domestic Product (G.D.P.) National Income Accounting, National Income and Economic Welfare. समष्टिअर्थशास्त्र की अवधारणा–समष्टिऔरव्यष्टिअर्थशास्त्र के मध्य अंर्तसंबंध ।समष्टिचर–स्टॉकऔरप्रवाह ।आय का चक्रीय प्रवाहराष्ट्रीय आय, सकलराष्ट्रीय उत्पाद (जी. एन. पी.) औरसकल घरेलूउत्पाद (जी. डी. पी.) की अवधारण ।राष्ट्रीय आय लेखांकन ।राष्ट्रीय आय औरआर्थिककल्याण ।
Unit-2	Classical theory of Employment, Keynesian theory of Employment Aggregate Demand Function and Aggregate Supply Function, Effectives Demand, Propensity to consume, save and invest, Principles of Multiplier and Acelerator. रोजगार का प्रतिष्ठितसिद्वांतकिन्स का रोजगारसिद्वांत–समग्रमांगफलनऔरसमग्रपूर्तिफलनप्रभावपूर्णमांग । उपभोग, बचतऔरनिवेशप्रवृत्ति, गुणांकऔरत्वरक के सिद्वांत ।
Unit-3	Investment Function and Marginal Efficiency of Capital (MEC), Factors Affecting Capital Formation Concept of Accelerator, keynesian Theory of Liquidity Preference, Liquidity Trap. निवेशफलन एवंपूंजी की सीमांत क्षमता (एम.ई.सी.) निवेशफलनकोप्रभावितकरनेवालेतत्व, कीन्स का तरलतापसंदगी का सिद्वातऔरतरलताजाल, बट्टे की दर ।
Unit-4	Money :- Meaning and Functions, Stock of Money and its measures – M1, M2, M3, M4, Quantity Theory of Money – Cash Transaction and Cash Balance Approach, Inflation, Deflation and Recession – Definition, causes and effects of various segments of economy. मुद्रा–अर्थऔरकार्यमुद्रा का स्टॉकऔरउसकेमापन- एम1, एम2, एम3, एम4, मुद्रा के परिमाण सिद्वांत–नकदव्यवहारऔरनकद शेषसिद्वांत । मुद्रास्फीति, मुद्रासंकुचनऔरमंदी–परिभाषा, कारणऔरअर्थव्यवस्था के विभिन्नवर्गोपरप्रभाव।

Unit-5	Bank – Meaning and types, Central Bank and its functions with special reference to Reserve Bank of India, Credit Control – Qualitative and Quantitative Methods,objectives and limitations of Monetary Policy, Functions of Commercial Banks, Process of credit creation. MUDRA and Jan DhanYojana. बैंक–अर्थऔरप्रकार, केन्दीय बैंकऔरउसकेकार्य (रिजर्व बैंकऑफइंडिया के विशेषसंदर्भ मे) साख नियंत्रण –गुणात्मकऔरपरिमाणात्मकविधियां, मौद्रिकनीति के उद्देश्य औरसीमाएं, व्यापारिकबैंक के कार्य, साख निर्माण की प्रक्रिया । मुद्राबाजारएवंजन धन योजना ।

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Class	:	B.A.
Year	:	II
Subject	:	Economics
Title of Subject Group	:	Public Finance and International Economics.
Paper	:	II
Course Code	:	AT-A(41) B
Max. Marks	:	40+ 10 CCE

Course Outcomes

CO1- Public finance : Nature and scope, GST
CO2- Budget, deficit Budget, fiscal policy, central – state financial relation(with constitution of 15th finance commission)
CO3- International trade, economic development and its theories
CO4- Term of trade, WTO, balance of trade and balance of payment
CO5- foreign trade in india (trends and direction) Exchange rate, Export- Import policy ofindia

Unit-1	Public Finance – Meaning, Nature and Scope. Public, Private and Merit goods, Principal of Maximum Social Advantage, Sources of Revenue, Tax Revenue and Non Tax Revenue, Kinds of Taxes-Direct and Indirect. Goods and Services Tax (G.S.T.) Taxable Capacity in India. सार्वजनिकवित्त–अर्थ, प्रकृति, और क्षेत्र, सार्वजनिक, निजीऔरउत्कृष्ट वस्तुऐं, अधिकतम सामाजिकलाभ का सिद्धांत, आगम के स्त्रोत–करआगम एवंगैरकरआगम, करों के प्रकार–प्रत्यक्ष औरअप्रत्यक्ष, वस्तु एवंसेवाकर (जी. एस. टी.) भारतवर्षमेंकरदान क्षमता।
Unit-2	Budget – Definition and Preparation, Fiscal Deficit, Fiscal Policy, Deficit Finance, Central – State Financial Relation, Recommendations of Latest FinanceCommission. बजट–परिभाषाऔरनिर्माण, राजकोषीय घाटा, राजकोषीय नीति, हीनार्थप्रबंधनकेन्द्र–राज्य वित्तीय संबंध, नवीनतमवित्तआयोग की अनुशंसाऐं ।
Unit-3	Meaning and importance of International Economics, Intra and International Trade, importance of International Trade in Economic Development. Theories of International Trade : Absolute and Comparative Advantage, Factor endowment : Heckscher – Ohlin. अंतर्राष्ट्रीय अर्थशास्त्र का अर्थऔरमहत्व, अंर्तऔरअंतर्राष्ट्रीय व्यापार, आर्थिकविकासमें अंतर्राष्ट्रीयव्यापार का महत्व, अंतर्राष्ट्रीय व्यापार के सिद्धांत, निरपेक्ष औरतुलनात्मकलाभ, साधनप्रचुरताहेक्शचरओहलिन ।
Unit-4	Terms of Trade -Concepts and Types, Tariff and Non Tariff in InternationalTrade.World Trade Organization (W.T.O.) Objectives and its functions. Balance of Trade. Concept and Types, Compositions and Structure of Balance of Trade (B.O.T.), and its relationship with Balance of Payment, Methods of Correction of Imbalance of Payment, International Capital Movement. व्यापार की शर्ते, संकल्पनाऔरप्रकार, अंतर्राष्ट्रीय व्यापार की प्रशुल्कऔरगैरप्रशुल्क बाधाएंविश्वव्यापारसंगठन ;ज्द्ध उद्देश्य औरकार्य, भुगतान शेष–संकल्पनाऔरप्रकार, व्यापार शेष की संरचनाऔर घटकतथाभुगतानसंतुलन के साथसंबंध, भुगतानअसंतुलन मे ंसुधार के तरीके, अंतर्राष्ट्रीय पूंजीप्रवाह ।

Unit-5	Trends and directions of India's foreign trade, Exchange rate.Theories of Exchange Rate, Mint Par Parity Theory, Purchasing Power Parity Theory.Concept of Appreciation and Depreciation of Currency and its effects on Foreign Trade. भारतीय विदेशीव्यापार की प्रवृत्ति एवंदिशा, विनिमय दरः विनिमय दर के सिद्धांत–टकसालीदरसमतासिद्धांत, क्रय शक्तिसमतासिद्धांत, मुद्रा का अवमूल्यन एवंअधिमूल्यन एवंविदेशीव्यापारपरप्रभाव ।

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Session 2019-20,2020-21

Class	:	B.A
Year	:	III
Subject	:	Economics
Title of Subject Group	:	Development and Environment Economics.
Paper	:	I
Course Code	:	AT-A46 (A)
Max. Marks	:	40+10CCE

Course Outcomes

CO1- Economic Growth & Development: Concept & Determinants.
CO2- Theory of Development: Adam Smith, Marxian, Schumpeterian, Rostow's & HR Development
CO3- Balanced and Unbalanced Growth, Harrod and Domar Model,
CO4- Gender Equality, Techniques of Development
CO5- Environment Economy Linkage and population Environment Linkage

Unit-1	Economic Growth and Development – Concept, Characteristics of Developing Countries, Factors of Economic Development and Growth – Capital, Physical and Human Recourses, Research & Development and Technology. आर्थिकवृद्वि औरविकास–अवधारणा, विकासशीलदेशों की विशेषताएं, आर्थिकवृद्वि और विकास के तत्व–पूँजी, भौतिकऔरमानवसंसाधन, अनुसंधानऔरविकास एवंतकनीक ।
Unit-2	Theories of Economic Development – Adam Smith, Karl Marx and Schumpeter, Rostow's Stages of Economic Growth, Investment Criteria of Economic Development, Human Resource Development. आर्थिकविकास के सिद्वांत– एडम स्मिथ, कार्लमार्क्स, शुम्पीटर । रोस्टोव की आर्थिक विकास की अवस्थाएं । आर्थिकविकास के निवेशमापदंड । मानवसंसाधनविकास ।
Unit-3	Balanced vs. Unbalanced Growth – Theories of Big Push (Rodan), A.Lewis, Herschman, Leibenstein, Gunnar Myrdal, and Harrod-Domar, Kuzenets Model. संतुलित बनाम असंतुलितविकास–बड़े धक्के का सिद्वांत (रोडान), ए. लुईस, हर्षमैन, लीबिसटीन, गुन्नारमिर्डल, हैरोड–डोमर, कुजनेट्समॉडल ।
Unit-4	Economic Development and Gender Equality Gender Development Index (GDI) Women Empowerment, Choice of Techniques of Development-Capital Intensive and Labour Intensive Techniques Human Development Index. आर्थिकविकासऔरलिंगसमानता ।महिलासशक्तिकरण, लैंगिकविकाससूचकांक (GDI) विकास की तकनीक का चुनाव–पूजीप्रधान एवं श्रम प्रधानतकनीके । मानव विकाससूचकांक ।

Unit-5	Environment Economics – Concepts, Components and Factors affecting Environments, Environment – Economy Linkage, Population – Environment linkage, Market Failure for Environment Goods. Concept of Sustainable Development, Valuation of Environmental Damages: Land, Water, Air, and Forest, Prevention and Control. Prevention of Pollution.Renewable and non-Renewable Resources, Green Index - Concept. पर्यावरणअर्थशास्त्र –अवधारणा, घटक एवंपर्यावरणकोप्रभावितकरनेवालेकारकअर्थव्यस्था–जनसंख्या अंर्तसंबंध, जनसंख्या–पर्यावरण, अंर्तसंबंध बाजारविफलता के रूपमें पर्यावरणीय वस्तु । धारणीय विकास की अवधारणा, पर्यावरणीय क्षति का आंकलन–भूमि,जल, वायुऔरवन । पर्यावरणप्रदूषणनिवारणऔररोकथाम । पुररूत्पादनीय एवंगैरपुनरूत्पादनीय संसाधन, हरितसूचकांक की अवधारणा ।

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Syllabus recommended by Board of studies of Economics
Session 2019-20,2020-21

Class	:	BA
Year	:	III
Subject	:	Economics
Title of Subject Group	:	Statistics
Paper	:	II
Course Code	:	AT –A(46) B
Max. Marks	:	40+ 10 CCE

Course Outcomes

CO1- Statistics: Nature Scope& Limitations
CO2- Measure of Central Tendency &Dispersian
CO3- Correlation, Regression Analysis
CO4- Analysis of Time Series, Index
CO5- Probability Theory, Hypothesis, Research Report Writing

Unit-1	Meaning and Definition of Statistics, Nature and Scope, Functions, Importance and Limitations of Statistics. Universe and Sample, Techniques of Data Collection, Classification, Tabulation, Graphic Representation of Data, Frequency Distribution, Cumulative Frequency. सांख्यिकी का अर्थ एवंपरिभाषा, प्रकृति, एवं क्षेत्र, सांख्यिकी के कार्य, महत्व एवंसीमाएं, समग्र एवंन्यादर्श, समंक संकलन की विधियां, वर्गीकरण, सारणीयन, समंकोंकाबिंदुरेखीय प्रदर्शन, आवृतिवितरण, संचयीआवृति ।
Unit-2	Measures of Central Tendency: Mean, Median, Mode, Geometric Mean and Harmonic Mean. Measures of Dispersion ;- Range, Quartile Deviation. Mean Deviation, Standard Deviation, Coefficient of Variation. केन्द्रीय प्रवृत्ति के मापन–माध्य, माध्यिका, बहुलक, यामितीय माध्य, हरात्मक माध्य, अपकिरण के मापन–विस्तार, चतुर्थकविचलन, माध्य विचलन, प्रमापविचलन, विचलन गुणांक ।
Unit-3	Correlation – Kari Pearson's co-efficient of Correlation, Spearmen's. Rank difference, Regression Analysis, Regression Equation, Co-efficient of Regression. Use of Regression and Correlation Analysis. सहसंबंध –कार्लपियरसन का सहसंबंध गुणांक, स्पियरमेन का कोटिअंतरसहसंबंध गुणांक, प्रतीपगमनविश्लेषण, प्रतीपगमनसमीकरण, प्रतीपगमनगुणांक, प्रतीपगमन एवं सहसंबंध का उपयोग ।
Unit-4	Time Series Analysis, Concept and Component, Additive and Multiplicative Model, Index Numbers- Concept Type, Importance Problems In The Construction of Index Number and their limitations. Laspaire's. Passche's and Fisher's Index Numbers. कालमाला का विश्लेषण, संकल्पना एवं घटक, योगात्मक एवंगुणात्मकप्रादर्श, सूचकांक की अवधारणा, प्रकार, महत्वसूचकांकनिर्माण की समस्याएं एवंसीमाएंलैस्पियर, पाश्चे, एवंफिशर का सूचकांक ।

Unit-5	Probability: Concept, Rules of Probability, Conditional Probability, Research-Concept and Types, Selection of Research Problems, Hypothesis-Concept and Types, Research Report Writing. प्रायिकता : अवधारणा, प्रायिकता के नियम, सशर्तप्रायिकता, अनुसंधानअवधारणा एवं प्रकार, अनुसंधानचयन की समस्या।परिकल्पना–अवधारणा एव प्रकार, अनुसंधानप्रतिवेदन लेखन ।

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Syllabus recommended by Board of studies of English
Session 2017-18 To 2020-21

Class	:	B.A
Year	:	I
Subject	:	English Literature
Paper	:	I
Title of Paper	:	Poetry
Compulsory / Optional	:	Compulsory
Course Code	:	AT-A32(A)
Max. Marks	:	40

Course Outcomes

CO1- Recognize poetry from various literary periods and understand and appreciate poetry as a literary art form.

CO2- Analyze the various elements of poetry, such as diction, tone, form, genre, imagery, figures of speech, symbolism, theme, rhythm,rhyme etc.

CO3- Identify variety of forms of poetry such as satire, epic,lyric and different schools of poetry as Romantic and Metaphysical and study works of the authors associated with these literary forms.

CO4- Develop creativity and critical thinking among the students and enhance their writing skills.

Unit-1	Poetry and Its Forms
Unit-2	William Shakespear : Sonnet No. 3, Look in Thy Glass Sonnet No. 26, Lord of My Love Sonnet No. 18, Shall I Compare Thee to a Summerr's Day Sonnet No. 116, Let Me Not to the Marriage of true Minds John Milton: On His Blindness : On His Having Arrived at the Age of 23
Unit-3	John Donne : Good Morrow, Love's Alchemy John Dryden : Absalom and Actitophel(Lines 1-50) Alexander Pope : Ode to Solitude
Unit-4	Thomas Gray : Elegy Written in a Country Churchyard. William Collins : In the Downhill of Life Oliver Goldsmith : Memory
Unit-5	William Blake : Tyger Tyger, The Garden of Love , A Divine Image P.B.Shelly : Ode to the West Wind Jhon Keats : Ode to a NIghtingale

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Class	:	B.A
Year	:	I
Subject	:	English Literature
Paper	:	II
Title of Paper	:	Prose
Compulsory / Optional	:	Compulsory
Course Code	:	AT-A32(B)
Max. Marks	:	40

Course Outcomes

CO1- Recognize poetry from various literary periods and understand and appreciate poetry as a literary art form.

CO2- Analyze the various elements of poetry, such as diction, tone, form, genre, imagery, figures of speech, symbolism, theme, rhythm,rhyme etc.

CO3- Identify variety of forms of poetry such as satire, epic,lyric and different schools of poetry as Romantic and Metaphysical and study works of the authors associated with these literary forms.

CO4- Develop creativity and critical thinking among the students and enhance their writing skills.

Unit-I	Prose and Its Forms
Unit-II	France bacon : Of studies, Of travel, Of Love, Of Revenge
Unit-III	Joseph Addison : Sir Roger at Church, Sir Roger at Home, The Spectator's Account of Himself, The Adventure Of A Shilling
Unit-IV	Charles Lamb:- A Bachlor's Complaint of the Behaviour of Married People,All Fools' Day E.V.Lucas : On Finding Things, Unbirthday and other presents.
Unit-V	A.G. Gardiner : On Saying Please H.G. Wells : The Stolen Bacillus

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Class	:	B.A
Year	:	II
Subject	:	English Literature
Paper	:	I
Title of Paper	:	Drama
Compulsory / Optional	:	Compulsory
Course Code	:	AT-A38(A)
Max. Marks	:	40

Course Outcomes

CO1 Interpret literary texts in English by nurturing and utilizing their ability to understand drama in a skilled, knowledgeable, and ethical manner.

CO2 Conceptualize various types of drama viz. Tragedy, Comedy, Farce, Melodrama,

CO3 Gain knowledge in the development of English drama from 16th Century to 21st century i.e., Shakespearean drama, Romantic Comedy, Shavian plays and One-act plays.

CO4 Understand the structure of a play and learn the dramatic devices used in writing a play and become well acquainted with the rhetorical aspect of Drama, historical contexts and psycho-social aspects.

CO5 The Scheme of examination and the allotment of marks shall be as under: -

Unit-I	Drama and Its Forms	
Unit-II	William Shakespeare	: The Merchant of Venice. : A Midsummer Night's Dream
Unit-III	Oliver Goldsmith Richard Sheridan	: The Vicar of Wakefield : The Rivals
Unit-IV	John Glasworthy : strife G.B. Shaw	: Arms and the Man
Unit-V	J.M. Synge W.B. Yeats	: Riders to the Sea : Purgatory

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Class	:	B.A
Year	:	II
Subject	:	English Literature
Paper	:	II
Title of Paper	:	Fiction
Compulsory / Optional	:	Compulsory
Course Code	:	AT-A38(B)
Max. Marks	:	40

Course Outcomes

CO1- Become well acquainted with the literary genre of Novel and Short Story and literary devices of allegory and metaphor, satire, and stream of consciousness technique.

CO2- Conceptualize the Genre of Novel and gain knowledge in the development of English Fiction from the 17th Century to the 21st century.

CO3- Enhance Reading skills and understand how to represent their experience and ideas critically, creatively, and persuasively through the medium of language.

CO4- Understand the social, historical and political backgrounds of the world of the novelists and short story writers.

CO5- Get a wide exposure of eminent writers, their unique styles of writing and imagination to help the students enhance their creative writing skills.

Unit-I	Fiction and Its Forms Aspects of the Novel
Unit-II	Jane Austen : Pride and Prejudice John Bunyan : The Pilgrim's Progress
Unit-III	Charles Dickens : A Tale of Two Cities Thomas Hardy : The Return of the Native
Unit-IV	George Orwell : Nineteen Eight-Four Virginia Woolf : Mrs. Dalloway
Unit-V	Somerset Maugham : OF Human Bondage Issac Asimov: Fantastic Voyage

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Class	:	B.A
Year	:	III
Subject	:	English Literature
Paper	:	I
Title of Paper	:	Contemporary Literature
Compulsory / Optional	:	Compulsory
Course Code	:	AT-A43(A)
Max. Marks	:	40

Course Outcomes

CO1- Broadens the origin of English education during British Empire in India and highlights the glory of Indian Writings in English through the works of J. L. Nehru, Mahatma Gandhi, Amartya Sen, R.K. Narayan , Jhumpa Lahiri etc.

CO2- Ignites the minds to compare the glory of Indian writings with other writings through the study of American, British poets ,dramatists , Indian poets and dramatists and other modern poets viz. Philip Larkin,SylviaPlath,T.S. Eliot,AsifCurrimbhoy,Ruskin Bond etc.

CO3- Inculcate interests to focus on contemporary literature and deepens the knowledge of contemporary world culture.

Unit-I	T.S.Eliot W.B. Yeats	: :	The Hollow Man, Ash Wednesday Fragments, Prayer for My Daughter
Unit-II	Philip Larkin Sylvia Plath	: :	Night Mail, Autum Song Daddy, A Better Resurrection
Unit-III	R.N. Tagore Tennesse Williams	: :	Kabuliwala Cat on a Hot Tin Roof
Unit-IV	APJ Abdul Kalam Amartya Sen	: :	‘‘Patriotism beyond Politics and Religion and Religion’‘ from The Ignited Minds(Penguine Books) ‘Tagore and His India’ from The Argumentative India byAmartya Sen (Penguine Books)
Unit-V	Ruskin Bond R.K. Narayan	: :	The Room on the Roof An Astrologer’s Day

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Class	:	B.A
Year	:	III
Subject	:	English Literature
Paper	:	II
Title of Paper	:	Indian Writing in English
Compulsory / Optional	:	Compulsory
Course Code	:	AT-A43(B)
Max. Marks	:	40

Course Outcomes

CO1- Enhances aesthetic sense – admiring the beauty of life and literature.

CO2- Inculcate the essence of the other regional literature of India in Englishtranslation and Indian Literature in English through the works of R. N.Tagore, Girish Karnad, Khushwant Singh, M.R.Anand,SarojiniNaidu,Sri Aurobindo etc

CO3- Enhance Reading skills and understand how to represent their experience and ideas critically,creatively, and persuasively through the medium of language.

Unit-I	History of Indian Writing in English (M.K. Naik)
Unit-II	**Poetry** R.N.Tagore : The First two Songs of Geetanjali Sarojini Naidu : Krishna, A Love Song from the North, An Indian Love Song
Unit-III	**Prose:** M.K. Gandhi : National Education J.L. Nehru : Will and Testament
Unit-IV	**Drama:** Girish Karnad : Tughlaq Asif Currimbhoy: Goa
Unit-V	**Fiction** M.R. Anand : A Pair of Moustache Khushwant Singh : The Mark of Vishnu

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Session 2017-18 To 2020-21

Class	:	B.A.
Subject	:	हिन्दीसाहित्य
Year	:	I
Paper	:	I
Title of Paper	:	प्राचीन एवं मध्यकालीनकाव्य
Max. Marks	:	40 मुख्य परीक्षा, 10 आंतरिकपरीक्षा
Course Code	:	AT-A31(A)

पाठ्यक्रम के परिणाम

CO1- प्राचीन युग की कार्यप्रवृत्तियों से विद्यार्थियों का परिचितकराना।

CO2- मध्यकालीनकाव्य की पृष्ठ भूमि का विद्यार्थियोंकोबोध कराना।

CO3- मध्ययुगीनकाव्य की प्रासंगिकता एवंकृतियों के माध्यम से साहित्य के शिल्पऔरसौंदर्य से अवगत करानां।

CO4- काव्य का विधाओं का सामान्य परिचय एवंप्रस्तुतिकौशल का परिचय कराना।

CO5- प्राचीन एवं मध्यकालीनकाव्य के माध्यम से काव्य के प्रति रूचिजाग्रतकरना।

Unit -1	कबीर, सूरदास, तुलसीदास, बिहारी, घनानन्द, भूषण–निर्धारितअंशो से व्याख्या
Unit -2	भक्तिकाल एवंरीतिकाल की पृष्ठभूमि, प्रमुख प्रवृत्तियां, धाराएं एवंविशेषताएं
Unit -3	कबीर, सूरऔरतुलसीपरसमीक्षात्मकप्रश्न
Unit -4	बिहारी, घनानन्दऔरभूषणपरसमीक्षात्मकप्रश्न
Unit -5	द्रुतपाठ के कवि–अमीर खुसरो, विद्यापति, जायसी, मीरा , रसखान, केशव, पद्माकर (व्यक्तित्व एवंकृतित्व)
Note:	द्रुतपाठ के कवियोंपरलघुउत्तरीय प्रश्नपूछेजायेंगे।

पाठ्यांश

1. कबीरदास–सम्पादक–डॉ. श्यामसुन्दरदास–काशीनागरी प्रचारिणी सभा, काशी
गुरूदेवको अंग, विरहको अंग, ग्यानविरहको अंग, प्रत्येक से प्रारंभिक 5–5 साखी एवंप्रारंभिक 5 पद

2. सूरदास–सम्पादक–डॉ. धीरेन्द्रवर्मा
उद्धव संदेश–कुल 15 पद –क्रमसंख्या 9,10,15, 21, 22, 26, 27, 29,52, 53, 62, 82, 95, 101, 120

3 तुलसीदास–(प्रकाशक –गीतागोरखपुर)
विनय पत्रिका एवंकवितावली से प्रारंभिक 5–5 पद
अयोध्या काण्ड (रामचरितमानस) दोहाक्रमांक 117 से 121 तक

4 बिहारी–बिहाररत्नाकर–सम्पादक–जगन्नाथदासरत्नाकरः (भक्ति, नीति, प्रकृति, श्रृंगार, विरह, के 5–5 दोहे) दोहासंख्या – 1, 5, 6, 7, 8, 11, 14, 16, 18, 19, 21, 25, 28, 31, 32, 35, 37, 38, 41, 51, = कुल 20 दोहे

5. घनानन्द– सं. डॉ. रामचंद्रतिवारी एवंडॉ. रामेश्वर त्रिपाठी, विश्वविद्यालय प्रकाशन, वाराणसी, (15 सैवाये) 2, 3, 4, 6, 8, 9, 10, 11, 12, 14, 15, 17, 19, 20, 22 त्र कुल 15 पद

6. भूषण–रीतिकाव्यधारा– सं. डॉ. रामचद्रतिवारी एवंरामेश्वर त्रिपाठीविश्वविद्यालय प्रकाशन,

वराणसी–चयनित 14 कवित्त
वन्दना–1, 2,
शिवाजीप्रशस्ति– 9, 10, 11, 12, 15, 17, 20,
छत्रसालप्रशस्ति– 22, 23, 26, 32, 34,
द्रुतपाठ–

(1) अमीर खुसरो
(2) विद्यापाति
(3) जायसी
(4) मीरा
(5) रसखान
(6) केशव
(7) पद्माकर

प्रश्नपत्र कीपद्धतिशासन के मान्य स्वरूप के अनुसारहोगी । अंको का विभाजनभी शासन के मान्य स्वरूप के अनुसारहोगा।

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Class	:	B.A.
Subject	:	हिन्दीसाहित्य
Year	:	I
Paper	:	II
Title of Paper	:	हिन्दीकथासाहित्य
Max. Marks	:	40मुख्य परीक्षा, 10आंतरिकपरीक्षा
Course Code	:	AT-A31(B)

पाठ्यक्रम के परिणाम

CO1- विद्यार्थियोंकोहिन्दीसाहित्य के इतिहास की लेखनपरंपरा से परिचय, कालविभाजन, नाम करण एवं युगीन पृष्ठभूमि से परीचय कराना।

CO2- हिन्दी के प्रतिनिधि कहानीकारों एवं उनके जीवन मूल्यों से परिचय कराना।

CO3- हिन्दीसाहित्य का विकासक्रम एवं युगजीवन का संबंध।

CO4- आधुनिक युग के साहित्य की प्रवृत्तियों से परिचय।

CO5- गबनउपन्यास के माध्यम से छात्रोंकोप्रेमचन्द युगीनपरिस्थितियों से परिचय कराना।

Unit -1	गबन–प्रेमचन्दअथवाआपकाबंटी–मन्नूभंडारी निर्धारितउपन्यासो एवंकहानियों सेव्याख्या
Unit -2	हिन्दीउपन्यास एवंकहानी का उद्‌भव, विकास एवंप्रवृत्तियॉ
Unit -3	''गबन'' अथवा ''आपकाबंटी'' परसमीक्षात्मकप्रश्न
Unit -4	निर्धारितकहानियोंपरसमीक्षात्मकप्रश्न
Unit -5	द्रुतपाठ–अमृतलालनागर, यशपाल, धर्मवीरभारती, कृष्णासोबती, मालतीजोशी, मीनाक्षीस्वामी
Note:	द्रुतपाठ के कहानीकारोपरलघुउत्तरीय प्रश्नपूछेजाएंगे ।

1 उपन्यासः–

गबन–प्रेमचंदअथवाआपकाबंटी–मन्नूभंडारी

नोट :–महाविद्यालय मेंगबनउपन्यासपढ़ायाजाऐगा।

2 हिन्दीकथासाहित्य :–

(1) गुण्डा– जयशंकरप्रसार
(2) कफन–प्रेमचंद
(3) अपना–अपनाभाग्य –जैनेन्द्रकुमार
(4) तीसरीकसमउर्फमारेगयेगुलफाम–फणीशवरनाथ रेणू
(5) चीफ की दावत–भीष्मसाहनी
(6) दोपहर का भोजन–अमरकांत
(7) रीछ–दूधनाथ सिंह
(8) ढाईबीघाजमीन–मृदुलासिन्हा

द्रुतपाठ–अमृतलालनागर, यशपाल, धर्मवारीभारती, कृष्णासोबती, मालतीजोशीतथामीनाक्षीस्वामी

प्रश्नपत्र की पध्दत्ति शासन के मान्य स्वरूप के अनुसारहोगी।अंको का विभाजनभी शासन के मान्य स्वरूप के अनुसारहोगा । द्रुतपाठ के कहानीकारोंपरलघुउत्तरीय प्रश्नपूछेजावेंगे।

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Class	:	B.A.
Subject	:	हिन्दीसाहित्य
Year	:	II
Paper	:	I
Title of Paper	:	अर्वाचीनहिन्दीकाव्य
Max. Marks	:	40मुख्य परीक्षा, 10आंतरिकपरीक्षा
Course Code	:	AT-A37(A)

पाठ्यक्रम के परिणाम

CO1- साहित्य की परिभाषाओं अध्ययन।
CO2- साहित्य की विविध विधाओं का तत्वोगत अध्ययन।
CO3- काव्य हेतुकाव्य प्रयोजनों का ज्ञानकराना।
CO4- काव्य के तत्वोंकाव्य के भेद शब्द शक्ति, छंद एवंअलंकारों का सहोदाहरणपरिचय।
CO5- रस के स्वरूप अंग एवंभेदों का विवेयन एंवआलोचनादृष्टि का विकास।

Unit- 1	निर्धारितकवि : मैथिलीशरणगुप्त, जयशंकरप्रसाद, निराला, माखनलालचतुर्वेदी,महादेवीवर्माअज्ञेय तथामुक्तिबोध की रचनाओं से तीनव्याख्यांश मैथिलीशरणगुप्तः • सखि वे मुझसे कहकरजाते (यशोधरा से) • दोनोंओरप्रेमपलताहै (साकेत से) जयशंकरप्रसादः ➢ बीतीविभावरीजागरी ➢ शेर सिंह का शस्त्र समर्पण सूर्यकान्त त्रिपाठीनिरालाः 3. जगोफिर एकबार 4. तोडतीपत्थर माखनलालचतुर्वेदीः 1. कैदीऔरकोकिला 2. हमकिरीटिनी महादेवीवर्माः 1. मैनीरभरीदुख की बदली 2. बीन भीहूँमैतुम्हारीरागिनीभीहूँ स.ही.वा. अज्ञेयः 1. कलगीबाजरे की 2. बावराअहेरी मुक्तिबोधः 1. सहर्षस्वीकाराहै
Unit- 2	मैथिलीशरणगुप्त, जयशंकरप्रसाद एवंनिराला से एक समीक्षात्मकप्रश्न
Unit- 3	माखनलालचतुर्वेदी, महादेवीवर्मा, अज्ञेय एवंमुक्तिबोध से एक समीक्षात्मकप्रश्न
Unit- 4	आधुनिक युग की काव्य प्रवृत्तियॉः भारतेन्दु युग, राष्ट्रीय काव्यधारा, छायावादऔर छायावादोत्तरकाव्य प्रगतिवाद एवंनईकविता।
Unit- 5	द्रुतपाठ–भारतेन्दुहरिशचंद्र, भवानीप्रसादमिश्र, रधुवीरसहाय, श्रीनरेशमेहताऔरदुष्यन्तकुमार

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Class	:	B.A.
Subject	:	हिन्दीसाहित्य
Year	:	II
Paper	:	II
Title of Paper	:	हिन्दीभाषा–साहित्य का इतिहासऔरकाव्यांगविवेचन
Max. Marks	:	40मुख्य परीक्षा, 10आंतरिकपरीक्षा
Course Code	:	AT-A37(B)

पाठ्यक्रम के परिणाम

CO1- साहित्य की परिभाषाओं का ज्ञानकराना।
CO2- साहित्य की विविध विधाओं का तत्वोगत अध्ययन।
CO3- काव्य हेतुकाव्य प्रयोजनों का ज्ञानकराना।
CO4- काव्य के तत्वोंकाव्य के भेद शब्द शक्ति, छंद एवंअलंकारों का सहोदाहरणपरिचय।
CO5 -रस के स्वरूप अंग एवंभेदों का विवेयन एंवआलोचनादृष्टि का विकास।

UNIT-1	हिन्दीभाषा की उत्पत्ति, हिन्दी कीमूलाकारभाषाये, विभिन्नभाषाओं का विकास । हिन्दीभाषा के विविध रूप–बोलचाल की भाषा, राष्ट्र भाषा, राज भाषा, संपर्क भाषा।
UNIT-2	तत्समऔरतदभव का अंतर, हिन्दी का शब्द स्त्रोत–तत्सम, तदभव, देशज एवंविदेशी शब्दावली । तत्सम, तदभवदेशज एवेंविदेशी शब्दावली का वाक्योंमेंप्रयोग ।हिन्दी के व्याकरणाचार्य–कामताप्रसादगुरू एवंकिशोरीदासबाजपेयी का भाषिकअवदान। डॉ0 हरदेवबाहरी ।
UNIT-3	हिन्दीसाहित्य का इतिहासलेखन एवंकालविभाजनः आदिकालपूर्वमध्यकाल (भक्तिकाल) उत्तर मध्यकाल (रीतिकाल) की प्रवृत्तियॉ ।
UNIT-4	आधुनिकहिन्दी ग साहित्य का विकास :–भारतेंदु युग, द्विवेदी युग, छायावाद युगीननाटक एवं गद्य साहित्य ।
UNIT-5	काव्यांगविवेचन–रसऔरउसकेभेद प्रमुख छंद दोहा, सोरठाचौपाई, रोलाऔरहरिगीतिका ।प्रमुख अलंकार–अनुप्रास, यमक, श्लेष, वक्रोक्ति, पुनुरूक्तिप्रकाश, उपमा, रूपक,उत्प्रेक्षा, भ्रांतिमानऔरसंदेह ।
Note:	**सभीइकाईयों से दीर्घउत्तरीय, लधुउत्तरीय व वस्तुपरकप्रश्नपूछेजायेंगें**

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Subject	:	हिन्दीसाहित्य
Year	:	III
Paper	:	I
Title of Paper	:	प्रयोजनमूलकहिन्दी
Max. Marks	:	40मुख्य परीक्षा, 10आंतरिकपरीक्षा
Course Code	:	AT-A42(A)

पाठ्यक्रम के परिणाम

CO1- तकनिकी शब्दावली से परिचय।
CO2- वैज्ञानिककार्यालयीनवाणिज्य विज्ञापनमीडियाविधिककानून एवंहिन्दी की पारिभाषिक शब्दावली से परिचय।
CO3- पत्राचारकार्यालयीनपत्र एवंव्यवसायिकपत्र प्रारूपण संक्षेपणपल्लवनआदि से परिचय।
CO4- हिन्दीपत्रकारिताइलेक्ट्रॉनिकमीडियापृष्ठ सज्जाप्रस्तुतिकरण एवं लखन से परिचय।
CO5- प्रमुख संचार माध्यमों से परिचय।

न्दपज.१	प्रयोजनमूलकहिन्दी एवंभाषाकम्प्यूटिंग : आशय एवंस्वरूप, कामकाजीहिन्दी से तात्पर्य एवंविविध रूप । कम्प्यूटर : परिचय एवं रूपरेखा, वर्डप्रोसेसिंग (एम. एस. वर्ड), डाटाप्रोसेसिंग, यूनिकोड, हिन्दी के अधुनातनसॉफ्टवेयनटूल ।
न्दपज.२	पत्राचारः कार्यालयीनपत्र एवंव्यावसाहियकपत्र । प्रारूपण, टिप्पण, संक्षेपण, पल्लवर ।
न्दपज.३	अनुवादः स्वरूप एवंप्रक्रिया । अनुवाद के प्रकार–कार्यालयीन, वैज्ञानिक, तकनीकी, वाणिज्यिक, विधिक, आशुअनुवाद । हिन्दी की पारिभाषिक शब्दावली ।
न्दपज.४	पत्रकारिताः स्वरूप एवंसमाचारलेखन । प्रिंटमीडिया, इलेक्ट्रॉनिकमीडिया,पृष्ठ–सज्जा एवंप्रस्तुतीकरण, पटकथालेखन एवंफीचरलेखन ।
न्दपज.५	प्रमुख संचार माध्यम–रेडियो, टी. वी., फिल्म, विडियोतथाइंटरनेट । संचार माध्यमों की लेखनप्रविधि, ई–मेल ।

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Class : B.A.
Subject : हिन्दीसाहित्य
Year : III
Paper : II
Title of Paper : हिन्दीनाटक, निबंध तथास्फुट गद्य–विधाएँ एवंबुंदेली भाषा–साहित्य
Max. Marks : 40मुख्य परीक्षा, 10आंतरिकपरीक्षा
Course Code : AT-A42(B)

पाठ्यक्रम के परिणाम

CO1- नाटकनिबंध एवंबुंदेलीभाषासाहित्य के तत्वों का आकलन एवंउसकाआस्वादन।
CO2- नाटकनिबंध की समिक्षण क्षमता का विकास एवंबुन्देलीसाहित्य से परिचयं।
CO3- बुन्देलीभाषासाहित्य की प्रासंगिकता एवंकृतियों के माध्यम से साहित्य के शिल्पऔरसौन्दर्य से परिचय
CO4- काव्य विधाओं का सामान्य परिचय एवंप्रस्तुतिकौशल का परिचय।
CO5- विभिन्नरचनाकारों की रचनाओं का आकलन एवंआस्वादन।

Unit- 1	व्याख्यांशः क. नाटक– भारतदुर्दशा (भारतेन्दु) अथावस्कन्दगुप्त (जयशंकर प्रसाद) अथवाआषाढ़ का एकदिन (मोहन राकेश) **निबंध–** कविताक्याहै (पं.रामचन्द्र शुक्ल), कुटज (हजारीप्रसाद द्विवेदी), संवत्सर (अज्ञेय), उत्तराफाल्गुनी के आसपास (कुबेंरनाथ राय) **ख. बुन्देलीभाषा–साहित्य** ईसुरी, जगनिक', माधव शुक्ल 'मनोज' एवंसंतोष सिंह बुन्देला की निर्धारितरचनाओं से व्याख्या।
Unit- 2	भारतदुर्दशाअथवास्कन्दगुप्तअथवाआषाढ़ का एकदिन एवं निर्धारितनिबंधों से आलोचनात्मकप्रश्न।
Unit- 3	नाट्क एवं एकांकी का इतिहास एवंप्रवृत्तियाँ।हिन्दी गद्य विधाओं का उद्भवऔरविकास। (निबंध, रेखाचित्र, संस्मरण, आत्मकथा, यात्रा वृत्तान्त)
Unit- 4	पठितकवियोंपरआलोचनात्कमप्रश्न**बुंदेलीभाषा**औरउसकीउपबोलियों का परिचय, इतिहासतथासीमा क्षेत्र ।
Unit- 5	**द्रुतपाठ**– (क) नाटककार–लक्ष्मीनारायण मिश्र, डॉ. लक्ष्मी नारायण लाल, धर्मवीरभारती, निबंधकार–बाबूगुलाबराय, रेखाचित्रकार–महादेवीवर्मा, परकेन्द्रितलघुउत्तरीय प्रश्न। (ख) गोरेलाल, गंगाधरव्यास, पं०भैयालालव्यास एवंडॉ०दुर्गेशदीक्षितपरकेन्द्रितलघुउत्तरीय प्रश्न।

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Class	:	B.B.A.
Year	:	I
Subject	:	PRINCIPLES OF MANAGEMENT
Paper	:	I
Course Code	:	BB-A11
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Student will be able to assess the global context for planning, coordination, and monitoring managerial behavior.

CO2- Through various planning and decision- making techniques, students can learn about how businesses ensure to remain in a competitive market.

CO3- Students will understand various forms of organizational structures and their importance.

CO4- Students can learn about carious strategies used by businesses to maintain and improve employee efficiency.

CO5 Students will be able to understand how organizations use different leadership styles to stay competitive.

Unit-1	Definition and Meaning of Management, Functions and Responsibilities of Management, Role of manager, Principles of Management. School & Thoughts of Management, Functional Areas of Management,: Production & Operations Management, HRM, Financial Management & Marketing Management.
Unit-2	Planning: Process, types and Significance, Planning vs Forecastiong, Objective, strategies and Policies, MBO. Decision making: Process & Significance.
Unit-3	Organizing : Nature and Purpose of Organizing. Importance and process of Organizing Departmentation. Organizational structures and design: types and relevance. Line and Sstaff relationship.
Unit-4	Direction: Principle & Techniques, Motivation: Types & Significance, Maslow's Need Hierchy, Theory X & Y of Motivation: Leadership: Styles and mportance.
Unit-5	Controlling: The system and process of controlling, Control techniques. Co-ordination: Meaning, Principles and importance. External and Internal Co-ordination. An overview of Strategic Management, SWOT Analysis & BCG Matrix. Strategies Alternative –Choice & Evaluation.

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Class	:	B.B.A.
Year	:	I
Subject	:	Communication Skills
Paper	:	II
Course Code	:	BB-A12
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1 Imagination, Ethical Theory and Skills to Interact, Students can learn how to do this ethically and effectively.

CO2 Student can learn and practice group communication skills. They will learn how to respond in discussions, interviews, conferences.

CO3 Students can learn nonverbal communication, listening and organizational culture.

CO4 Students can be equipped with knowledge of professional communication through the basic principles of writing professional papers and other documents.

Unit-1	Definition and Process of Communication. Essentials of Effective Communication. Barries to Communication. Role of Communication IN Organization Effectiveness.
Unit-2	Publix Speech- Com Position, Principle, Speech Delivering Skills. Group Dicussion Do's and Don'ts of GD's Communication in Committee, Seminars and Conference.
Unit-3	Non Verbal Communication Meaning, types and Importance.Listening: Difference between : Listening and Hearing.
Unit-4	Drafting of Notices, Agendas, Minutes, Job Application Letters Preparation of Curricular Vitae.
Unit-5	Business Correspondence Essentials Of Effective Business Correspondence. Structure of Business Letter Types of Business Letter- Enquiry Reply Orders Complaints Circular Letter.

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Syllabus recommended by Board of studies of Management
Session 2017-18

Class	:	B.B.A.
Year	:	I
Subject	:	MICRO ECONOMICS
Paper	:	III
Course Code	:	BB-A13
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1 Student will understand the importance of basic principles of micro economics.
CO2 Students will be able to understand the basics of demand- supply rules and analysis and elasticity. They will also learn how to implement it.
CO3 Utility, apathy analysis and market surplus, students will be able to understand.
CO4 Students will be able to understand production principles, classify costs and incomes.
CO4 Students will be able to understand the comparison of different market systems.
CO5 Students will be able to understand how national income is calculated.

Unit-1	Introduction to economics. Definitions of economics, Nature and Scope of Economics, Significance and Evolution of Micro Economics. Functions of Managerial Economist.
Unit-2	Concept and Law of Demand, Law of Supply, Concept of Market Equilibrium, Elasticity of Demand. Demand Determinants.
Unit-3	Utility Analysis, Marginal Concept of Utility, Indifference curve Analysis: Assumptions, Properties of Indifference curve, Theory of Consumer Surplus.
Unit-4	Elements of Cost. Factors of Production: Theory of Rent, Theory of interest, Theories of Profit.
Unit-5	National Income: Estimates and Analysis (GNP, NNP,GDP,HDI), Methods ofMeasurement of National Income. Types of Market Structure. Perfect vsImperfect Market. Trade Cycles.

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Session 2017-18

Class	:	B.B.A.
Year	:	I
Subject	:	BUSINESS STATISTICS
Paper	:	IV
Course Code	:	BB-A14
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1 Statistical Research Tools will increase student's ability to understand how to perform social researches.
CO2 Student will be equipped with knowledge about analyzing professional reports analyzed.
CO3 Students will learn about Quantization, analysis of performance relationship.

Unit-1	Meaning and Definition of statics, Statistical Investigations, Laws of Statistics, Scope of statistics, Limitations of Statistics.
Unit-2	Collection of Data, Presentation of Data, Frequency distribution, Primary and Secondary data.
Unit-3	Measure of Central Tendencies: Mean, Median, mode, Geometric mean, Harmonic Mean.
Unit-4	Measure of Variation: Standard Deviation, Mean Deviation and Skewness, Time Series Analysis.
Unit-5	Correlation & Regression analysis. Karl Pearson's co-efficient of correlation &Regression. Lines of Regression. Spearman's rank correlation. Index numbers.

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Session 2017-18

Class	:	B.B.A.
Year	:	I
Subject	:	Financial Accounting
Paper	:	V
Course Code	:	BB-A15
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1 Imagination, Ethical Theory and Skills to Interact, Students can learn how to do this ethically and effectively.

CO2 Student can learn and practice group communication skills. They will learn how to respond in discussions, interviews, conferences.

CO3 Students can learn nonverbal communication, listening and organizational culture.

CO4 Students can be equipped with knowledge of professional communication through the basic principles of writing professional papers and other documents.

Unit-1	Accounting and its place in business and relationship with other financial areas, ouble entry system. Book Keeping- Meaning, Advantage, Concepts and Conventions, Management Accounting- Concept, Need, Importance & Scope.
Unit-2	Type of books of accounts and their Preparation. Journal, Ledger, Trial balance, Depreciation.
Unit-3	Preparation of Final Account: Trading Account, Profit & Loss Account, Balancesheet.
Unit-4	Cost Accounting: Records and Processes, Bank Reconciliation Statement, Royalty Account, Accounting record in the book of lease & landlord (when royalty in less than & more minimum rent).
Unit-5	Hire Purchase Accounts: Accounting record in the book of purchase and vendor. Budget and Budgetory Control.

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Session 2017-18

Class	:	B.B.A.
Year	:	I
Subject	:	Business Mathematics
Paper	:	VI
Course Code	:	BB-A16
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1 Students will be able to explain the concept and use equations, Formulae and Mathematical expression and relationship in a verity of contexts.
CO2 Apply the knowledge in Mathematics (Algebra, Matrices, Calculus) in solving business problems .
CO3 Analyse and demonstrate Mathematical Skills required in Mathematically intensive areas in economics and Business.
CO4 Integrate concepts in International Business concepts with funning global trade.

Unit-1	Introduction to Sets. Forms and Types of set. Venn Diagram. Basic Operations on Set. Union and Intersection of Set. Demorgan's Law for two stes
Unit-2	Linear Equations in Two variable. Solution of Linear Equation. Linear Equalities. Solution Set for equalities. Graphical Solution. Quadratic Equations. Root and Coefficient of Quadratic Equations. Relation between Root and Coefficient.
Unit-3	Determinants And Matrix- Definition. Types Basic Operation on Martices. Transpose of Matrix. Determinants. Minors and Co Factor. Adjoint and Inverse of Matrix.
Unit-4	Limits, Continuity And Logarithm, Differential Calculus: Differentiations of Algebraic. Exponential and Logarithm Function (introductory) , Logarithm-Use of logarithmic formulae
Unit-5	Calculus Integral Calculus: Standard formulas on Algebraic. Exponential and Logarithmic integral. Definite and indefinite integral (Introductory). Maxima and minima Functions

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Session 2018-19

Class	:	B.B.A.
Year	:	II
Subject	:	MARKETING MANAGEMENT
Paper	:	VII
Course Code	:	BB-A17
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Identify the marketing process and how it fits into business operations and will be able to communicate marketing information persuasively and accurately in oral, written graphic formats.
CO2- Differentiate between categories of consumer criteria for determining value.
CO3- Recognize how to identify target markets and environments by analyzing demographics and consumer behavior.
CO4- List best practices for responsible marketing and how to manage efforts Synthesize ideas into a business plan for entrepreneurial start-up venture.
CO5- The student will be able to Emphasis on various aspects of service marketing which make it different from goods marketing.

Unit-1	Nature and scope of marketing, Selling V s Marketing, basic concepts and approaches. Marketing management philosophies.
Unit-2	Market segmentation, Marketing Mix, Marketing Environment, Marketing System, Marketing research.
Unit-3	Product classification& products mix, branding and packaging decision, Promotion mix: Advertising, Publicity, Selling Sales Promotion and Public Relations.
Unit-4	Pricing decision, methods of setting prices, pricing strategies product promotion. Consumer Behavior and Decision Making.
Unit-5	Channel of distribution, Factors affecting choice of channel, Types of intermediaries and their roles. Types of Retailing.

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Syllabus recommended by Board of studies of Management
Session 2018-19

Class	:	B.B.A.
Year	:	II
Subject	:	MARKETING RESEARCH
Paper	:	VIII
Course Code	:	BB-A18
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Discuss the scope and managerial importance of market research and its role in the development of marketing strategy.
CO2- Provide a detailed overview of the stages in the market research process.
CO3- Develop research questions and objectives that can be addressed in a research design.
CO4- Develop an appropriate market research design for the clients.
CO5- Mange the data collection process Use contemporary statistical package to calculate and report descriptive statistics from quantitative data Interpret data analysis in the context of the identified business problem.
CO6- Communicate research results in written report and oral presentation formats.

Unit-1	Problem formulation and statement of research, Research process, research design – exploratory research, descriptive research and experimental research design.
Unit-2	Methods of data collection – observational and survey methods. Questionnaire Design attitude measurement techniques.
Unit-3	Administration of surveys, sample design, selecting an appropriate statistical technique. Tabulation and analysis of data, scaling technique.
Unit-4	Concept and Objectives of Marketing research. Advantage and limitations of marketing Research, Problems and precautions in Marketing research.
Unit-5	Types of marketing Research: Consumer Research, products research, sales research and advertising research, Various issue involved and ethics in marketing research.

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Session 2018-19

Class	:	B.B.A.
Year	:	II
Subject	:	FINANCIAL MANAGEMENT
Paper	:	IX
Course Code	:	BB-A19
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Students will have the awareness about the various types of support rendered by the institution to the entrepreneurs.

CO2- The students will be able to do the financial analysis and interpretation of any business concern independently.

CO3- The students will be able to evaluate comparative working capital management policies and their impact on the firm's profitability, liquidity, risk and operating flexibility. They will be also able to design the combination of debt and equity used to finance a firm.

CO4- The students will learn to make decisions regarding the purchase of long-term assets or the start of a business project.

CO5- The students will be able to differentiate between the different models of dividend payout policy and their calculations.

Unit-1	Finance function and its objectives, tools for financial analysis, capitalization, over capitalization analysis, Under capitalization.
Unit-2	Ratio analysis, funds flow and cash flow analysis, Meaning Interpretations of ratio's classification of ratio.
Unit-3	Working capital management, capital structure, source of capital, financial leverage, optimum capital structure, Theories of capital structure, Factors determining the working Capital. Requirement management of working capital.
Unit-4	Capital budgeting, methods investments evaluation, payback period and accounting rate of return, discounted cash flow method and internal rate of return.
Unit-5	Capital structure decision of the firm, dividend payment and valuation of Firms dividend policy of the firm, Determinants of dividend policy & Types of dividend policy

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Session 2018-19

Class	:	B.B.A.
Year	:	II
Subject	:	PROJECT MANAGEMENT
Paper	:	X
Course Code	:	BB-A20
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Students will be competent to understand various concepts of Project Management like a project life cycle, and identify the resources needed for each stage, including involved tools and supplementary materials.

CO2- Students will describe the time needed to successfully complete a project, considering factors such as task dependencies, constraints and task lengths.

CO3- Students will be able to indentify and comprehends information regarding project costs such as estimated cost, variances and profits.

CO4- Students will be able to define project scope considering factors such as customer requirements, internal/external goals and other requirements.

CO5- Demonstrate effective project execution and control techniques resulting in successful projects closure and obtain formal project acceptance.

Unit-1	Generation and Screening of Project idea; Capital Expenditure; Importance & Difficulties.
Unit-2	Market demand & situational analysis; technical analysis; analysis of project risk; social cost benefit analysis.
Unit-3	Multiple projects & constraints; Network Technique for Project management, Project Review & Administrative Aspects.
Unit-4	Project Financing in India; problem of time & cost overrun in public sector enterprises in India.
Unit-5	Assessment of tax burden of various projects, making comparative analysis, Environmental appraisal of projects- Financial & Technical Environment.

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Session 2018-19

Class	:	B.B.A.
Year	:	II
Subject	:	HUMAN RESOURCE MANAMENENT
Paper	:	XI
Course Code	:	BB-A21
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Demonstrate proficiency in fundamental human resources theories and concepts and how they apply to real world situations.
CO2- Formulate human resources policies and practice that help promote the organization's strategic goals.
CO3- Students will understand how organizations link training programs to organizational needs.
CO4- Students will learn how organizations evaluate jobs and design salary structure based on that.
CO5- Develop an understanding of the challenges of human resources management and successfully manage and resolve conflicts.

Unit-1	Concept and functions of Human Resource Management, Structure & Role of Personnel management in an Organization, implementation of Personal policy.
Unit-2	Staffing Policy and process; Management Planning, Job Analysis, Job subscription, Job Specification, recruitment, Selection, Induction, Placement, promotion.
Unit-3	Manpower Training & Development. Employment training and Development, Employee Training, performance Appraisal and Potential Appraisal.
Unit-4	Wage & Salary Administration, ob Evaluation & designing, Salary structure. Compensation Management and Benefits
Unit-5	Industrial disputes and participative Management, Grievance Vs Dispute Grievance Handling Procedure, Disciplinary Action.

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Session 2018-19

Class	:	B.B.A.
Year	:	II
Subject	:	ORGANISATIONAL BEHAVIOUR
Paper	:	XII
Course Code	:	BB-A22
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Compare and contrast theories of organizational behavior. What is organizational behavior and why is it important? This learning outcome breaks down the definition of organizational behavior and introduces you to several theories on management framework, role of managers, skills of managers, and how managers do their jobs.

CO2- Examine the components and theories behind leadership, power, and politics are illustrated positively and negatively.

CO3- Analyze Various Stress management and coping strategies.

CO4- Compare different organizational cultures, examine characteristics of cultures, explore global implications, and examine crating and sustain a positive culture, and assessing the impact of culture on organizational behavior.

Unit-1	Concept of Organizational Behavior, Contributing Disciplines to Organizational Behavior, Background/ Historical perspective and Framework of OB.
Unit-2	Individual Behaviour- perception perceptual selectivity, Perceptual organization, Social Perception and Impression management, Attitude and Values.
Unit-3	Leadership – Concept and Theories of leadership. Qualities of a good leader, Group Dynamics, Group Formation, Nature of groups, Reasons for joining Group Functions of group within organization.
Unit-4	Stress Management – Meaning, Cause, Effect and Coping Strategies for stress.
Unit-5	International Dimensions of Organizational Behavior; Equal Employment opportunities.

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Syllabus recommended by Board of studies of Management
Session 2019-20

Class	:	B.B.A.
Year	:	III
Subject	:	Entrepreneurial Development
Paper	:	XIII
Course Code	:	BB-A23
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Students will be able to understand the significance of entrepreneurship and the role and entrepreneur plays in economic growth of the country.
CO2- Will get acquainted to various programmes for the development of entrepreneurship in Indi.
CO3- Will get insights into what helps an entrepreneur succeed in rural areas.
CO4- Get an understanding of how a business idea is conceptualized and turned into success.
CO5- Will understand the various financial, technical and marketing assistance provided for the establishment and growth of entrepreneurship.

Unit-1	Concept and Nature of Entrepreneurship and SSI. Entrepreneurial Trait, Types and Significance, Role and Importance of entrepreneur in economic growth Government's Policy with regards to SSI and Entreprenuers.
Unit-2	Entrepreneurial Development Programmes in India, History, Support Objectives, Stages of Performance, Entrepreneurial Environment, EDP and their valuation.
Unit-3	Entrepreneurial Behavior and entrepreneurial Motivation, Achievement and management success. Innovation and Entrepreneur. Entrepreneurial Success in Rural Areas and Government policies threof.
Unit-4	Establishing Entrepreneur System, Search for Business Idea, Sources of Ideas, Idea Processing Input requirement.
Unit-5	Sources and Criteria of Financing, Fixed and Working capital assessment, technical assistance, marketing assistances, Sickness of units and remedial assistance.

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Syllabus recommended by Board of studies of Management
Session 2019-20

Class	:	B.B.A.
Year	:	III
Subject	:	MANAGEMETN INFORMATION SYSTEM
Paper	:	XIV
Course Code	:	BB-A24
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- The Student will be able to understand the utility of MIS.
CO2- The Student will be able to implement the process of MIS development
CO3- The student will be able to use MIS for decision – making.
CO4- The student will be able to know about the emerging trends in commuter.
CO5- The Student will be able to design MIS modules.

Unit-1	managerial information system definition basic concepts frame work, major trends in technology application of information technology, Information Theory and Resource Management, ERP, e- Business & e- Governance.
Unit-2	Systems approach to MIS, operating elements of MIS, MIS and decision making, network and Virtual Organizations, knowledge Based Enterprise – Systems & Processes.
Unit-3	MIS structures on the basis of management activity and organizational functional synthesis of MIS structure , Types Flexibility and its and its evaluation , role of MIS, at various levels viz operational, planning and control.
Unit-4	Need of information, levels of information handling, characteristics of information at various control levels advantages of computerization , User involvement
Unit-5	DSS , Data flow diagram, data dictionary, Data Base Management system (DBMS), RDMS and work processing, electronic spread sheet and managerial application. Use of computer in managerial operations.

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Session 2019-20

Class	:	B.B.A.
Year	:	III
Subject	:	BUSINESS ENVITOMENT
Paper	:	XV
Course Code	:	BB-A25
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Understand the concept, significance and changing dimensions for Business Environment
CO2- Identify various types of Business Environment and tools for scanning the Environment.
CO3- Gain insights on role of economic systems, economics planning, government policies, Public sector and development banks, economic reforms and their Impact on business.
CO4- Appreciate the importance and impact of changing laws and regulations on a business firm.
CO5- Gain insight on patent laws, policy on research and development and new technological developments in Business Environment.

Unit-1	Introduction to business environment, classification of business environment , factors affecting business, Role of environment in business, Strategy to change environment.
Unit-2	Economic & Political Environment : Economic Policy –Old & New Economic Policy, Industrial Policy, Role of government in Business, Government – business Interface, PDS, LPG and CPA..
Unit-3	Technological Environment : Introduction, How technology affects business, Technological factors affecting business, ways to adopt technology.
Unit-4	Culture &Business : introduction , Role & effect of culture on business, Social Responsibility of business organization.
Unit-5	Global Business Environment : Global market, Strategies for going Global, Pro's &Con's of Global Markets, EXIM Procedures, FTAs, FDI, FII, JV and Global marketing Strategies.

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Session 2019-20

Class	:	B.B.A.
Year	:	III
Subject	:	Business Laws
Paper	:	XVI
Course Code	:	BB-A26
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Describe business law in the global context.
CO2- Describe current law, rules and regulations related to settling business disputes.
CO3- Knowledge and understanding of substantive and procedural law.
CO4- Legal analysis and reasoning, legal research, Problem – solving, professional skills and written and oral communication in the legal context.
CO5- Explain basic principles of law that apply to business and business transactions.

Unit-1	Contract act: Essentials of a valid contract, capacity to contract (Contracts minor), free consent, unlawful and void agreements, Discharge of contract remedies for breach of contract.
Unit-2	Bailment & Pledge, Agency, Law of consumer Protection Consumer and Consumer Disputes, Consumer Protection councils, Consumer Disputes Redressal Agencies.
Unit-3	Company: Formatin of a company, Prospectus, Memorandum and articles of association share capital and share holders, Meeting and Resolution, Directors.
Unit-4	Law of sales of Goods : Conditions and Warranties, Transfer of property & title, performance of the contract, Rights of an unpaid seller and suits for breach of contract.
Unit-5	Negotiable instruments Act 1881 Nature & their types, FEMA.

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Session 2019-20

Class	:	B.B.A.
Year	:	III
Subject	:	Consumer Behaviour
Paper	:	XVII
Course Code	:	BB-A27
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Be able to identify the dynamics of human behavior and the basic factors that influence the consumers decision process.

CO2- Be able to demonstrate how concepts may be applied to marketing strategy.

CO3- Be able to demonstrate how concepts may be applied to marketing strategy.

CO4- Be able to seek global opportunities in marketing.

Unit-1	Introduction to consumer Behavior, Concept, Scope and their application s Information search process, Evaluative Criteria and Decision Rules, Building Customer satisfaction.
Unit-2	Consumer Decision making Process, Four views of Consumer decision rules :- Economic man, Passive man, Emotional man, Cognitive man, Models of Consumer Decision making, Nicosia Model.
Unit-3	Consumer Motivation, needs and goals, Positive and negative Motivation, Dynamic nature of Motivation, Consumer Perception, Conceptual Frame Work.
Unit-4	consumer attitude and change, Influence of personality and self concept on buying behavior, Diffusion of Innovations, Diffusion Process, The adoption process.
Unit-5	Reference group influence, profile of consumer's opinion leadershipIndustrial buying behavior, CRM and Consumer Protection .

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Session 2019-20

Class	:	B.B.A.
Year	:	III
Subject	:	ADVERTISING MANAGEMENT AND SALES
Paper	:	XVIII
Course Code	:	BB-A28
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Be able to understand concepts of advertising and the basic factors that influence the marketer's decision.
CO2- Be able to demonstrate how concepts my be applied to marketing strategy.
CO3- Be able to seek global opportunities in advertising.

Unit-1	Definition, objectives, Functions and classification of advertisement, Advertising s a component of marketing mix. Advertising as a marketing communication process, Use of marketing for stimulating primary and secondary demand.
Unit-2	Advertising Vs other forms of mass communication, Communication mix, DAGMAR approach, Determination of target audience, building of advertisingprogramme – Message, Headlines, Copy, Logo, Illustration, Appeal, Layout.
Unit-3	Media Planning – Media characteristics, Media Selection, Media Scheduling. Social and economic relevance of advertising, ethics and truth in Advertising.
Unit-4	Sales promotion – Meaning and Importance of sales promotion, Objective and strategies for sales promotion, Consumer oriented sales promotion, Trade rienting coupons, Deals, Premiums, Contest etc.
Unit-5	Trade oriented sales promotion - Allowance and Discount, Training distributors, Sales force contest and reward.

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Syllabus recommended by Board of studies of Management
Session 2019-20

Class	:	B.B.A.
Year	:	III
Subject	:	Elective B Finance – Working Capital
Paper	:	XIX
Course Code	:	BB- A29
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Analysis of the corporate policy in financing.

CO2- Understanding the change in working capital and what should be course of action by the Finance Manager!

CO3- Practical problems of cash managements and how to resolve them

CO4- Techniques problems of cash management and how to resolve them.

CO5- The importance of control on inventories for cost control and the different measures adopted by industries and business.

Unit-1	Working Capital Management: Concepts of working capital and its determinates, Risk-returns trade off.
Unit-2	Case Management and Marketable Securities, Cash Planning.
Unit-3	Credit Management, Optimum Credit Policy, Recent Trends in Credit Market in India.
Unit-4	Inventory Management: Need and Objectives of Inventory Management, Inventory Management Techniques, Selective Inventory Control.

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Session 2019-20

Class	:	B.B.A.
Year	:	III
Subject	:	Elective B Finance – Corporate Taxation
Paper	:	XX
Course Code	:	BB-A30
Max Marks	:	40
Internal Marks	:	10

Course Outcomes

CO1- Students will be able to describe how the provisions in the corporate tax laws can be used in tax planning.

CO2- Students will be able to identify the difference between tax evasion and tax planning.

CO3- They will be able to state the use of deductions of expenses to reduce the taxable income.

Unit-1	Basic concepts of Income Tax , Computation of Income under different heads of income, Deduction of Tax at source.
Unit-2	Company's Tax Management, Rationale of Company taxation, Residential status of company, set off and carry forward of Losses, Advance payment of tax.
Unit-3	Tax Planning: Concepts, Significance and problem of Planning, Distinction between tax avoidance and tax evasion, Division of Income Claiming , Maximum deduction, Rebates, Relieves and Restoring Tax free incomes.
Unit-4	Tax Administration: Filing of returns, Self Assessment of Tax, Default and Penalties, Conceptual Framework of GST, Effects of GST Government Initiatives and Emerging Trends.
Unit-5	Tax Consideration in respect of special managerial Decisions. Make or Buy, Own of Lease, Closes or Continue, Export of Domestic Sales return or Replace Tax Planning in respect of Managerial Remuneration.

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Syllabus recommended by Board of studies of Commerce
Session 2017-18, 2018-19, 2019-20, 2020-21

Class	:	B.Com.
Year	:	I
Subject	:	Accounting
Paper	:	I
Title of Subject	:	Financial Accounting
Compulsory / Optional	:	Compulsory Paper I
Course Code	:	CM-A27(A)
Max. Marks	:	40

Course Outcomes

CO1- Knowledge of accounting concept, conventions and basic accounting. Study about journal and its sub division and primary accounting system.

CO2- Detail study about accounting standard, clear concept of Department, Branch and precaution Account.

CO3- Student will get knowledge about overall accounting including Non profit organizations.

CO4- practical question related to join venture account and investment account.

CO5- detailed study about partnership accounting and its amalgamation.

Unit – I	Concept of Double Entry System, Accounting Concepts and Conventions Preparation of Journal, Sub Division of Journal, Preparation of Ledger and Trail Balance. Final Accounts with Adjustments, Revenue Recognition. द्वि –प्रविष्टिप्रणाली की अवधारणा, लेखांकन की अवधारणाएं एवंपरम्पराएंजर्नलतैयारकरना, जर्नल का उपविभाजन, खाताबही एवंतलपट का निर्माण, अंतिम खातेसमायोजनसहित, राजस्वमान्यता ।
Unit – II	Introduction to Indian Accounting Standards, Detail Study of accounting standard – 6 and 10, Branch Accounts, Departmental Account, भारतीय लेखा मानकों का परिचय, लेखा मानक 6 एवं 10 का विस्तृत अध्ययन, शाखा लेखे, विभागीय लेखे।
Unit – III	Royalty Accounts, Accounting of Non Profit Making Organization. अधिकार शुल्क खाते, गैरलाभकारीसंस्थाओं के खाते
Unit – IV	Joint Venture Accounts, Consignment and Investment Account. संयुक्तउपक्रम खाते, प्रेषण खाते एवंविनियोग खाते ।
Unit – V	Partnership Accounts – Dissolution with Insolvency of Partner, Amalgamation of Parnership Firms, Conversion of Partnership Firm into Joint Stock company. साझेदारी खाते, साझेदार के दिवालिया से संबंधितविघटन, साझेदारीफर्मो का एकीकरण, साझेदारीफर्म का सुयक्तस्कन्ध प्रमण्डलमेंपरिवर्तन ।

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Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Commerce
Session 2017-18, 2018-19, 2019-20

Class	:	B.Com.
Year	:	I
Subject	:	Accounting
Paper	:	II
Title of Subject	:	Business Mathematics
Compulsory / Optional	:	Compulsory
Course Code	:	CM-A27(B)
Max. Marks	:	40

Course Outcomes

CO1- Students will be able to understand the basic concepts of mathematics and knowledge about ratio, percentage and commission

CO2- study about equation, types of calculation.

CO3- students get knowledge about matrices.

CO4- practical question related to logarithms and anti-logarithms, and simple & compound interest.

CO5- student study about simple average and statistical averages.

Unit – I	Ratio – Gaining and Sacrificing Ratio, Proportion, Percentage, Commission, Discount and Brokrage. अनुपात–प्राप्ति व त्यागअनुपात, समानुपात, प्रतिशत, कमीशन, बटटा एवंदलाली ।
Unit – II	Simultaneous Equations – Meaning, Characteristic Types and Calculations, Preparation of Invoice. युगपद् समीकरण–अर्थ, विशेषताऐंप्रकार एवंगणनाये, बीजक का निर्माण ।
Unit – III	Elementary Matrices – Definition and Calculations, Types of Matrices. प्रारम्भिकआव्यूह–परिभाषा एवंगणनायेंआव्यूह के प्रकार ।
Unit – IV	Logarithms and Antilogarithms – Principles and Calculations, Simple and Compound Interest. लधुगणक एवंप्रतिलधुगणक–सिद्वांत एवंगणनाएं । साधारण एवंचक्रवृद्वि ब्याज ।
Unit – V	Averages – Simple, Weighted and Statistical Averages Arithmetic mean, Harmonic mean, Geometric mean. Profit and Loss. औसत–सामान्य, भारित एवंसांख्यिकीय औसत–अंकगणितीय माध्य, हरात्मक माध्य औरज्यामितीय माध्य, लाभ एवंहानि ।

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Class	:	B.Com.
Year	:	I
Subject	:	Management Group
Paper	:	II
Title of Subject	:	Business Organization and Communication
Compulsory / Optional	:	Compulsory
Course Code	:	CM-A28(B)
Max. Marks	:	40

Course Outcomes

CO1- Understanding of the main working aspects of org. not only from an economic point of view but also considering org. as part of society.
CO2- Detailed study about company organization its terminology. knowledge about MNC's corporation .
CO3- Students will be able to communicate effectively orally and in writing.
CO4- Students will get knowledge about different methods of communication.¬
CO5- Students will be able to understand and apply Knowledge of modern means of communication and, language processes as they occur across various contexts.

Unit – I	BussinessOrganization :Defination, Concept, Characteristics, Objectives, Significance, Components, Functions, Bussiness, ethics, Social responsibilities of Bussiness, Promotions of Bussiness: Meaning, Functions, Stages, of Promotions, Forms of Bussiness Organization: Detailed Study of Sole Proprietorship and Partnership. व्यावसायिकसंगठन : परिभाषा, अवधारणा, विशेषताएंउद्देश्य, औचित्य घटक एवंकार्यव्यावसाय मेंनैतिकमूल्य, व्यावसाय का सामाजिकउत्तरदायित्व । व्यावसाय का प्रवर्तनकीअवस्थाएं । व्यावसाय संगठन के प्रकार : एकांकीस्वामित्व एवंसाझेदारी का विस्तृत अध्ययन ।
Unit – II	Company Organization : Meaning, Defination, Formatyion of Private and Public Company, merits and Demerits, types of Companies Cooperative Organization – Need, Meaning Significance and its Merits-Demerits, Public Enterprises-Concept, Meaning, Characteristics, Obectives and Significance, Multinational, Corporations, (MNC'S)-An Introduction in India. कम्पनी का संगठनअर्थ, परिभाषा, निजी एवंसार्वजनिककम्पनी का निर्माणगुण–दोष, कम्पनी के प्रकार । सहकारीसंगठन–आवश्यकता, अर्थ, विशेषताएंउद्देश्य एवंमहत्व । भारतमेंबहुराष्ट्रीय निगम–एक परिचय ।
Unit – III	Communication – Introducation, Defination, Nature, Objectd, Importance of Communication to Manager, Elements of Communication, Feedback, Dimension and Directions of Communication, Means of Communication – Verbal Communication SWOC Analysis. सम्प्रेषण–परिचय, परिभाषा, प्रकृतिउद्देश्य प्रबंधको के लिए सम्प्रेषण का महत्व, सम्प्रेषण के महत्वप्रतिपृष्टि । सम्प्रेषण के आयामऔरदिशाएं, सम्प्रेषणस्वॉकविश्लेषण ।

Unit – IV	Non-Verbal Communication, Boby Language, Paralanguage, Sign language, Visual and Audio Communication, Channel of Communication, Barriers in Communication, Writen Business Communication – Concept, Advantages, Disadvantages, Importance. Need and kinds of business Letters, Essentials if and Effective Bussiness Letter. अशाब्दिकसंप्रेषण, दैहिकभाषा, पार्श्वभाषा, संकेतभाषा, संप्रेषण दृश्य एवं श्रव्य संप्रेषण, संप्रेषण की श्रंखलाएँ, संप्रेषण की बाधाएँ । लिखितव्यायसायिकसंप्रेषण–अवधारणा, लाभ, हानियांमहत्व । व्यावसायिकपत्रों की आवयश्यकता एवंप्रकार, प्रभावीव्यावसायिकपत्र की विशेषताएँ ।
Unit – V	Modern forms of communication – Fax, Emails, Video Conferencing International Communication fopr Global Bussiness, Group Bussiness, Group Communication Network. Preparation of Bussiness survey Report, Preparation of Business Survey Report. संप्रेषण के आधुनिकस्वरूपफैक्स, ई–मेल, दृश्य परिचर्चा । भूमण्डलीय व्यावसाय के लिए अर्न्तर्राष्ट्रीय संप्रेषण, समूहसंप्रेषणनेटवर्क, व्यावसायिकसंप्रेषणप्रतिवेदनतैयारकरना, व्यवसायिकसर्वेक्षणप्रतिवेदनतैयारकरना।

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Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2017-18

Class	:	B.COM.
Year	:	I
Subject	:	Computer Science & Application
Title of Subject Group	:	FundamentalsofComputerandPCSoftware
Max. Marks	:	40
Course Code	:	CM- A30 (A)

Course Outcome

CO1- Introduction to the basics of computer, input, output devices, types of hardware and software.
CO2- Practical implementation and usage of PC packages.
CO3- Effective learning of E-Commerce, MIS, decision making and planning.
CO4- Understandthedynamicsofan officeenvironment.
CO5- Demonstratetheabilitytoapply application software in an office environment

Unit-1	**IntroductiontoComputerSystem:B**lockdiagram**,c**omponents:motherboard,processor,main memory, cachememory, hard disk. Inputdevices,Outputdevices,Externalstoragedevices:floppydisk,CDROM,DVD,USB drives. Typesofsoftware:Systemsoftware,Applicationsoftware. System software: Operating system. Utility programs: anti-virus, disk cleaning, defragmentation,compressionand decompression offiles. Applicationsoftware:examplesofcommercialsoftwarewithbriefintroduction. Programming Languages: Low-level Language, Assembly Language, Middle Level Languageand High Level Language, Compiler, Interpreter, Assembler, Difference between Compiler &Interpreter.
Unit-2	**Operating system:**Definition**,** Functions of operating system, CUI, GUI, types of operatingsystemslikeSingleuser,Multi-user,Realtime,TimesharingandBatchprocessing,Multiprocessing, Multiprogramming, Multitasking, Distributed processing. Elementary idea ofvariouscommon operating system prevalent roundthe world. **MS Windows**: An introduction and its features, desktop, taskbar, files and folders start menuoperations,mycomputer,networkneighborhood,recycle-bin,windowsexplorer,creating,copying,moving anddeletingfiles,settingwallpaper,changingthemousepointer,paint,notepad, understanding the OLE features.
Unit-3	**Introduction to MS-Word**: Advantages of word processing, Creating, Saving and Editing adocument: Selecting, Deleting, Replacing Text, Copying text to another file.Insert, FormattingTextandParagraph,UsingtheFont,DialogBox,ParagraphFormattingusingBulletsandNumbering in Paragraphs, Use of Smart Art, Checking Spelling, Line spacing, Margins, Spacebefore and after paragraph, Mail merge, customizing the ribbon. **Introductionto MS-Excel:** Enteringinformation:Numbers,Formula,Editing Datainacell,Excel functions, using a Range with SUM, Moving andCopying data,Inserting andDeletingRow and Columns in the worksheet, Using the format Cells Dialog box, Using

	chart wizard tocreateachart. **IntroductiontoMS-PowerPoint**:IntroductiontoPowerPointpresentation,Slideshow,Formatting,creatinga Presentation,insertingSmartArts,AddingObjects,ApplyingTransitions, Animationeffects,Adding Tables, Chartsand Mediafiles.
Unit-4	**Decision Support System**: Importance of Decision support system, limitation, Characteristics ofDSS, Decision Support and Structure of Decisions Making Decision Support and RepetitivenessofDecisions, DSSUsers. **ExpertSystems:**Supportfordecisionmakingphases, SupportfortheIntelligencePhase,Support for the Design Phase, Support for the Choice Phase, Decision Support and AlternativeConceptsof Decision Making. **Management Information System:** Introduction, Role of IT, MIS characteristics and applicationareas,BusinessandTechnologytrends-specialization,managementbymethodology,decentralization,internationalization etc.
Unit-5	**Internet**: Meaning, Definitions, History, Internet protocols, TCP/IP, FTP, HTTP, URL. InternetBrowsers, WWWConsortium,Search engines. IntroductiontoInternetSecurityterminology-networksecurity,firewall,cryptography,password,biometrics, digitalsignature,digitalcertificate. Business applications of internet, e-mail, UseNet, newsgroup, telnet, intranet, extranet,e-ticketing,chatting. **E-Banking and its benefits**: Smart Card, E-cash, Online financial Services Stock trading, E-broking. E-business Model, Do–it–yourself model, Made-to-Order model, Information ServiceModel,Emerging hybridmodels.

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Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2017-18

Class	:	B.COM.
Year	:	I
Subject	:	Computer Science & Application
Title of Subject Group	:	DesktopPublishingandMultimedia
Max. Marks	:	40
Course Code	:	CM- A30 (B)

Course Outcome

C01- Using adobe PageMaker to create various publication.
C02- Introduced with multimedia elements like text, audio, video, animation, graphics.
C03- Create a book and export it into PDF Multipage Layout Design.
C04- Identify the basic components of a multimedia project.
C05- Identify the basic hardware and software requirements for multimedia development and playback.

CourseObjectives:

1. Toreviewthebasicconcepts andfunctionalknowledgein thefieldofcomputerapplication
2. Toexposethe studentstocomputerapplicationinthefieldofBusiness.

Unit-1	Importance and Advantages of DTP, DTP Software and Hardware, Commercial DTP Packages, Page Layout programs, Introduction to Word Processing. Commercial DTP Packages, Difference between DTP Software and Word Processing Software.
Unit-2	Types of Graphics, Uses of Computer Graphics Introduction to Graphics Programs, Font andTypefaces, Types of Fonts, Creation of Fonts (Photographer), Anatomy of Typefaces, Printers,Typesof Printers used inDTP, Plotter, Scanner.
Unit-3	History and Versions of PageMaker, Creating a New Page, Document Setup Dialog Box, PaperSize, Page Orientation, Margins, Different Methods of placing text and graphics in a document.Master Page, Story Editor, Formatting of Text, Indent, Leading, Hyphenation, Spelling Check,CreatingIndex, TextWrap, Position (Superscript/Subscript),Control Palette.
Unit-4	History, Multimedia Elements; Text, Images, Sound, Animation and Video. Text, Concept ofPlainTextandFormattedText,RTF&HTMLText,Image,ImportanceofGraphics inMultimedia, Image Capturing Methods, Scanner, Digital Camera, Sound – Sound and its effectin Multimedia, Analog and Digital Sound, Animation, Basics, Principles and use of Animation.Video,Basics ofVideo,Analog and Digital Video

Unit-5	Features of Multimedia, Overview of Multimedia, Multimedia Software Tools,MultimediaAuthoring – Production and Presentation, Graphic File Formats, MIDI – Overview, Concepts,Structureof MIDI, MIDI Devices, MIDIMessages.

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Syllabus recommended by Board of studies of Commerce
Session 2018-19,2019-20,2020-21

Class	:	B.Com.
Year	:	II
Paper	:	I
Subject	:	Accounting Group
Title of Subject	:	Corporate Accounting
Compulsory / Optional	:	Compulsory
Course Code	:	CM-A32(A)
Max. Marks	:	40

Course Outcomes

CO1- Get basic knowledge about corporate entity.

CO2- Student will understand methods of presentation of profit, managerial remunerationand method of calculation per and post incorporation profit of company.

CO3- Student will study about financial statement foelectricaity company and calculation of goodwill and .

CO4- Get knowledge about types of company and deeply stud about holding and subsidiany companies.

CO5- Detail study about merger accounting standard 14 (about merger and reconstruction of company)

Unit – I	Final Accounts of Companies (Including calculation of managerial Remuneration). Declaration of dividend, Profit and Loss Appropriation Account and disposal of Profits. Calculation of Pre and Post Incorporation Profit/Loss, Accounting for share Capital Transaction Including Bonus option and Buy Back of Shares, Issue and Forfeiture of Shares. कम्पनियां के अंतिमलेखे (प्रबंधकीय परिश्रमिक की गणना सहित) लाभांश की घोषणा । लाभ–हानिनियोजन खाता एवंलाभोंकानिपटारा । समामेलनके पूर्व एवंपश्चात् के लाभ–हानि की गणनाएँ, अंशपूँजीव्यवहारकालेखांकन, बोनसअंशोसहित, अधिकारकर्मचारीस्टॉकबाईबैंक, अंशों के अंतर्गतविकल्प । अंशोकानिर्गमन व हरण ।
Unit – II	Valuation of Goodwill and Shares, Methods of Valuation. Accounts of Public Utility Companies (Electricity Company). ख्यातिऔरअंशोकामूल्यांकन, मूल्यांकन की विधियॉ । सार्वजनिकउपयोगिताकंपनियों के खाते (विघुत कम्पनी) ।
Unit – III	Meaning of Holding and Subsidiary Company, Preparation of Consolidated Balance Sheet of a holding company with one subsidiary company, Accounting of liquidation of companies. सूत्रधारी एवंसहायककम्पनीकाअर्थ । सूत्रधारीकम्पनीकासमेकितचिट्ठातैयारकरना (एक सहायककम्पनी के साथ), कम्पनियों के परिसमापन के लिऐलेखांकन ।

Unit – IV	Accounting for Merger as per AS 14. Internal Reconstruction of a company as per Indian Accounting Standard 14 (Excluding inter company holdings and External reconstruction scheme) लेख मानक 14 के अनुसारकम्पनियोंसम्मिश्रण के लिए लेखांकन । आंतरिकपुनः निर्माण, (अर्तकंपनी सूत्रधारी एवंबाह्य पुनःनिर्माणको छोड़कर)
Unit – V	Accounts of Banking Companies, Accounts of Insurance Companies with claim settlement. बैंकिंगकम्पनियॉ के खातोबीमाकम्पनियों के लेखे–दावा समझौते के साथ

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Class	:	B.Com.
Year	:	II
Paper	:	I
Subject	:	Management Group
Title of Subject	:	Principles of Statistics
Compulsory / Optional	:	Compulsory
Course Code	:	CM-A33(A)
Max. Marks	:	40

Course Outcomes

CO1- Student will be able to Interpret the meaning of calculated Stabiotreal Indicators.
CO2- Student willable to Independently calculated basic statistical parameter.
CO3- This will help students in selecting appropriate statical methods and apply them in analysis of data.
CO4- Get study about correlation and regression.
CO5- Students are able to solve a variety of business related problems using systematic approach involving accepted statistical techniques.

Unit – I	Statistics – Meaning and Definitions, Significance, Scope and Limitations of Statistics. Statistical Investigation. Process of Data Collection, Primary and Secondary Data, Methods of Sampling, Preparation of Questionaire, Classification and Tabulation of Data, Preparation of Statistical Series and its types. सांख्यिकी –आशय, परिभाषा एवंमहत्व, क्षेत्र एवंसीमाये, सांख्यिकीय अनुसंधान । समंक संकलुन की प्रक्रिया, प्राथमिक एवं द्वितीयक समंक, निदर्शन की रीतियॉ, प्रश्नावली की रचना, समंकोकावर्गीकरण एवंसारणीयनसांख्यिकीय श्रेणियों की रचना एवंप्रकार ।
Unit – II	Measurement of Central Tendency – Mean, Median, Quartile, Mode, Geometric Mean and Harmonic Mean. केन्द्रीय प्रवृत्ति की माप–माध्य, मध्यका, चतुर्थक, भूयिष्ठक, गुणोत्तरमाध्य एवंहरात्मकमाध्य ।
Unit – III	Dispersion and Skewness. Analysis of Time Series – Meaning, Importance, Components, Decomposition of Time Series, Measurement of Long Term Trends, Measurement of Cyclical and Irregular Fluctuations.

	अपकिरण एवंविषमता । काल श्रेणी काविश्लेषण–अर्थ, महत्व, संघटक, काल श्रेणी काविघटन, दीर्धकालीनउपनति के माप, चक्रीय व अनियमितउच्चावचनों के माप ।
Unit – IV	Correlation-Meaning, Definitions, Types and Degree of Correlation, Methods of Correlation, Regression Analysis-Meaning, Uses, Difference between Correlation and Regression, Linear Regression, Regression Equations, Calculation of Coefficient of Regression. सहसंबंध –आशय, परिभाषा, प्रकारसहसंबंध कापरिणाम, सहसंबंध की विधियां । प्रतीपगमनविश्लेषण–आशय, उपयोग, सहसंबंध एवंप्रतीपगमनमेंअंतर, रेखीय प्रतीपगमन, प्रतीपगमनसमीकरण, प्रतीपगमनगुणांककापरिकलन ।
Unit – V	Index Number – Meaning, Characteristics, Importance and Uses, Construction of Index Number – Cost of living Index, Fisher's Ideal Index Number. Diagrammatic and Graphic presentation of Data.
	निर्देशक–अर्थ, विशेषताएँ, महत्व एवंउपयोग । निर्देशांको की रचना– जीवन निर्वाहनिर्देशांक, फिशरकाआदर्शसूचकांक । समंकोकाचित्रमय एवंरेखीय प्रदर्शन ।

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Class	:	B.Com.
Year	:	II
Paper	:	II
Subject	:	Management Group
Title of Subject	:	Principles of Management
Compulsory / Optional	:	Compulsory
Course Code	:	CM-A33(B)
Max. Marks	:	40

Course Outcomes

CO1- Explain basic principal and Technique of management.
CO2- Students get knowledge about primary functions of management.
CO3 - To identify and communicate the purpose and functions of management.
CO4- Help to student to determine the most effective action to be taken in specific situations.
CO5- Help integrate management principal in to management practice.

Unit – I	Management – Meaning. Nature and Importance, Functions and Principles of Management, Management V/s Administration. Development of Managerial Thought Contribution by Taylor and Fayal Management by Exceptions and Management by objectives social responsibility of management. प्रबंध –अर्थ, प्रकृति एवंमहत्व, प्रबंध के कार्य एवंसिद्वांत, प्रबंध बनामप्रशासन । प्रबंधकीय विचारधाराकाविकास, टेलर एवंफेयोलका योगदान । अपवाद द्वाराप्रबंध, उद्दश्यों द्वाराप्रबंध । प्रबंध कासामाजिकउत्तरदायित्व ।
Unit – II	Planning – Meaning – Nature & Importance, Elements, Types, Process of Planning, Barriers to Effective Planning. Forecasting – Need & Techniques. Decision Making, Concept and Process, Coordination. नियोजन–अर्थ, प्रकृति एवंमहत्व, तत्व, प्रकार, नियोजन की प्रक्रिया, प्रभावीनियोजन की बाधाऐं । पूर्वानुमान, महत्व एवंतकनीके । निर्णयन–अवधारणा एवंप्रक्रिया, समन्वय
Unit – III	Organizing : Meaning, Importance and Principles, Span of Management, Centralization and Decentralization, Forms of Organization, Staffing: Nature & Scope of Staffing, Manpower Planning, Selection & Training, Performance Appraisal, Delegation of Authority. संगठन–अर्थ, महत्व एवंसिद्वांत, प्रबंध काविस्तार, केन्द्रीयकरण एवंविकेन्द्रीकरण, संगठन के प्रकार, स्टाफिंग–प्रकृति एवं क्षेत्र, मानवसंसाधननियोजन, चयन एवंप्रशिक्षण, निष्पाद, मूल्यांकन, सत्ताकाभार्रापण ।

Unit – IV	Motivation: Concept, Importance Characteristics, Classification of motives Theories of Motivation, Leadership – Concept and Leadership styles, Leadership Theories. अभिप्रेरण–अवधारणा, महत्व, विशेषताऐं, वर्गीकरण, सिद्वांत, नेतृत्व–अवधारणा एवंनेतृत्व शैलियॉ, नेतृत्व के सिद्वांत ।
Unit – V	Direction-Concept, Nature, Importance Process and Methods, Controlling – Concept, Nature, Importance, Process of Controlling. Control Technique. निर्देशक–अवधारणा, प्रकृति, महत्वप्रक्रिया एवंपद्धतियॉ नियंत्रण –अवधारणा, प्रकृति, नियंत्रण प्रक्रिया, नियंत्रण तकनीके ।

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Syllabus recommended by Board of studies of Commerce
Session 2018-19,2019-20,2020-21

Class	:	B.Com.
Year	:	II
Paper	:	II
Subject	:	Applied Economics Group
Title of Subject	:	Banking & Insurance
Compulsory / Optional	:	Optional
Course Code	:	CM-A34(B)
Max. Marks	:	40

Course Outcomes

CO1- Students will be well equipped with the meaning and nature of Banking and Insurance sector of India.

CO2- Students will be able to understand the core functions of Banking and Insurance Company along with their features and legal rules and regular of RBI and IRDAI.

CO3- Student will be able to easily identify and develop the knowledge about the basic process of recruitment and selection used by banking and Insurance.

CO4- Student will have ample knowledge of Banking and Insurance sector and they will also be able to apply for the various advance banking and financial courses available in the country.

Unit – I	Principles of Banking: Definition of Bank, Creation of Money: Present Structure of Commercial Banks in India. Principles of Management in Banks: Managerial Functions in Ban Indian Banking System – Features, Classification of Banking Institutions, Reserve Bank of India – Functions, Control of Credit by RBI, Powers of RBI. बैकिंग के सिद्वांत : बैक की परिभाषा, मुद्राकासृजन, भारतमेंवाणिज्यिकबैंको की वर्तमानसंरचना । बैंकोमेंप्रबंध के सिद्वांत–बैकोमेंप्रबंधकीय कार्य । भारतीय बैकिंगपद्वति–विशेषताएं, बैकिंगसंस्थाओंकावर्गीकरण । रिजव्रबैंकऑफइंडिया–काय्र, रिजर्वबैंक द्वारासाख नियंत्रण, रिजर्वबैंक की शक्तियां ।
Unit – II	Management of Deposits and Advances, Deposit Mobilization, Classification and Nature of Deposit Accounts, Advances, Lending Practice, Types of advances, Investment Management: Nature of Bank Investment, Liquidity and Profitability Cheques, Bills and their Endorsement, Government Securities. Procedure of E-Banking. जमा एवंअग्रिमोंकाप्रबंधन, जमाओं की गतिशीलता, जमा खातोंकावर्गीकरण एवंप्रकृति, अग्रिम, उधारव्यवहार, अग्रिम के प्रकार, बैंकविनियोगप्रबंध –बैंकविनियोग की प्रकृतितरलता एवंलाभदायकता । चैक, बिल एवंउनकापृष्ठांकन । शासकीय प्रतिभूतियां । ई–बैकिंगप्रक्रिया ।

Unit – III	Insurance – Meaning, Need, Types, functions and Principles, IRDA its function and Importance Insurance as Social Security Tool. Insurance and Economic Development. बीमा–अर्थ, आवश्यकता, प्रकारकार्य एवंसिद्वांत । आई . आर . डी ए . –कार्य एवंमहत्वबीमा एक सामाजिकसुरक्षाउपकरण, बीमाऔरआर्थिकविकास ।
Unit – IV	Life Insurance: Introduction, Need, Importance, Elements of Contracts and Life Insurance Contract. Settlement of life Insurance Claims. जीवन बीमा : परिचय, आवश्यकता, महत्व, अनुबंध के सारतत्व एवं जीवन बीमाअनुबंध । जीवन बीमादावोंकानिराकरण ।
Unit – V	Organization of General Insurance Corporation and its Subsidiary Companies and its Functions Settlement of General Insurance Claims. Health Insurance Need Scope & Importance. सामान्य बीमानिगमकासंगठन एवंइसकीसहायककम्पनियां एवं उनके कार्य । सामान्य बीमादायोंकानिपटारा, स्वास्थबीमा–आवश्यकता क्षेत्र एवंमहत्व

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Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2017-18

Class	:	B.COM.
Year	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	Internet and E-Commerce
Max. Marks	:	40
CourseCode	:	CM- A35 (A)

Course Outcome

C01- Fundamental principles of E-Commerce, Tools and services.

C02- Advantages of E-Marketing over traditional marketing.

C03- Internet, Intranet, various tools, protocols and methodologies briefed out.

C04- Analyce of E- Marketing and Additional Marketing.

C05- Tecnology Resource of E- Security, E- Payment System.

Course Objectives:

1. Toreviewthebasic conceptsandfunctionalknowledge inthefield ofcomputerapplication.
2. Toexposethestudentstocomputer applicationinthefieldofBusiness.

Unit – I	Internet: Evolution, Concepts, Growth of Internet, ISP, ISP in India, Types of connectivity, Dial-up, leasedline,DSL,Broadband, RF,VSAT etc.,Methodsof sharingof Internet connection,Use ofproxyserver. Internet Services: USENET, GOPHER, WAIS, ARCHIE and VERONICA, IRC, Concept of SearchEngines, Search engines types, searching the Web, Web Servers, TCP/IP and other main protocols usedon the Web. E-Mail: Concepts of e-mailing, POP and WEB Based E-mail, merits, address, Basics ofSending & Receiving, E-mail Protocols, Mailing List, Free E-mail services, e-mail servers and e-mailclientprograms.
Unit – II	Introduction to E-Commerce: Emergence of the Internet, Commercial use of the Internet, Emergence ofWorld Wide Web, Advantages and Disadvantages of E-Commerce, Transition to E-Commerce in India, E-Commerceopportunitiesfor Industries.
Unit– III	Models: Business Models for E-commerce, Models based on Relationship ot Transaction parties:B2C,B2B,C2C, C2B;Models based on the Relationship of Transaction types, Brokerage Model,AggregatorModel,InfomediaryModel,CommunityModel,ValueChainModel,ManufacturerModel,AdvertisingModel, Subscription Model, Affiliate Model.

Unit–IV	E-Marketing versus Traditional Marketing: Identifying Web Presence Goals, Browsing BehaviorModel ,Online Marketing, E-advertising, Internet Marketing Trends, E-branding and E-Marketingstrategies.
Unit – V	**E-Security**: Information system security, security on the intermit, E-business nagement issues,information security environmentin India. **E-Payment Systems:** Digital payment requirements, Digital Token based e-payment tems, properties ofcash, Electronic riskand e-paymentsystems anddesigning e-paymentsystems. Secure Business, Web store, Online Payment, Internet Banking. Security- E-commerce security issues,Cryptography,DigitalSignature&Authenticationprotocol,DigitalCertificates.Onlin eSecurity,Secure Electronic Transaction (SET)

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Session – 2017-18

Class	:	B.COM.
Year	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	RelationalDatabaseManagementSystem
Max. Marks	:	40
Course Code	:	CM- A35 (B)

Course Outcome

C01- Understand,effectively&explain the underlying concepts of database Technologies.

C02- Designandimplementadatabase schemaforagivenproblem-domain.

C03- Normalizeadatabaseandquerya database using SQL DML/DDL/DCL/TCL/DQL commands.

C04- Declare and enforce integrity constraintson adatabase.

C05- Formulate solution of Data management Problems Using SQL.

CourseObjectives:

1. Toreviewthebasic conceptsandfunctionalknowledge inthefield ofcomputerapplication
2. Toexposethestudentstocomputer application inthefieldofBusiness.

Unit – I	Evolution of Database technology, File-Oriented System, Database System, Client ServerPlatforms. Database System in the Organization: Databases and Data sharing, Strategic database planning,Managementcontrol, Risksand cost of database,Logical and Physicaldatarepresentation.
Unit – II	Database Development Life Cycle(DDLC), Principles of Conceptual Database Design, Objects,Specialization, Generalization, Relationship, Cardinality, Attributes. Relational data model: FundamentalConcepts, Normalization process (INF, 2NF,3NF, BCNF, 4NF), Transforming Conceptual Model to aRelationalModel.
Unit– III	RelationalAlgebra,Relational implementationwithSQL,Introduction,DataDefinitionlanguage(DDL),Data Manipulation Language (DML), Data Control Language (DCL), Transaction ControlLanguage(TCL), Schema and table definition, SQL functions: Mathematical functions, Group functions,Viewdefinition:Introduction, Command tocreate a VIEW.
Unit – IV	Physical, storage media, Disk performance factors Data storage format file organization and addressingmethods implementing, Managing the Data base environment - Database administration and control, DBAfunctions, goals,integrity, securityandrecovery.

Unit – V	Introduction to SQL: Components of SQL, DDL, DML, Query Language, DCL, TCL, SCL etc. Invokingsql• plus.The oracle datatypes twodimensionalmatrixcreation. Insertion, updating, deletion operations, the many faces of SELECT command, creating tables using query,inserting data using query, modifying the structure of tables, renaming tables, dropping tables, droppingcolumns,logicaloperators,rangesearching,patternmatching,useofAlias,OracleFunctions.Accessing data from multiple tables. Set operations: Union, Intersect, Minus. Data Constraints: I/O constraints,Business Rule constraints. Grouping data from tables. Joins: Equi-join, Self-join, Sub-Queries. Views,Sequences, Synonyms, use of save point, ROLLBACK&COMMIT commands, creating user accounts,grantingpermission,revoking permission.

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Session 2019-20,20-21

Class	:	B.Com
Year	:	III
Subject	:	Accounts Group
Paper	:	I
Title of the paper	:	Income Tax Law & Practice
Course Code	:	CM-A37 (A)
Compulsory/Optional	:	Compulsory
Max. Marks	:	40

Course Outcomes

CO1 Understand fundamental concepts of income tax law.
CO2 Knowledge of file IT return on Individual basis.
CO3 Learn about computation of income tax and capital gain in Business and profession.
CO4 Students will study to compute total Income and define tax complicacies and structure.
CO5 Able to understand tax assessment procedure amendments made from time to time in finance Act.

Unit-I	General Introduction of Indian Income Tax Act, 1961, Basic Concepts; Income, Agriculture Income, Casual Income, Previous Year, Assessment Year, Gross Total Income, Total Income, Person Assessee, Residential Status and Tax Liability, Exempted Income. भारतीय आयकरअधिनियम 1961 का सामान्य परिचय, मूलअवधारणाएँ, आय, कृषिआय, आकस्मिकआय, गतवर्ष, कर निर्धारणवर्ष, सकलकुलआय, कुलआय, व्यक्तिकरदाता।निवासस्थान एवंकरदायित्व, करमुक्तआयें।
Unit-2	Income from Salary, Income from house property. वेतन से आय।मकानसंपत्ति से आय।
Unit-3	Income from Business and Profession, Capital Gains, Income from order Sources. व्यापार एवंपेशे से आय, पूंजीलाभ, अन्य साधनों से आय।
Unit-4	Set off and carry forward of losses, Deductions from Gross Total Income, Clubbing in income, Computation of Total Income and Tax Liability of an Individual. हानियों की पूर्ति एवंउसेआगेलेजाना, सकलकुलआय में से की जानेवालीकटौतियॉ, आय का मिलान, व्यष्टि की कुलआय एवंकरदायित्व की गणना।
Unit-5	Assessement Procedure, Tax deduction at Source, Advance Payment of Tax, Income Tax Authorities, Appeal, Revision and Pendalties. कर निर्धारण की विधि, उद्गमस्थानपरकर की कटौती, कर का अग्रिमभुगतान, आयकरपदाधिकारी, अपील, पुनर्विचार व अर्थदण्ड।

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Session 2019-20,20-21

Class	:	B.Com
Year	:	I
Subject	:	Management Group
Paper	:	I
Title of the paper	:	Auditing
Course Code	:	CM-A38(A)
Compulsory/Optional	:	Compulsory
Max. Marks	:	40

Course Outcome

CO1 Detail study of Audit Terminology.
CO2 Have knowledge about audit planning and financial statement analysis.
CO3 Develop an understanding of various Auditing techniques such as vouching, verificationand valuation.
CO4 Working knowledge of auditor's duties, powers and appointment also study types of Audit Report.
CO5 Knowledge about investigation of financial matter related with sole trader, Partnership firm or joint stock company.

Unit 1	Introduction : Meaning and objectives of Auditing, Types of Audit. Audit Programme, Audit books, Working Papers and evidences. Preparation before commencing of Audit. अंकेक्षण का परिचय–अंकेक्षण का अर्थ व उद्देश्य, अंकेक्षण के प्रकार।अंकेक्षणप्रक्रिया–अंकेक्षणकार्यक्रम, अंकेक्षणपुस्तकें, अंकेक्षणसंबंधीकागजपत्र व साक्ष्य, अंकेक्षणप्रारंभकरने के पूर्वतैयारी।
Unit-II	Internal Check System : Routine Checking, Internal Checking, Internal Audit and Test Checking. Internal Control and Audit Procedure. आंतिरकनिरीक्षणप्रणाली–नैत्यकजॉच, आंतरिकपरीक्षण।आंतरिकअंकेक्षण एवंनमूनाजांच, आंतरिकनियंत्रण, अंकेक्षणकार्यविधि।
Unit-III	Vouching, Verification of Assets and Liabilities:- Immovable Property, Fictitious Assets, Current Assets, verification of current and Fixed Liabilities. प्रमाणन, सम्पत्तियों व दायित्वों का सत्यापन–अचनसंपत्तियों, बनावटीसंपत्तियों, चलसंपत्तियोंचन एवंस्थायीदायित्यों का सत्यापन।
Unit-IV	Company Audit : Appointment of auditor, Powers, Duties and Liabilities. Divisible Profits and Dividend. Auditor's report: Cleaned and Qualified report. कंपनीअंकेक्षण–अंकेक्षण की नियुक्ति, अधिकार, कर्त्तव्य व उत्तरदायित्व।विभाज्य लाभ व लाभांश।अंकेक्षकप्रतिवेदन : स्वच्छ व मर्यादितप्रतिवेदन।

Unit-V	Investigation : Objectives, Difference between audit and investigations, Process of Investigation. Special Audit of Banking Companies, Educational, Non Profit Institutions and Insurance Companies. अनुसंधानः उद्देश्य अंकेक्षण व अनुसंधानमेंअंतर, अनुसंधान की प्रकिया।बैंकिंगकंपनियों, शिक्षणसंस्थाओं, अलाभकारीसंस्थाओं एवंबीमाकंपनियों का विशेषअंकेक्षण।

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Session 2019-20,20-21

Class	:	B.Com
Year	:	III
Subject	:	Applied Economics Group
Paper	:	I
Title of the paper	:	Principles of Marketing
Course Code	:	CM-A39(A)
Compulsory/Optional	:	Compulsory
Max. Marks	:	40

Course Outcome

CO1 Use a vocabulary of marketing terms correctly.

CO2 Demonstrate the ability to critically evaluate a marketing program from consumer and marketing practitionerviewpoint, including consideration of ethical implications.

CO3 Communicate clearly, in an organized fashion, the concepts of marketing in both oral and writtenwork.

CO4 Demonstrate an understanding of how marketing fits with the other business disciplines within and organization.

CO5 Student will learn all sale force activities for promotion of product.

Unit-I	Marketing : Introduction, Nature and Scope of Marketing, Importance of Marketing, Marketing Concept: Traditional and modern, Selling V/S Marketing, Marketing Mix, Marketing Environment. विपणनः परिचय, विपणन की प्रकृति एवं क्षेत्र, विपणन का महत्व, विपणनअवधारणापरम्परागत एवंआधुनिक, विक्रय बनाम विपणन, विपणनमिश्रण, विपणनपर्यावरण।
Unit-II	Consumer Behaviour and Marketing Segmentation; Nature, Scope and Significance of consumer behavior, Market Segmentation- Concept and importance. Bases for market segmentation. उपभोक्ताव्यवहार एवंबाजारविभक्तिकरण : उपभोक्ताव्यवहार की प्रकृति, क्षेत्र एवंमहत्वबाजारविभक्तिकरण–अवधारणा एवंमहत्व, बाजारविभक्तिकरण के आधार।
Unit-III	Product: Concept of product, consumer and industrial goods; Product planning and development, Packaging role and functions, Brand name and trade mark; After sales service; Product life cysle concept. उत्पाद : उत्पाद की अवधारणा, उपभोक्ता एवंऔद्योगिकमाल, उत्पादननियोजन एवंविकाससंवेष्ठन–भूमिका एवंकार्य, ब्राण्ड नाम एवंट्रेडमार्क, विक्रय पश्चात् सेवा, उत्पादन जीवन चक्रअवधारणा।

Unit-IV	Price : Importance of price in the marketing Mix, Factors affecting price of a product/service, Discounts and rebates, Distribution Channels and Physical Distribution : Distribution channels-concept and role; Types of distribution channel; Factors affecting choice of a distribution channel; Retailer and wholesaler, Physical distribution of goods; Transportation, Warehousing. कीमतः विपणनमिश्रणमेंकीमत का महत्व, उत्पाद/सेवा की कीमतकोप्रभावितकरनेवालेतत्व, बट्टा एवंछूट, वितरणवाहिकाएं एवंभौतिकवितरणः वितरणवाहिकाएं–अवधारणा एवंभूमिका, वितरणवाहिकाओं के प्रकार, वितरणवाहिकाओं के चयन के निर्धारक घटक, खुदरा/फुटकर एवंथोकव्यापारी, माल का भौतिकवितरण, परिवहन, भण्डारण।
Unit-V	Sale Promotion: Methods of promotion; Optimum Promotion Mix; Advertising media-their relative merits and limitations; Characteristics of an effective advertisement; Personal selling; Selling as a career; qualities of a successful sales person; Functions of salesmen. विक्रय प्रवर्तन : प्रवर्तन की विधियां, अनुकूलतमप्रवर्तनमिश्रण, विज्ञापन के माध्यम, उनके पारस्परिकगुण एवंसीमाऐं, एक प्रभावीविज्ञापन की विशेषताएँ, वैक्तिकविक्रय, जीवन वृत्ति के रूपमेंविक्रय, एक सफलविक्रेता के गुण, विक्रेता के कार्य।

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Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2017-18

Class	:	B.COM.
Year	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	Web Designing
Max. Marks	:	40
Course Code	:	CM- A40 (A)

Course Outcome

C01- Understand Web Design concept.

C02- Complete knowledge about the form controls & their properties.

C03- Cerate external interface using forms.

C04- Explainthehistoryoftheinternet and related internet conceptsthat are vital in understanding webdevelopment.

C05- Discuss the insights of internet programming and implement completeapplicationoverthe web.

Unit-I	Web page overview, Elements of a web page. Types of Sites, personal sites, small business sites, largebusinesssites,onlinebusinesssites,Educationalinstitutionsites,Governmentsites,Blogs,twitter,Matching format to audience, creating guidelines, creating a site structure, writing for the web, downloadtime,methodsforcreatingpages,publishingasite,Addressingawebsite,Absolute&Relativeaddresses,URL. Static anddynamic websites.
Unit-II	Headcontent,addingatitle,Bodycontent,Paragraphbreaks,Linebreaks,Horizontallines,Fontsandtext size, Textcolor, Headings, Aligningtext, Lists,Background color.

Unit-III	About HTML editors, Net beans, Dream Viewer, the editing environment, effective page design, Uniformstyle, finding design ideas, Heading, Lists, using white space, splitting the text, colors and background,creatingpages with Save As.
Unit-IV	Frames and tables, animation effects, creating forms, Images, Image formats for the web, obtainingimages, image size, editing images, thumbnails, images and text, rollover images, Navigation, types of hyperlinks, navigation bars, linking to external sites, email links, creating image maps, image maps inaction, sitemaps,three-click navigation,sitelinkage.
Unit-V	CSS: creating and editing cascading style sheets, adding sound - types of sound files, linking to soundfiles, embedding sound files, Video, Analog video, Digital video, webcams, animation, downloadinganimations,flashPublishing, testing,transferringtotheweb,registeringasite,marketingasite,maintainingasite, Domainnames, web hosting.

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SADHU VASWANI AUTONOMOUS COLLEGE
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2017-18

Class	:	B.COM.
Year	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	Digital Marketing
Max. Marks	:	40
Course Code	:	CM- A40 (B)

Course Outcome

C01. Explain the role and importance of digital marketing in a rapidly changing business landscape.

C02. Understanding Internet, Web Hosting and Web Server.

C03. Understanding Google Analytics Tools.

C04. Discuss the key elements of a digital marketing strategy, and Social Networking Side.

C05. Demonstrate practical skills in common digital marketing tools such as SEO, SEM, Social media, Blogs.

Unit-I	Digitalmarketing,UnderstandingtheMarketingProcess, IncreasingVisibility,Typesofvisibility,Examplesofvisibility,VisitorEngagement, BringingTargetedTraffic,Inbound, Outbound,UnderstandingConversionProcess, Retention,TypesofRetention, PerformanceEvaluation, ToolsNeeded.
Unit-II	UnderstandingInternet,DifferencebetweenInternet&Web,understandingwebsites anddomainnames, extensions,Webserver&webhosting, differenttypesofwebservers,Planningandconceptualizinga website,building websiteusing CMS in Class.
Unit-III	UnderstandingGoogleAnalytics,setupAnalyticsaccount,addAnalyticscodeinawebsite,understanding goals and conversions, setup goals, understanding bounce rate, Difference between bouncerateandexitrate, reduce bouncerate, Monitoringtrafficsources

Unit-IV	Marketing on Social networking websites, viral marketing and its importance, Face book Marketing,TwitterMarketing,LinkedInMarketing,GoogleplusMarketing, VideoMarketing, PinterestMarketing
Unit-V	Introduction to SEO and its importance, Google Ad Words overview, Understanding Ad Words Algorithm,creatingsearchcampaigns,CreatingAds,Trackingperformance/conversion,OptimizingSearchCampaigns,Creating Display Campaign.

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Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Chemistry
Session 2017-18

Class	:	B.Sc.
Year	:	I
Subject	:	Chemistry
Paper	:	I
Title of Subject	:	Physical Chemistry
Course Code	:	SC-A21(A)
Max. Marks	:	29 + CCE 05

Course Outcomes

After completion of this course, the students understand:

CO1 - mathematical concepts in Chemistry wherever needed and various phenomena occurring in the gaseous state, the students can solve and understand mathematical equations wherever needed

CO2 - liquid and solid states that will help in their related topics at higher level

CO3 - rates of reactionsand related topics, thus acquiring practical utility of a chemical reaction **CO4** radioactivity and nuclear chemistry

CO5 - Chemical Equilibrium, which they can apply to check the feasibility of a reaction by applying law of mass action, equilibrium constant and Le Chatelier's principle. Colloidal Solutions and acquire knowledge about various properties of colloids and their applications.

Unit I	**A. Mathematical Concepts:** Logarithmic relations, (rules and types), use of log table and antilog table in calculations, curves sketching, straight line and linear graphs, calculation of slopes, Differentiation of functions like K_x, e^x, x^n, sinx, logx; multiplication and division in differentiation, maxima and minima, partial differentiation, Integration of some useful/relevant functions; Factorials, Probability. **B. GaseousStatesandMolecular Velocities:** Critical phenomenon:PV isothermsofidealgases,Andrew's experiment,continuity ofstate, theisothermsofvander Waals equations, relationship between critical constants andvanderWaalsconstants, Root mean square, average andmostprobablevelocities. Qualitative discussion of the Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter.
	अ. गणितीय अवधारणाएं :लघुगणकीय संबंध (लघुगणक के नियमतथा प्रकार), लघुगणकतालिकातथाप्रतिलघुगणकतालिका का गणनामेंअनुप्रयोग, वक्रआरेखन, सरलरेखा तथारेखीय ग्राफ एवंढाल की गणनाएंK_x, e^x, x^n, sinx, logx;जैसेफलनों का अवकलन, दोफलनों का गुणनफलतथाभाग का अवलकनउच्चतम एवंनिम्नतम, आंशिकअवकलन।कुछउपयोगी एवंसंबद्व फलनों का समाकलन, क्रमगुणित (फेक्टोरियल्स), प्रायिकता। **ब. गैसीय अवस्थातथाआणविकगतियां** :क्रांतिकपरिघटनाएं–वास्तविकगैसों के PVसमतापीय वक्र, ऐन्ड्रूज का प्रयोग, अवस्था का सातत्य, वाण्डरवाल्ससमीकरण के समतापीवक्र, वाण्डरवालस्थिरांक एवंक्रांतिकस्थिरांकमेंसंबंध। वर्गमाध्य मूलवेग, औसतवेग, प्रायिकतमवेग, आणविकवेगों के मैक्सवेलवितरण की गुणात्मकविवेचना, संघट्टन संख्या, माध्य मुक्तपथ, संघट्टनव्यास।
Unit II	**A. Liquid State:**Intermolecular forces, structure of Liquids (a qualitative description) ,Liquid crystals: Differencebetweenliquidcrystal,solidand liquid. Classification, structureofnematic andcholestricphases. Thermographyandsevensegmentcell. **B. Solid State:** Definition of space lattice, Unit cell, Laws of crystallography : (i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Laws of symmetry, Symmetry elements in crystals. Ionic solid structures, radius ratio effect and coordination number, limitations of radius rule, lattice defects.

	अ. द्रवअवस्था : अंतराअणुक बल, द्रवों की संरचना (गुणात्मक विवरण) द्रवक्रिस्टलःठोस एवंद्रवमेंअंतर, वर्गीकरण, नेमेटिक एवंकोलिस्ट्रिक, प्रावस्थाओं की संरचना, उष्माग्राफीऔरसात खण्डीय सेल। **ब. ठोसअवस्था** : त्रिविम जालकतथाईकाईसेल की परिभाषाक्रिस्टलोग्राफी के नियम (1) अंतराफलककोणों की स्थिरता का नियम (2) परिमेय घातांक का नियम (3) सममिति का नियम ।क्रिस्टलमेंसममितितत्व। आयनिकठोससंरचना, त्रिज्याअनुपात, त्रिज्याअनुपातप्रभावऔर उप सहसंयोजक संख्या। त्रिज्याअनुपात की कमियाँ औरजालकदोष।
Unit III	**Chemical Kinetics:** Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction concentration, temperature, pressure, solvent, light and catalyst. Dependence of rate on concentration, mathematical characteristics of simple chemical reactions-zero order, first order, second and pseudo order, half- life and mean life. Determination of the order of reaction, Differential method, Integration method and half life method. Study of chemical kinetics by polarimetry and spectrophotometery. Effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy, simple collision theory, transition state theory (equilibrium hypothesis).
	रासायनिकबलगतिकी :रासायनिकबलगतिकी एव इसकाकार्यक्षेत्र, अभिक्रिया की दर, अभिक्रियादरकोप्रभावितकरनेवालेकारक–सान्द्रण, ताप, दाब, विलायक, प्रकाश एवंउत्प्रेरक, अभिक्रियादर की सान्द्रणपरनिर्भरता, सरलरासायनिकअभिक्रियाओं के गणितीय अभिलक्षण–शून्य कोटि, प्रथमकोटि, द्वितीय कोटितथाछद्मकोटि, अर्द्ध आयुकाल एवं माध्य काल, अभिक्रिया की कोटि का निर्धारण–अवकलनविधि, समाकलनविधि, अर्घआयुकालविधि। रासायनिकबलगतिकी का पोलेरीमापीतथास्पेक्ट्रोफोटोमितीविधियों द्वारा अध्ययन ।रासायनिकअभिक्रियादरपरताप का प्रभाव, आरहीनियससमीकरण, सक्रियण उर्जा की अवधारणा, सरलसंघट्य सिद्धांत, संक्रमणअवस्था (साम्य परिकल्पना)।
Unit IV	**Radioactivity and Nuclear Chemistry:** Natural and artificial radioactivity, radioactive radiations, detection and measurement of radioactive radiations, theory of radioactivity, Group displacement law of Soddy, radioactive disintegration, nuclear reactions, nuclear fission and nuclear fusion, half life period, isotopes, isobars and isomers, application of radiochemistry.
	रेडियोएक्टिवता एवंनाभिकीय रसायन :प्राकृतिक एवंकृत्रिम रेडियोएक्टिवता, रेडियोएक्टिवविकिरण, रेडियोएक्टिवता का अभिज्ञान एवंमापन, रेडियोएक्टिवता का सिद्वांत, सोडी का समूहविस्थापन का नियम, रेडियोएक्टिवविखण्डन, नाभिकीय क्रियाएं, नाभिकीय विखण्डन, नाभिकीय संलयन, अर्धआयुकाल, समस्थानिक, समभारिक एवंसमवयी, रेडियोएक्टिवता का अनुप्रयोग।
Unit V	**A. Chemical Equilibrium:** Law of mass action, Equilibrium constant, Le Chatelier's Principle. **B. Colloidal Solutions:** Classification, lyophilic and lyophobic colloids, properties: kinetic, optical and electrical, coagulation, Hardy- Schulze rule, gold number, emulsions, gels and sols, application of colloids.
	अ. रासायनिकसाम्य :द्रवअनुपातीक्रिया का नियम, साम्य स्थिरांक, ली शेतेलिये का सिद्वांत। **ब. कोलॉइडीविलयन** :वर्गीकरणः द्रव–स्नेहीतथाद्रव–विरोधीकोलॉइडी, कोलॉइडीविलयन के गुण–धर्म, गतिक, प्रकाशिक एवंविद्युत, स्कंदन, हार्डी शुल्जे का नियम, स्वर्णांक, पायस, जेल एवंसॉल, कोलॉइडीविलयन के अनुप्रयोग।

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Syllabus recommended by Board of studies of Chemistry
Session 2017-18

Class	:	B.Sc.
Year	:	I
Subject	:	Chemistry
Paper	:	Pratical
Course Code	:	PR-SC-A21
Max. Marks	:	50

Course Outcomes

After successfully completing practical course, students understand the following concepts that may help in their employment as chemist

CO1- Determination of melting point, boiling point of compounds, weighing and preparation of solution
CO2- Determination of surface tension and viscosity, percentage composition of liquid mixtures.
CO3- Analysis of inorganic mixture for two cations and two anions and separate cations by paper chromatography.
CO4- Process of crystallization, sublimation and detection of elements and functional groups in organic compounds.

Examination Scheme

Physical Chemistry	: 12 Marks
Inorganic Chemistry	: 12 Marks
Organic Chemistry	: 12 Marks
Viva-voce	: 06 Marks
Record	: 08 Marks
Total	: 50 Marks

Physical Chemistry

(A) Any one experiment **6 Marks**
(i) Determination of melting point
(ii) Determination of boiling point
(iii) Weighing and preparation of solution

(B) Any one experiment **6 Marks**
(i) Determination of surface tension/percentage composition of given liquid mixture using surface tension method.
(ii) Determination of viscosity/ percentage composition of given liquid mixture using viscosity method

Inorganic Chemistry 8+4 marks

(i) Inorganic mixture analysis
Mixture analysis for 2 cations and 2 anions
(ii) Separation of cations by paper chromatography

Organic Chemistry (Any two) **12 Marks**

(i) Crystallization
(ii) Sublimation
(iii) Detection of elements
(iv) Identification of functional group

Viva- voce **6 marks**

Record **8 marks**

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Syllabus recommended by Board of studies of Chemistry
Session 2017-18

Class	:	B.Sc.
Year	:	II
Subject	:	Chemistry
Paper	:	I
Title of Subject	:	Physical Chemistry
Course Code	:	SC-A32(A)
Max. Marks	:	29 + CCE 05

Course Outcomes

After completion of the course, the students understand:

CO1 – Gibbs's function and Helmholtz functions, standard state, Hess's law and its applications basicconcepts and laws of thermodynamics, efficiency of heat engine, concepts of entropy

CO2– Phaseequilibrium**,** phase, component and the degree of freedom, compound formation with congruent melting point and incongruent melting point. liquid-liquid mixtures, non-ideal system, partial miscible liquids, Nernst distribution law and its applications

CO3 –The concept of electrical transport, conduction in metals and in electrolyte solutions, Kohlrausch law, Arrhenius theory of electrolyte, Ostwald's dilution law, Hittorf method

CO4– Different types of electrodes, Nernst equation, reversible and irreversible cells, determination of pH using hydrogen. quinhydrone and glass electrodes by potentiometricmethods, mechanism of buffer action. This knowledge can help them in their career as a chemist or technician

CO5– The idea of surface chemistry**,** Freundlich and Langmuir adsorption isotherms and catalysis and its application that can be used in their job part

Unit I	**A. Thermodynamics:**Basic concepts of thermodynamics. First law, Second law of Thermodynamics: Need for the law, Different statements of the law,Thermodynamic scale of temperature, Concept of Entropy: entropy as a state function, entropy as a function of P&T and T&V entropy change in physical change, Clausius inequality, Entropy as criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases, Nernst heat theorem. Statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data, Gibbs and Helmholtz functions, Gibbs function (G) and Helmholtz function (H) as a thermodynamic quantity. A and G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change **B. Thermochemistry:**Standard state, standard enthalpy of formation: Hess's Law of heat summation and its application. Enthalpy of neutralization. **अ. ऊष्मागतिकी:**ऊष्मागतिकी की मूलअवधारणाएं,प्रथमनियम, ऊष्मागतिकी का द्वितीय नियमः नियम, नियमकीआवश्यकता, नियम के विभिन्नकथन, तापमान का ऊष्मागतिकीपैमाना।एण्ट्रॉपी की अवधारणाः एण्ट्रॉपी–अवस्थाफलन के रूपमें एण्ट्रॉपी P&T एवंT&Vअवस्थाफलन के रूपमें,भौतिकपरिवर्तनमें एण्ट्रॉपीपरिवर्तन, क्लॉसियसअसमता एण्ट्रॉपीऊष्मागतिकसाम्य और स्वतः प्रवर्तिता की कसौटी के रूपमेंआदर्शगैसोंमें एण्ट्रॉपीपरिवर्तन एवंगैसोंकोमिलाने की एण्ट्रॉपी, नर्नस्टऊष्माप्रमेय कथनतथाअवशिष्ट एण्ट्रॉपी की अवधारणा,उष्माधारिताआंकड़ों से परम एण्ट्रॉपी का निर्धारण या परिकलन, गिब्बजतथाहेल्महोल्ट्सफलन,गिब्बजफलन(G) तथाहेल्महोल्टजफलन(H), फलनऊष्मागतिकराशियों के रूपमें,(A)तथा(G)ऊष्मागतिकसाम्य और स्वतः प्रवर्तित की कसौटी के रूपमें, एण्ट्रॉपीपरिवर्तन की तुलनामें इनके लाभ। **ब. ऊष्मारसायनः**प्रामाणिकअवस्था, प्रामाणिकसम्भवन की एन्थैल्पी, हेस का ऊष्मासंकलन का नियम

	एवंइसकेअनुप्रयोग, उदासीनीकरण की एन्थैल्पी।
Unit II	**Phase equilibrium:**Statement and the meaning of terms: phase component and the degree of freedom, thermodynamic derivation of the Gibbs phase rule. One component system: water, CO_2 and S system, two component system: solid-liquid equilibrium, simple eutectic system: Bi-Cd; Pb-Ag system. Desilverisation of lead. **Solid solution:**Systems in which compound formation with congruent melting point (Zn-Mg) and incongruent melting point. (NaCl-H_2O) and ($CuSO_4$-H_2O) system, Freezing Mixtures: acetone-dry ice. **Liquid-Liquid mixtures:**Ideal liquid mixtures. Raoult's and Henry's law. Non-ideal system,Azeotrops: HCl- H_2O and ethanol water system. **Partial miscible liquids:**Phenol-water, trimethylamine-water and nicotine-water system. Lower and upper consolute temperature, Immiscible Liquids, steam distillation, Nernst distribution law: thermodynamic derivation, applications. **प्रावस्थासाम्य:**कथन एवंविभिन्नपदों का अर्थ, प्रावस्था, घटकतथा स्वतंत्रता की कोटि, गिब्जप्रावस्थानियम का ऊष्मागतिकव्युत्पन्न, एक घटक तंत्र –जल तंत्र, CO_2एवंसल्फर तंत्र, दो घटक तंत्र–ठोस–द्रवसाम्य, सरलगलनक्रांतिक तंत्र–बिस्मथ–कैडमियम तंत्र, सीसा–चांदीतंत्र, सीसे का विरजतीकरण। **ठोसविलयन:**तंत्र जिनमेंसर्वांगसमगलनांकवाले यौगिक बनते हैं: (Zn-Mg) तथाजिसमेंअसर्वांगसमगलनांकवाले यौगिक बनते हैं(NaCl-H_2O) एवं($CuSO_4$-H_2O) तंत्र हिम मिश्रण–एसिटोन–शुष्कबर्फ। **द्रव–द्रवमिश्रण:**आदर्शद्रवमिश्रण, राउल्ट एवंहेनरी का नियम, अनादर्श तंत्र स्थिरक्वथनांकीमिश्रण: HCl- H_2Oतथा एथिलअल्कोहल–जल। **आंशिक मिश्रणीय द्रव:**फीनॉल–जल, ट्राइमेथिल ऐमीन–जल एवंनिकोटिन–जल तंत्र, निम्नतथाउच्चसंमविलेय–संविलेयनतापक्रम, अमिश्रणीय द्रव, भापआसवन, नर्नस्ट का वितरणनियम: ऊष्मागतिकव्युत्पन्न, अनुप्रयोग।
Unit III	**Electrochemistry I** :Electrical transport, conduction in metals and in electrolyte solutions. specific and equivalent conductivity, measurement of equivalent conductance, effect of dilution on conductivity, migration of ions and Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations. Weak and strong electrolytes, Ostwald's dilution law, theory of strong electrolytes, DHO theory and equation, transport numbers. determination of transport numbers by Hittorf method and moving boundary method. **विद्युतरसायन–I** : विद्युतीय अभिगमन, धातुओं एवंविद्युतअपघटकविलयनोंमेंचालन, विशिष्ट एवंतुल्यांकीचालकता, तुल्यांकीचालकता का मापन, चालकता का तनुतापरप्रभाव, आयनों का अभिगमन एवंकोहलरासनियम, आरहीनियस का विद्युतअपघटन का सिद्वांत एवंसीमाएं, प्रबल एवंदुर्बलविद्युतअपघट्य, आस्टवाल्ड का तनुतानियम, प्रबलविद्युतअपघट्य का सिद्वांत, DHOसिद्वांत एवंसमीकरण, अभिगमनांक, हीटार्फ एवंगतिमानसीमाविधि द्वाराइसका निर्धारण।
Unit IV	**Electrochemistry II** :Types of reversible electrodes: Gas - metal ion, metal-metal ion, metal -insoluble salt, anion and redox electrodes. Electrodes reactions, Nernst equation, derivation of cell EMF and single electrode potential, Standard hydrogen electrode, reference electrodes, Standard electrode potential, electrochemical series and its significance. Concentration cell with and without transport, liquid junction potential,application of concentration cells, valency of ions, solubility product and activity coefficient, potentiometric titration. Definition of pH and pK, determination of pH using hydrogen, quinhydrone and glass electrodes by potentiometric methods.

	Buffers:mechanism of buffer action, Henderson-Hazal equation, hydrolysis of salts. **विद्युतरसायन– II** : उत्क्रमणीय इलेक्ट्रोडों के प्रकार : गैस–धातुआयन, धातु–धातुआयन, धातुअविलेय लवण, ऋणायन एवंरेडॉक्सइलेक्ट्रोड । इलेक्ट्रोडअभिक्रियाएंनर्नस्टसमीकरण, सेलवि. वा.ब. एवं एकलइलेक्ट्रोडविभव का निर्धारण, मानकहाइड्रोजनइलेक्ट्रोड, संदर्भइलेक्ट्रोड ,मानकइलेक्ट्रोडविभव, विद्युतरसायन की श्रेणी एवंउसकामहत्व, सान्द्रतासेल, अभिगमन एवंबिनाअभिगमन के द्रवसंधि विभव, सान्द्रतासेल के अनुप्रयोग, आयनों की संयोजकता, विलेयतागुणनफल एवंसक्रियतागुणांक, विभवमापीअनुमापन, pH एवंpKकीपरिभाषा, हाइड्रोजन, क्विनहाइड्रोन एवंकाँचइलेक्ट्रोडों के प्रयोग द्वाराpH का निर्धारण। **बफर:** :बफरक्रिया की क्रियाविधि, हेन्डरसनहजलसमीकरण।लवणों का जल अपघटन।
Unit V	**Surface Chemistry:**Adsorption, adsorption and absorption, types of adsorption, adsorption of gases and liquids in solid adsorbent. Freundlich and Langmuir adsorption isotherms, surface area and determination of surface area. **Catalysis:**Characteristics of catalyzed reactions, classification of catalysis, application of catalysts, miscellaneous examples. **अ.पृष्ठ रसायन** :अधिशोषण, अधिशोषण एवंअवशोषण, अधिशोषण के प्रकार , ठोसअधिशोषकोंपरगैसोंतथाद्रवों का अधिशोषण, फ्रेण्डलिचतथालेंग्म्योरअधिशोषणसमतापीप्रक्रम, पृष्ठ क्षेत्र एवंपृष्ठ क्षेत्र का निर्धारण। **ब. उत्प्रेरण**:उत्प्रेरितअभिक्रियाओं के अभिलक्षण, उत्प्रेरण का वर्गीकरण, उत्प्रेरक के अनुप्रयोग, विविध उदाहरण।

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SADHU VASWANI AUTONOMOUS COLLEGE
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Chemistry
Session 2017-18

Class	:	B.Sc.
Year	:	II
Subject	:	Chemistry
Paper	:	III
Title of Subject	:	Organic Chemistry
Course Code	:	SC-A32(C)
Max. Marks	:	29 + CCE 05

Course Outcomes

After undergoing this course, the students understand:

CO1- Electromagnetic spectrum, absorption laws, UV spectroscopy, analysis of UV spectra,IR spectroscopy, measurement and interpretation of IR spectrum of simple organic compounds. They acquire the skill to predict various functional groups present in the given IR spectra

CO2- Alcohols, their classification, nomenclature, methods of formation and various chemical reactions of mono-, di-and tri- hydric alcohols, different methods of preparations and reactions of phenol and mechanism of variousrearrangement reactions

CO3- Nomenclature, synthesis of aldehydes and ketones, their physical properties, chemical reactions and mechanism of various name reactions

CO4- Nomenclature, methods of formation and various chemical reactions of carboxylic acids, halo acids,hydroxy acids, dicarboxylic acids and ethers

CO5- Nomenclature, methods of formation and various chemical reactions of nitroalkanes, halonitro arenes and amines

Unit I	**Electromagnetic Spectrum: Absorption spectra** :Ultraviolet (UV) absorption spectroscopy-absorption laws(Beer Lambert Law), Molar absorptivity, Presentation and analysis of UV spectra, Types of electronic transitions, Effect of conjugation. Concept of chromophore andauxochrome.Bathochromic, hypsochromic, hyperchromic and hypochromic shifts. UV spectra of conjugated enes and enones. Infra red (IR) absorption spectroscopy- Molecular vibrations, Hook's law, selection rules, intensity and position of IR bands, Measurement of IR spectrum, finger print region, characteristic absorption of various functional groups and interpretation of IR spectra of simple organic compounds. **विद्युतचुंबकीय स्पेक्ट्रमअवशोषणस्पेक्ट्रम** : पराबैंगनी(UV)अवशोषणस्पेक्ट्रामितीय –अवशोषण के नियम (बियर एवंलेम्बर्ट नियम) आणविकअवशोषिता, पराबैंगनीस्पेक्ट्रा का प्रस्तुतिकरण एवंविश्लेषण, इलेक्ट्रानिकसंक्रमण के प्रकार, संयुग्मन का प्रभाव।वर्णमूलकतथावर्णवर्धक की संकल्पना, वर्णापकरणी, वर्णोत्कर्णी, अतिवर्णकतथा अधोवर्णकविस्थापन।संयुग्मितडाइनतथाइनोन का पराबैंगनीस्पेक्ट्रा। अवरक्तस्पेक्ट्रामितीय–आणविककंपन, हुक का नियम, वरणनियम, अवरक्तबैंड की स्थिति एवंतीव्रताअवरक्तस्पेक्ट्रा का मापन, फिंगरप्रिंटक्षेत्र, विभिन्नक्रियात्मकसमूहों के चारित्रिक अवशोषणतथासरलकार्बनिक यौगिक के अवरक्तस्पेक्ट्रा का निर्वचन।

Unit II	**A. Alcohols:** Classification and nomenclature. **Monohydric alcohols**-Nomenclature,methods of formation, reduction of aldehydes, ketones, carboxylic acids and esters. Hydrogen bonding, acid nature and reactions of alcohols. **Dihydric alcohols**-nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage[$Pb(OAc)_4$ and HIO_4) and pinacol-pinacolone rearrangement. **Trihydric alcohols**- Nomenclature, methods of formation, Chemical reactions of glycerol. **B. Phenols:**Nomenclature, structure and bonding. Preparations of phenols, Physical properties and acidic character, comparative acidic strength of alcohols and phenols, resonance stabilization of phenoxide ions. Reactions of phenols- Electrophillic aromatic substitution, acylation and carboxylation. Mechanism of Fries rearrangement, Claisen rearrangement, Gatermann synthesis, Hauben-Hoesche reaction, Lederer Manasse reaction and Reimer Teiman reaction. **अ. एल्कोहल** : वर्गीकरण एवंनामकरणः **मोनोहाइड्रिक एल्कोहल** :नामकरण, ऐल्डिहाइड, कीटोन, कार्बोक्सिलिकअम्ल एवं एस्टरों के अपचयन द्वारा एल्कोहल के विरचन की विधियाँ, हाइड्रोजन बंध,अम्लीय गुण , एल्कोहल की अभिक्रियायें। **डाइहाइड्रिक एल्कोहल** :नामकरण, विरचन की विधियाँ, विसिनलग्लाइकॉल की रासायनिकअभिक्रियायें, ऑक्सीकारकीय विदलन ,[$Pb(OAC)_4$तथाHIO_4]पिनाकोल एवंपिनाकोलॉनपुनर्विन्यास। **ट्राइहाइड्रिक एल्कोहल** :नामकरण एवंविरचन की विधियाँ, ग्लिसरॉल की रासायनिकअभिक्रियायें। **ब. फीनॉल** :नामकरण, संरचनाएवंआबंधन,विरचन की विधियाँ, भौतिकगुण एवंअम्लीय स्वभाव, फिनॉक्साइडआयन का अनुनादीस्थायित्व, फीनॉलतथाएल्कोहल की तुलनात्मकअम्लीयसामर्थ्य, फीनॉल की अभिक्रियाएं–इलेक्ट्रानस्नेही ऐरोमेटिकप्रतिस्थापन,ऐसीटलीकरण,कार्बोक्सिलिकरण, फ्राईसपुनर्विन्यास, क्लेजनपुनर्विन्यास,गाटरमैनसश्लेषण, हाउबन–हॉशअभिक्रिया, लैडरर–मानसेअभिक्रिया एवंराइमर–टीमनअभिक्रियाओं की क्रियाविधि ।
Unit III	**Aldehydes and ketones:** Nomenclature, structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3dithianes, synthesis of ketones from nitriles and from carboxylic acids. Physical properties. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig and Mannich reaction. Use of acetals as protecting groups, Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizaro reaction, Meerwein-Pondroff-Verley reaction, Clemmensen, Wolf Kischner, $LiAlH_4$, and $NaBH_4$reductions. Halogenation of enolizable ketones. An introduction to α, βunsaturated aldehydes and ketones. **ऐल्डिहाइड्स् एवंकीटोन्स** : नामकरणतथाकार्बोनिलसमूह की सरंचना, ऐल्डिहाइड्सएवंकीटोनकासंश्लेषणविशेषतः अम्लक्लोराइड से ऐल्डिहाइड, 1,3–डाइथाएन्स से ऐल्डिहाइड्सएवंकीटोन , नाइट्रिलतथाकार्बोक्सिलिकअम्लसेकीटोनकासंश्लेषण,भौतिकगुण धर्म । कार्बोनिलसमूहमेंनाभिकस्नेही योगात्मकअभिक्रियाओं की क्रियाविधि–बेन्जोइन, ऐल्डोलसंघनन , पर्किन एवंनोवेनजलसंघननकोप्रमुखतादेतेहुए, ऐल्डिहाइड्स एवंकीटोन्स की अमोनिया एवंउसकेव्युत्पन्नों के साथसंघननक्रियाएं,विटिग, मानिशअभिक्रिया,अभिरक्षकसमूह के रूपमेंएसिटलों का उपयोग , ऐल्डिहाइड्सकाउपचयन, कीटोन्स का बेयर–विलिजरउपचयन,केनिजारोअभिक्रिया, मीरवीन–पोन्डॉर्फ–वर्ले, क्लेमेन्सन, वुल्फकिश्नरअपचयन, $LiAlH_4$एवं$NaBH_4$अपचयन, इनोलीकरणीय कीटोन का हेलोजनीकरणα,βअसंतृप्तऐल्डिहाइड्सएवंकीटोनका परिचयात्मकज्ञान ।

Unit IV	A. Carboxylic Acids:Nomenclature, structure and bonding, physical properties and acidity of carboxylic acids, Effects of substituents on acid strength. Preparation of carboxylic acids and reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Synthesis of acid chlorides, esters and amides. Reduction of carboxylic acids. Mechanism of decarboxylation. Methods of formation and chemical reactions of halo acids, hydroxyl acids, Malic, Tartaric and citric acids. Methods of formation and chemical reactions of unsaturated monocarboxylic acids. Dicarboxylic acids-Methods of formation and effect of heat and dehydrating agents. B. Ether: Nomenclature of ethers and methods of their formation. Physical properties and chemical reactions. Cleavage and auto oxidation, Ziesels method. **अ. कार्बोक्सिलिकअम्ल** : नामकरण, संरचना एवंआबंधन, भौतिकगुणधर्म, कार्बोक्सिलिकअम्लों की अम्लीयता, अम्लीयतापरप्रतिस्थापियों का प्रभाव, कार्बोक्सिलिकअम्लों का अभिक्रियाएं, हैल–वोल्हार्ड–जैलिन्सकीअभिक्रिया, अम्लक्लोराइडों, एस्टर एवं एमाइड का विरचन,कार्बोक्सिलिकअम्लों का अपचयन, विकार्बोक्सिलीकरण की क्रियाविधि।हेलोअम्लों का विरचन एवंरासायनिकअभिक्रियाएं, हाइड्रोक्सीअम्ल,मैलिक,टारटरिक एवंसिट्रिकअम्ल।असंतृप्तमोनोकार्बोक्सलिकअम्ल का विरचन एवंरासायनिकअभिक्रियाएं।डाईकार्बोक्सिलिकअम्ल–विरचन की विधियां एवंताप एवंनिर्जलीकरणअभिकर्मकों का प्रभाव। **ब. ईथर** :ईथर का नामकरण एवंविरचन की विधियां, भौतिकगुण, रासायनिकअभिक्रियाएं, विदलन एवंस्वऑक्सीकरण, जीजल्सविधि।
Unit V	**Organic compounds of Nitrogen:** Preparation of nitro-alkanes and nitro-arene. Chemical reactions of nitro-alkanes. Mechanism of nucleophilic substitution in nitro-arenes and their reductions in neutral, acidic and alkaline media. Halonitroarenes; reactivity, structure and nomenclature of amines, physical properties, stereochemistry of amines, separation of mixture primary, secondary and tertiary amines. Structural features effecting basicity of amines. Amine salts as phase transfer catalyst. Preparation of alkyl and aryl amine (reduction of nitro compounds, nitriles), reductive amination of aldehydic and ketonic compounds. Gabriel-Phthalamide reaction. Hoffmann-Bromamide reaction .Reactions of Amines. Electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acids. Synthetic trans-formations of aryl diazonium salts, Azo coupling. **नाइट्रोजन के कार्बनिक यौगिक** : नाइट्रोऐल्केन व नाइट्रोएरीन के बनाने की विधियां।नाइट्रोएल्केन की रासायनिकअभिक्रियाएं।नाइट्रो एल्केनमेंनाभिकस्नेहीप्रतिस्थापनअभिक्रियाओं की क्रियाविधि तथाउनकाअम्लीय, क्षारीय, उदासीनमाध्यम मेंअपचयन। हैलोनाइट्रोऐरीन : क्रियाशीलता।एमीन की संरचना एवंनामकरण, एमीनकेभौतिकगुण एवं त्रिविम रसायन।प्राथमिक, द्वितीयक एवंतृतीयक एमीन के मिश्रण का पृथक्करण। एमीन की क्षारकतापरसंरचना का प्रभाव।प्रावस्थारूपांतरउत्प्रेरकों के रूपमेंएमीनलवण, एल्किल एवं एरिल एमीनकेविरचन की विधियां (नाइट्राइल एवंनाइट्रो यौगिकों का अपचयन), एल्डिहाइडों एवंकीटोनीअवयवों का अपचयनीएमीनीकरणःगेब्रियल–थैलेमाइडअभिक्रिया, हॉफमैनब्रोमेमाइडअभिक्रिया, एमीन्स की अभिक्रियाएं, एरिल एमीनमेंइलक्ट्रॉनस्नेही एरोमेटिकप्रतिस्थापन, एमीन्स की नाइट्रसअम्ल के साथअभिक्रिया, एरिलडाइएजोनियमलवण के सांशलेषिक रूपांतरण, एजो युग्मन।

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Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Chemistry
Session 2017-18

Class	:	B.Sc.
Year	:	II
Subject	:	Chemistry
Title of Subject	:	Pratical
Course Code	:	PR-SC-A32
Max. Marks	:	50

Duration of practical during the examination :5-6hrs

Course Outcomes

After pursuing this course, the students become able

CO1- To analyse the given inorganic mixture containing five radicals with at least one interfering radical, to determine the percentage of acetic acid in commercial vinegar, to do redox titrations and estimation of hardness in water samples

CO2- To determine the transition temperature of substance by thermometer method, enthalpy of neutralization of strong acid and strong base, to draw phase diagram of two component system by cooling curve method

CO3- To identify the given organic compound through functional group analysis and determination of melting point with preparation of suitable derivatives, to perform paper chromatography and thin layer chromatography

Examination Scheme

Physical Chemistry	: 12 Marks
Inorganic Chemistry	: 12 Marks
Organic Chemistry	: 12 Marks
Viva-voce	: 06 Marks
Record	:08 Marks
Total	:50 Marks

Inorganic Chemistry 12 Marks

(i) Analysis of inorganic mixture containing five radicals with at least one interfering radical
(ii) Determination of acetic acid in commercial vinegar using NaOH
(iii) Redox titrations
(iv) Estimation if hardness of water by EDTA .

Physical Chemistry 12 Marks

(i) Determination of transition temperature of given substance by thermometric method.
(ii) To determine the enthalpy of neutralization of strong acid, strong base.
(iii) Verification of Beer's- Lambert law.
(iv) To study the phase diagram of two component system by cooling curve method

Organic Chemistry (Any two) 12 Marks

(i) Identification of an organic compound through the functional group analysis ,determination of melting point and preparation of suitable derivatives.
(ii) Use of Paper chromatography / Thin layer chromatography: determination of R_f values, separation and identification of organic compounds
a. Separation of green leaf pigments (spinach leaves may be used)
b. Separation of dyes

Viva- voce **6 Marks**

Record

8 Marks

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Syllabus recommended by Board of studies of Chemistry
Session 2017-18

Class	:	B.Sc.
Year	:	III
Subject	:	Chemistry
Paper	:	I
Title of Subject	:	Physical Chemistry
Course Code	:	SC-A43(A)
Max. Marks	:	29 + CCE 05

Course Outcomes

After completion of this course, the students understand:

CO1- Planck's radiation law, Photoelectric effect, de-Broglie hypothesis, Schrodinger wave equation and its importance, molecular orbital theory and calculation of energy levels from wave function

CO2- Electromagnetic Spectrum, Rotational Spectrum and Vibrational Spectrum

CO3- Raman Spectrum, Electronic Spectra and UV Spectroscopy,selection rules, Frank Condonprinciple, Woodward Fiser rule and application to organic molecules

CO4- photochemistry and Jablonski diagram

CO5 - physical Properties and Molecular Structure

Unit I	**A. Elementary Quantum Mechanics:**Black-body radiation. Planck's radiation law. Photoelectric effect. Heat capacity of solids, Bohr's model of hydrogen atom (no derivation) and its defects. Compton effect. de-Broglie hypothesis, the Heisenberg's uncertainty principle. Sinusoidal wave equation. Hamiltonian operator. Schrodinger wave equation and its importance, physical interpretation of the wave function, postulates of quantum mechanics, particle in a one-dimensional box. **B. Molecular orbital theory:**Basic ideas-criteria for forming M.O. from A.O., construction of M.O.'s by LCAO-H_2 ion, calculation of energy levels from wave functions, physical picture of bonding and antibonding wave functions. Concept of σ, σ*, π, π* orbitals and their characters. Hybrid orbitals- sp, sp^2, $sp^{3;}$ calculation of coefficients of A.O.'s used in these hybrid orbitals. Introduction to valence bond model of H_2 ion, comparison of M.O. and V.B. models.
	अ प्रारंभिकक्वान्टम यांत्रिकी : कृष्णिकाविकिरण, प्लांक का विकिरणनियम, प्रकाशवैद्युतप्रभाव, ठोसों की उष्माधारिता, बोर का हाइड्रोजनपरमाणुमॉडल एवंइसकेदोष, कॉम्पटनप्रभाव । डी–ब्रोगली की परिकल्पना, हिन्सबर्ग का अनिश्चितता का सिद्वांत, ज्यातरंगसमीकरण, हेमिल्टोनियनप्रचालक, श्रॉडिंजरतरंगसमीकरण एवंइसकामहत्व, तरंगफलन की भौतिकव्याख्या, क्वान्टम यांत्रिकी के अभिगृहीत, एक–विमीय कोष्ठमेंकण। **ब–आणविक कक्षकसिद्वांत** :आधारभूतअवधारणा–A.O.'sसेM.O.'sनिर्माण का आधार।H_2^+आयनका LCAOद्वाराM.O.का निर्माणतंरगफलनद्वाराऊर्जास्तरों की गणनाआबन्धनतथाप्रति–आबन्धनतरंगफलनों का भौतिकचित्रण σ, σ*, π, π*कक्षकों की अवधारणातथा उनके अभिलक्षण,संकरण कक्षकsp, sp^2, sp^3 इनसंकर कक्षकोंमेंप्रयुक्तA.O.'sकेगुणांक की गणनाहाइड्रोजन के संयोजनबन्ध मॉडल का परिचय।

Unit II	**Spectroscopy: Introduction:** Electromagnetic radiation. regions of the spectrum, basic features of different spectrometers. Statement of the Born-Oppenheimer approximation. degrees of freedom. **Rotational Spectrum:**Diatomic molecules, Energy levcls of rigid rotor (semi-classical principles), selection rules, spectral intensity, distribution using population distribution (Maxwell-Boltzmann distribution) determination of bond length, qualitative description of non-rigid rotor, isotope effect. **Vibrational Spectrum:**Infra-red spectrum : Energy levels of simple harmonic oscillator. selection rules. pure vibrational spectrum, intensity. determination of force constant and qualitative relation of force constant and bond energies, effect of an harmonic motion and isotope on the spectrum, idea of vibrational frequencies of different functional groups
	स्पेक्ट्रोस्कोपी (स्पेक्ट्रममिति) :परिचय:विद्युतचुम्बकीय विकिरण, स्पेक्ट्रम के परिक्षेत्र, विभिन्नस्पेक्ट्रोमापी के आधारभूत लक्षण, बोर्नओपनहाइमरसन्निकटन का कथन, स्वतन्त्रता की कोटि, **घूर्णनस्पेक्ट्रम:**च द्विपरमाणवीय अणु, दृढ़ घूर्णक के ऊर्जास्तर, अर्ध–चिरप्रतिष्ठितसिद्वांत, वरणनियम, स्पेक्ट्रलतीव्रतासमष्टिबंटनप्रयुक्तकरतेहुए वितरण, मैक्सवेल–बोल्टजमैनवितरण, आबन्ध लम्बाई का निर्धारण, अदृढ़ घूर्णक का गुणात्मकविवरण, समस्थानिकप्रभाव। **कम्पनस्पेक्ट्रम,अवरक्तस्पेक्ट्रम:**सरलआर्वतीय कम्पन के ऊर्जास्तर, वरणनियच्म, विशुद्व कम्पनस्पेक्ट्रम, तीव्रता, बल स्थिरांक का निर्धारण, बल स्थिरांक एवंआबन्ध ऊर्जाओंमेंगुणात्मकसंबंध। स्पेक्ट्रमपरअनावर्तीय गतितथासमस्थानिक का प्रभाव, विभिन्नक्रियात्मकसमूहों की कम्पनआवृत्तियों की जानकारी।
Unit III	**Raman Spectrum:**Concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules. **Electronic Spectrum:** Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck-Condon principle. Qualitative description of σ, π and n M.O. their energy levels and the respective transition. **UV Spectroscopy:**Electronic excitation, elementary idea of instrument used. Application to organic molecules. Woodward-Fieser rule for determining λ_{max} of enes, polyenes and α,β unsaturated carbonyl compounds.
	रमन स्पेक्ट्रम:ध्रुवणीयता की परिकल्पना, द्विपरमाणवीय अणुओं के लिए विशुद्व घूर्णन एवंविशुद्व कम्पन रमन स्पेक्ट्रम, वरणनियम। **इलेक्ट्रॉनिकस्पेक्ट्रम:** आबन्धन एवंप्रतिबन्धनआणविक लक्षकोंहेतुस्थितिजऊर्जावक्रों की परिकल्पना, वरणनियमों का गुणात्मकविवरणतथाफ्रेंक–कोण्डनसिद्वांत, σ, π तथाn M.O. का गुणात्मकविवरण, उनके ऊर्जास्तरतथातत्संबंधीसंक्रमण। **पराबैंगनीस्पेक्ट्रामिकी:**इलेक्ट्रॉनिकउत्तेजन, प्रयुक्तउपकरण के संबंध मेंप्रारंभिकजानकारी, कार्बनिक यौगिकों की संरचनाज्ञातकरने के अनुप्रयोगईन, पॉलिईनतथाα,βअसंतृप्तकार्बोनिल यौगिकों के λ_{max} निर्धारण के लिए बुडवर्ड–फिशरनियम।
Unit IV	**Photochemistry:**Interaction of radiation with matter, difference between thermal and photochemical processes.Laws of photochemistry: Grothus-Draper law, Stark-Einstein law, Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non- radioactive processes (internal

	conversion intersystem crossing), quantum yield, photosensitized reactions energy transfer processes (simple examples.)
	प्रकाश–रसायन पदार्थतथाविकिरणों की पारस्परिकअभिक्रिया, उष्मीय तथाप्रकाश–रासायनिकक्रिया–विधि मेंविभेद, प्रकाश–रसायन के नियम : ग्रोथस–डेपरनियम, स्टार्क–आइन्सटीननियम,उत्तेजितअवस्थाओंमेंहोनेवालीविभिन्नक्रिया–विधियोंकोदर्शातेहुए जैबलोन्सकीआरेख, प्रतिदीप्ति का गुणात्मकविवरण, स्फुरदीप्ति, अविकरणीय क्रिया–विधियां(अन्तरपरिवर्तन, अन्तरनिकाय लांघन), क्वाण्टम दक्षता, प्रकाशग्राहीअभिक्रियाएं, ऊर्जास्थानान्तरणक्रिया–विधियां (सरल उदाहरण)
Unit V	**Physical Properties and Molecular Structure:** Optical activity. Polarisation (Clausius - Mossotti equation), orientation of dipoles in an electric field, dipole moment. induced dipole moment measurement of dipole moment, temperature method and refractive method. dipolemoment and structure of molecules, magnetic properties - paramagnetism, diamagnetism and ferromagnetism.
	भौतिकगुणतथाअणुसंरचना:ध्रुवण–घूर्णता ध्रुवण– (क्लॉसियस–मोसोटी समीकरण), विद्युत क्षेत्र में द्विध्रुवीय अभिविन्यास, विध्रुवीय आघूर्ण, प्रेरित द्विध्रुवआघूर्ण, अपवर्तनविधि तथातापविधि द्वारा द्विध्रुवीय आघूर्णमापन, द्विध्रुवआघूर्णतथाअणुओं की संरचना, चुम्बकीय गुण–पराचुम्बकीय, अनुचुम्बकीय तथालौहचुम्बकत्व।

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Syllabus recommended by Board of studies of Chemistry
Session 2017-18

Class	:	B.Sc.
Year	:	III
Subject	:	Chemistry
Paper	:	II
Title of Subject	:	Inorganic Chemistry
Course Code	:	SC-A43(B)
Max. Marks	:	28 + CCE 05

Course Outcomes

After pursuing this course, the students understand:

CO1 –phosphazines

CO2– Metal ligand bonding in transition metal complexes, thermodynamic and kinetic aspects ofmetal complexes

CO3–Magnetic properties of transition metal complexes

CO4– Electronic spectra and organometallic compounds

CO5– Bioinorganic chemistry and metal nitrosyl complexes which may help them in their career related to medicinal chemistry

Unit I **इकाई I**	**1. Hard and Soft Acids and Bases (HSAB)** :Introduction. Classification of hard and soft acid-base concept of Pearson, Application of hard-soft acid base theory, Symbiosis, acid-base st softness; Theoretical basis of hardness and softness, electronic theory, π-bonding theory, an electronegativity and hardness and softness, limitations of hard soft acid-base concept. **2. Silicones aisdPhosphazenes** :Introduction: silicones-methods of preparation, classification, properties and application (uses). Phosphazenes (Phosphonitrilic chloride)-Methods of preparation and properties; Structure of triphosphazenes. Some other phosphazenes and uses of phosphazenes. 1. **कठोरतथामृदुअम्ल–क्षारक**वर्गीकरण, पीयरसन की HSAB धारणा, कठोर–मृदुअम्ल–क्षारकसिद्वांत के उपयोग, सहजीवता, अम्ल–क्षारप्रबलतातथाकठोरता एवंमृदुता, कठोरता एवंमृदुता के सैद्वांतिकआधार, विद्युत ऋणात्मकताऔरकठोरता एवंमृदुताHSAB धारणा की सीमायें एवंअभ्यासार्थप्रश्न। 2- **सिलीकॉन्स एवंफास्फाजीन्स**परिचय, सिलीकॉन्सः बनाने की विधियां, वर्गीकरण, गुण एवंउपयोग, फॉस्फाजीन्स : बनाने की विधियां, गुण त्रिफॉस्फाजीन्स$(NPCl_2)3$की संरचना, उपयोग एवंअभ्यासार्थप्रश्न।

Unit II	**1. Metal Ligand Bonding in Transition Metal Complexes.** Introduction. limitations of valence bond theory, crystal field theory, crystal field splitting of d-orbitals, d-orbital splitting and stabilisationcnergy in octahedral, tetrahedral and square planar complexes: factors affecting the crystal field parameters. Applications of crystal field theory and limitations of crystal field theory. **2.Thermodynamic and Kinetic Aspects of Metal Complexes.** Introduction: Thermodynamic aspects of metal complexes,factors affecting thermodynamic stability of complexes, kinetic aspects of metal complexes, stabilization reactions of square planar complexes and factors affecting the rate of substitution reactions in square planar complexes. **1. संक्रमण धातुसंकुलोंमें धातुलिगण्डबन्धन** : संयोजकता बंध सिद्वांत की सीमायें, क्रिस्टल क्षेत्र सिद्वांत, d-कक्षकों का क्रिस्टल क्षेत्र विपाटन–अष्टफलकीय, चतुष्फलकीय एवंसमतलवर्गीकारसंकुलोंमेंd-कक्षकों का विपाटन, इलेक्ट्रानों का वितरण एवंक्रिस्टलस्थायीकरणऊर्जा, संकुलों द्वाराज्यामितीय प्रबन्धन, अष्टफलकीय तथासमचतुष्फलकीय ज्यामिति की तुलना, क्रिस्टल क्षेत्र मापकों (पैरामीटर) कोप्रभावितकरनेवालेकारक, क्रिस्टल क्षेत्र सिद्वांत के अनुप्रयोग, क्रिस्टल क्षेत्र सिद्वांत की सीमायें एवंअभ्यासार्थप्रश्न। **2. धातुसंकुलों की ऊष्मागतिकी एवंबलगतिकीअवधारणा** :परिचयात्मक, धातुसंकुलों की ऊष्मागतिकीअवधारणा, बन्ध ऊर्जा, स्थायित्व एवंस्थायित्वनियतांक, ऊष्मागतिकीस्थायित्वकोप्रभावितकरनेवालेकारक। धातुसंकुलों की बलगतिकीअवधारणा, वर्गसमतलीय संकुलोंमेंप्रतिस्थापनक्रियायें, वर्गसमतलीय संकुलोंमेंप्रतिस्थापनअभिक्रियादरकोप्रभावितकरनेवालेकारक एवंअभ्यासार्थप्रश्न।
Unit III	**Magnetic Properties of Transition Metal Complexes.** Introduction: Types of magnetic behavior, diamagnetism, Paramagnetism, Ferromagnetism, Anti-ferromagnetism. Ferri-magnetism. Origin and calculation of magnetism. Methods of determining magmetic susceptibility-Guoy, Bhatnagar Mathur. Quincke's, Curie and Nuclear Magnetic Resonance method. Magnetic moment; L-S coupling, Determination of ground state term symbol. Correlation of μ_s and $\mu_{eff.}$ values. Orbital contribution to magnetic moments and application of maganetic moment data for 3d-metal complexes. **संक्रमण धातुसंकुलों के चुम्बकीय गुण** : परिचयात्मक, चुम्बकीय व्यवहार के प्रकार, चुम्बकीय सुग्राहिताकोमापने की विधियां, चुम्बकीय आघूर्णL-S युग्मनμ_sतथा$\mu_{eff.}$मानोंमेंसहसंबंध, चुम्बकीय आघूर्णमें कक्षक योगदान, 3d-धातुसंकुलों के लिए चुम्बकीय आघूर्ण, आघूर्णआंकड़ों की उपयोगिता एवंअभ्यासार्थप्रश्न।
Unit IV	**A. Electronic Spectra of Transition Metal Complex** Introduction: Type of electronic transition. Selection rules for d-d transitions: spectroscopic ground states-Notations. Spectroscopic states and spectroscopic ground states in complexes; Spectrochemical series; Orgal energy level diagram-Uses in octahedral and tetrahedral complexes having d^1 to d^9 states: Electronic spectrum of $[Ti(H_2O)_6]^{3+}$ complex ion. **B. Organometallic Chemistry** Introduction: Nomenclature and Classification of Organometallic compounds. General methods of Preparation: Alkyl and aryl organometallic compounds of Lithium-Preparation, Properties. Bond nature and application; Organometallic compounds of Al. Hg, Sn and Ti-Preparation. Properties, bond nature and applications.
	अ. संक्रमण धातुसंकुलों के इलेक्ट्रॉनिकस्पेक्ट्रा परिचयात्मक, इलेक्ट्रॉनिकसंक्रमण एवंउसकेप्रकार, संक्रमण के लिए वरणनियम , चयनवरणनियम का भंगहोना, स्पेट्रोस्कोपिकमूलअवस्थायें, संकुलोंमेंस्पेक्ट्रोस्कोपिकअवस्थायें एवंस्पेक्टोस्कोपिकमूलअवस्थायें, रासायनिकवर्णक्रम श्रेणी, आर्गेलऊर्जास्तरचित्र d^1से d^9अवस्थाओं के लिए, $[Ti(H_2O)_6]^{3+}$संकुलआयन

	की इलेक्ट्रॉनिकवर्णक्रमविवेचना एवंअभ्यासार्थप्रश्न। **ब. कार्ब–धात्विकरसायन** परिचयात्मक, कार्ब–धात्विक यौगिकों का नामकरण, वर्गीकरण एवंबनाने की सामान्य विधियां, लीथियम, ऐल्यूमीनियम, मरकरी, टिनऔरटाइटेनियम के ऐल्किल व एरिल यौगिकों की बनाने की विधि, गुण, बन्ध प्रकृति एवंउपयोग।
Unit V	**A. Bio-Inorganic Chemistry** Introduction: Essential and trace elements in biological processes. Biological function of the bio-elements. Availability of bio-metals and bio-non-metals: Metalloporphyrins. Haemoglobin structure and biological function. Myoglobin-mechanism of oxygen transfer through haemoglobin and myoglobin; Relation between haemoglobin and myoglobin and chemical reaction of haemoglobin and myoglobin; Biological role of alkali and alkaline earth metal ions with special reference to Ca^{2+}, Nitrogen fixation. **B. Metal Nitrosyl Complex** Nitrosylating agents. Synthesis, Structure. Properties and Bonding . **अ. जैव–अकार्बनिकरसायन** परिचयात्मक, जैविकप्रक्रियाओंमेंआवश्यक एवंसूक्ष्म तत्व, जैवतत्वों के जैविककार्य, जैव धातु एवंजैव धातुओं की उपलब्धता, धातुपोरफाइरीन्स–हीमोग्लोबिन एवंमायोग्लोबिन, क्षारतथा क्षारीय मृदा धातुआयनों का जैविकमहत्व, पोटेशियम, सोडियमतथाकैल्शियम के संदर्भमें, नाइट्रोजनस्थिरीकरण एवंअभ्यासार्थप्रश्न। **ब. धातुनाइट्रोसिलसंकुल** नाइट्रोसिलेटिंग एजेण्ट, संश्लेषण, संरचना, गुण–धर्म एवंआबंधन।

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CO3–Magnetic properties of transition metal complexes

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CO5– Bioinorganic chemistry and metal nitrosyl complexes which may help them in their career related to medicinal chemistry

Unit I	**Spectroscopy:** Nuclear Magnetic Resonance Spectroscopy. Proton Magnetic Resonance (1HNMR) Spectroscopy, Nuclear shielding and de-shielding, chemical shift and molecular structure, spin-spin coupling and coupling constant, region of signals, Explanation of PMR spectra of simple organic molecules like ethyl bromide, ethanol, acetaldehyde, 1,1,2 tribromo ethane, ethylacetate, toluene and acetophenone. Applications of UV, IR and PMR spectroscopy for simple organic compounds.
	स्पेक्ट्रमिकी :नाभिकीय चुम्बकीय स्पेक्ट्रमिकीप्रोटोनचुम्बकीय अनुनाद(1HNMR)स्पेक्ट्रमिकी, नाभिकीय परिरक्षण एवंविपरिरक्षण, रासायनिकविस्थापन एवंआण्विकसंरचना, स्पिन–स्पिन युग्मन एवं युग्मनस्थिरांक, सिग्नल का क्षेत्र, सरलकार्बनिक यौगिकों के PMRस्पेक्ट्रा की व्याख्या, जैसे–इथाइलब्रोमाइड, एथेनॉल, एसीटेल्डिहाइड 1,1,2–ट्राइब्रोमोएथेन, इथाइलएसीटेट, टॉल्वीन एवं एसिटोफीनोन।UV, IR एव PMRस्पेक्ट्रमिकीतकनीक का उपयोगकरतेहुए सरलकार्बनिक यौगिकों की संरचना का निर्धारण।
Unit II	**(A) Organo-Metallic compounds:** Organomagnesium compounds- Grignard reagent, preparations, structure and chemical reactions. Organozinc compounds- Preparations and chemical reactions. Organolithium compounds- Preparations and chemical reactions. **(B) Organosulphur compounds.** Nomenclature, structural characteristics.

	Thiol, thio-ether, sulphonic acid, sulphonamide and sulphaguanidine- methods of preparations and chemical reactions. **(C) Organic synthesis by enolates:**Acidity of hydrogen, alkylation of diethyl malonate and ethyl acetoacetate, synthesis of ethylacetoacetate -Claisen condensation. Keto-enol tautomerism in ethylacetoacetate. Alkylation of 1,3 dithiane. Alkylation and acetylation of enamine.
	(अ)कार्ब–धात्विक यौगिक :कार्बमैग्नीशियम यौगिकः ग्रिग्नार्डअभिकर्मक–विरचन, संरचना एवंरासायनिकअभिक्रियाएं। कार्बजिंक यौगिक :–विरचन एवंरासायनिकअभिक्रियाएं। कार्बलीथियम यौगिकः–विरचन एवंरासायनिकअभिक्रियाएं। **(ब)कार्बसल्फर यौगिक** :नामकरण, संरचनात्मक लक्षण, थायोल, थायोईथर, सल्फोनिकअम्ल, सल्फोनामाइड एवंसल्फाग्वानिडीन के विरचन की विधियां एवंरासायनिकअभिक्रियाएं। **(स)–इनोलेटों द्वाराकार्बनिकसंश्लेषण**:हाइड्रोजन की अम्लीयता, डाइ एथिलमैलोनेट एवं एथिल ऐसिटोएसीटेट का ऐल्किलीकरण, एथिल ऐसिटोएसीटेट का संश्लेषण–क्लेसनसंघनन, एथिल ऐसिटोएसीटेट की कीटो–ईनॉलचलावयवता। 1,3–डाइथायेन का एल्किलीकरण व इनामिन का एल्किलीकरण एवं एसिलीकरण।
Unit III	**(A)Carbohydrates:**Classification and nomenclature. Monosaccharides, mechanism of osazone formation, interconversion of glucose into fructose. Ascending and descending series in aldose. Configuration of monosaccharides. Stereoisomers of erythro and threo sugars. Conversion of glucose into mannose. Glycosides, determination of size of the ring of monosaccharides. Ring structure of D(+) glucose, Mechanism of mutarotation, Structure of ribose and deoxyribose. Disaccharides- introductory idea of maltose, sucrose and lactose(Excluding structures). Polysaccharides - introductory idea of starch and cellulose (Excluding structures). **(B)Fat, Oil & Detergents:** Natural fats, edible and industrial oils of plant origin, Normal fatty acids, glycerides. Hydrogenation of unsaturated oils, Saponification value, iodine value and acid value. Synthetic Detergents:- Alkyl and aryl sulphonate.
	(अ) कार्बोहाइड्रेट : वर्गीकरणएवंनामकरण, मोनोसैकेराइड, ओसाजोन के विरचन की क्रियाविधि, ग्लूकोजतथाफ्रक्टोस का अंतररूपातंरण, एल्डोसोंमें श्रंखलाआरोहण व अवरोहण, मोनेसैकेराइडों का अभिविन्यास, एरिथ्रो एवंथ्रियोअप्रतिबिम्बी त्रिविम समावयवी, ग्लूकोज का मैनोजमें रूपांतरण, ग्लाइकोसाइड, मोनोसैकेराइड के वलय के आकार का निर्धारणD(+)ग्लूकोज की वलय संरचना, परिवर्ती ध्रुवणघूर्णन की क्रियाविधि, राइबोस एवंडीऑक्सीराइबोस की संरचना, डाइसैकेराइड–माल्टोस, सुक्रोज एवंलैक्टोस (संरचना निर्धारण छोडकर) एवंपॉलीसैकेराइड–स्टार्च एवंसैल्युलोस का परिचयात्मक अध्ययन (संरचना निर्धारण छोड़कर)। **(ब) वसा, तेल एवंअपमार्जक:**

	प्राकृतिकवसा; वानस्पतिकउद्भव के खाद्य एवंऔद्योगिकतेल, सामान्य वसीय अम्ल, ग्लिसराइड, असंतृप्ततेलों का हाइड्रोजनीकरण, साबुनीकरणमान, आयोडीनमान, अम्लमान साबुन, सांश्लेषिकअपमार्जकः– एल्किल एवं ऐरिलसल्फोनेट।
Unit IV	**(A)Amino acids, Peptide, Protein and Nucleic acid :**Classification of amino acids, structure and stereochemistry. Acid base behaviour, Isoelectric point and electrophoresis. Preparations and chemical reactions of α- amino acids. Nomenclature and structure of peptide and proteins. Classifications of proteins, determination of peptide structure, end group analysis, selective hydrolysis of peptides, peptide synthesis, solid phase peptide synthesis. Structure of peptide and proteins, level of Proteins structure, denaturation of proteins. Nucleic acids:Constitution of nucleic acids, ribonucleoside and ribonucleotide, Double helical structure of DNA. **(B) Synthetic dyes:** Colour and chemical constitution (electronic concept). Classification of dyes – Methyl orange, Congo red, Malachite green, Crystal violet, phenolphthalein, Fluoroscein, Alizarine and Indigo – Chemical study and synthesis.
	(अ) एमीनोअम्ल, पेप्टाइड, प्रोटीन एवंन्युक्लिकअम्लःऐमीनोअम्ल का वर्गीकरण, संरचना एवं त्रिविम रसायन, अम्ल–क्षारकीय व्यवहार, समविभवबिन्दु एवंवैद्युतकणसंचलन, α- ऐमीनोंअम्ल का विरचन एवंअभिक्रियाएं।पेप्टाइड एवंप्रोटीन की संरचना एवंनामकरण, प्रोटीन का वर्गीकरण, पेप्टाइडसंरचना का निर्धारण, अंत्य समूहविश्लेषण, पेप्टाइड का चयनात्मकजल–अपघटन, पेप्टाइडसंश्लेषण, ठोसप्रावस्थापेप्टाइडसंश्लेषण, पेप्टाइड एवंप्रोटीन की संरचना, प्रोटीनसंरचना के स्तर, प्रोटीनविकृतिकरण। न्यूक्लिकअम्ल–परिचयात्मक अध्ययन, न्युक्लिकअम्ल का संघटन, राइबोन्यूक्लियोसाइड एवंराइबोन्यूक्लियोटाइड, DNA की द्विकुंडलिनीसंरचना। **(ब) संश्लेषितरंजकः**रंग एवंसंघटन (इलेक्ट्रॉनिक अवधारणा) , रंजकों का वर्गीकरण, मेथिलऑरेंज, कॉगोरेड, मैलाकाइटग्रीन, क्रिस्टलवायलेट।
Unit V	**Heterocyclic compounds** Introduction of pyrrole, furan, thiophene and pyridine: molecular orbital approach aromatic characters, methods of synthesis and specific chemical reactions with reference to electrophillic substitutions. Reaction mechanism of nucleophillic substitution in pyridine derivatives. Comparison of basicity between pyridine, piperidine and pyrrole. Introductory idea about five- and six-membered condensed hetercyclic compounds. Indole, Quinoline and isoquinoline- preparations and chemical properties (Fischer-Indole synthesis, Skraup'ssynthesis,Bischler–Napieralski synthesis). Electrophilic substitution reactions of Indole, Quinoline and Isoquinoline.
	विषमचक्रीय यौगिक :पिरोल, फयुरेन, थायोफीन एवंपिरिडीन का परिचयः आण्विककक्षकपरिदृश्य एवं ऐरोमेटिकअभिलक्षण, संश्लेषण की विधियां एवंइलेक्ट्रॉनस्नेहीप्रतिस्थापन के

	संदर्भमेंविशिष्टरासायनिकअभिक्रियाएं, पिरिडीनव्युत्पन्नों के नाभिकस्नेहीप्रतिस्थापनअभिक्रियाओं की क्रियाविधि। पिरीडीन, पिपेरिडीन एवंपिरोल की भास्मिकता की तुलना। पांच एवं छः सदस्यीय संघनितविषमचक्रीय यौगिकों का परिचय।इण्डोल, क्वीनोलीन एवंआइसोक्वीनोलीन का विरचन एवंरासायनिकअभिक्रियाएं (फिशर–इण्डोल संश्लेषण, स्क्रॉपसंश्लेषण एवंबिशलर–नेपिअराल्सकीसंश्लेषण के विशिष्टसंदर्भ में) : इण्डोल, क्विनोलीन एवंआइसोक्विनोलीन के इलेक्ट्रॉनस्नेहीप्रतिस्थापनअभिक्रियाओं की विधि।

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SADHU VASWANI AUTONOMOUS COLLEGE
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Syllabus recommended by Board of studies of Chemistry
Session 2017-18

Class	:	B.Sc.
Year	:	III
Subject	:	Chemistry
Paper	:	Pratical
Course Code	:	PR-SC-A43
Max. Marks	:	50

Course Outcomes

After completion of this course, the students understand:

CO1- Gravimetric estimation of Ba and Cu, preparation of inorganic complexes and organic compounds which will further help in chemical industry

CO2- Analysis of various ions present in water samples, determine the velocity constant, partition coefficient and perform pH-metric and conductometric titrations and find the stoichiometry of complex formation by Job's method

CO3- Separation and analysis of binary organic mixture and identify two simple organic compounds

CO4- After understanding all this the students can easily get jobs in chemical industries.

Examination Scheme

Physical Chemistry	: 12 Marks
Inorganic Chemistry	: 12 Marks
Organic Chemistry	: 12 Marks
Viva-voce	: 06 Marks
Record	:08 Marks
Total	:50 Marks

Inorganic Chemistry **12 marks**

(i) Gravimetric analysis :
Barium as barium sulphate, Copper as cuprous–thiocynate.
(ii) Complex compound preparation
a. Potassium chlorochromate(IV)
b. Tetrammine copper (II)sulphate monohydrate
c. Hexamminenickel (II)chloride
(iii) Effluent water analysis, Identification of cations and anions in different water samples.
(iv) Water analysis:To determine the amount of dissolved oxygen in water samples in ppm.

Physical Chemistry **12 marks**

(i) To determine the velocity constant (specific reaction rate) of hydrolysis of methyl acetate/ethyl acetate catalyzed by hydrogen ions at room temperature.
(ii) Determination of partition coefficient of iodine between carbon tetra chloride and water.
(iii) Job's Method.
(iv) pH-metric titrations, conductometric titrations.

Organic Chemistry **12 marks**

(i) Binary mixture analysis containing two solids: Separation, identification and preparation of derivatives.

(ii) Preparation:

(i) Acetylation(ii) Benzoylation(iii) meta-Dinitrobenezene(iv) Picric acid

Viva- voce **6 marks**

Record **8 marks**

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Syllabus recommended by Board of studies of Industrial Chemistry
Session 2017-18

Class	:	B.Sc.
Year	:	I
Subject	:	Industrial Chemistry
Paper	:	I
Course Code	:	SC-A26(A)
Max. Marks	:	40 + CCE 10

Course Outcomes

After completion of this course, the students understand:
CO1 - about petroleum and fractional distillation of crude oil
CO2 - different types of coal, test methods and characterization
CO3 - catalysis and surface chemistry
CO4 - inorganic materials of industrial importance
CO5 - process of drying, distillation and evaporation

Unit- 1	Petroleum: Introduction, Occurrence, composition of petroleum, origion, theory of petroleum, classification of petroleum, refining of petroleum. Fraction distillation of crude oil : Cracking, reforming, Hydroforming Isomerisation, Purification of petroleum, Flash Point, Knocking, Octane number.
Unit- 2	Coal : Types, Composition, structure, classification and properties of coal, Distillation of coal, Low and high temperature carbonation of coal, calorific value of coal, Analysis of Coal.
Unit- 3	Catalysis: Introduction, Types: Homogeneous and Heterogeneous catalysis, Basic Principles of catalysis, Mechanism of catalysis, Factor affecting the catalysis reaction, Industrial uses of catalysis reaction. Surface chemistry and interfacial phenomenon : Adsorption isotherm, Sols, Gels, Emulsions
Unit- 4	Inorganic materials of industrial importance: Their availability, forms, structure and modifications - Alumina, Silica, Silicates, Clays, Mica, Carbon, Zeolites. Drying: Introduction, Equipments- tray dryer, rotary dryer, drum dryer, spray dryer
Unit- 5	Distillation: Introduction, Types of distillation : Simple distillation, Fractional distillation, Steam distillation, Distillation under reduced pressure, Batch and continuous distillation, Plate columns and packed column distillation. Evaporators : Introduction, Equipment Short tube evaporator, forced circulation evaporators, climbing film evaporators, wiped film evaporators.

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Session 2017-18

Class	:	B.Sc.
Year	:	I
Subject	:	Industrial Chemistry
Paper	:	II
Course Code	:	SC-A26(B)
Max. Marks	:	40 + CCE 10

Course Outcomes

After pursuing this course, the students understand:

CO1 - metallurgical operations and physicochemical principles of extraction of different metals
CO2 - industrially important enzyme catalysed reactions, dimensions and units, basic chemical calculations and mole composition of liquid and gaseous mixtures.
CO3 - Material balance without chemical reactions for chemical engineering operations
CO4 - different types of fuels, boilers and heat exchangers.
CO5 - industrial use of water, steam and air; working of fans, blowers and different type of pumps

Unit- 1	**Basic Metallurgical Operations :** Pulverization, Calcinations, roasting, refining, Physicochemical Principles extraction of Iron, Copper, Aluminium, Magnesium, Zinc and Chromium.
Unit- 2	**Enzyme Catalyzed reaction:** Rate model, industrially important reactions. Dimensions and Units, Basic Chemical Calculations : Atomic weight, molecular weight, equivalent weight, Mole composition of (i) liquid mixture and (ii) gaseous mixtures.
Unit- 3	**Material balance without chemical reaction:** Flow diagram for material balance, simple material balance with or without recycle of by-pass for chemical engineering operations such as distillation, absorption, crystallization, evaporation, extraction etc.
Unit- 4	**Utilities in Chemical industry:** **Fuel :** Types of fuel, Advantages and disadvantages, combustion of fuels, calorific value, specification for fuel oils. **Boilers :** Types of boilers and their functioning, Heat transfer, heat exchangers shell and tube, finned tube heat exchanger ,plate heat exchangers, refrigeration cycles
Unit- 5	**Water:** Specification for Industrial use, various water treatments. **Steam :** generation and use, **Air:** specification for industrial use processing of air. **Fluid flow :** Fans, blowers, compressors, vacuum pumps ejector. **Pump:** Reciprocating pumps, gear pump, centrifugal pumps.

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Syllabus recommended by Board of studies of Industrial Chemistry
Session 2017-18

Class	:	B.Sc.
Year	:	I
Subject	:	Industrial Chemistry
Paper	:	Pratical
Course Code	:	PR-SC-A26
Max. Marks	:	50

Duration of practical during the examination : 4 hours

Course Outcomes

After completion of this course, the students can:

CO1 determine melting point, boiling point
CO2 find various parameters of water and soil samples
CO3 prepare standard solutions
CO4 do calibration of thermometers
CO5 perform different techniques of chromatography.
CO6 find different physical constants

Scheme of Examination

Experiment No. 1	: 15 Marks
Experiment No. 2	: 15 Marks
Viva	: 10 Marks
Sessional	: 10 Marks
Total	**:50 Marks**

Experiments

1. Determination of M.P. and elevation in B.P. of solids and liquids.
2. Analysis of water : Alkalinity, Hardness, pH, Chloride, Sulphate.
3. Calibration of thermometers.
4. Preparation of standard solution : Primary and secondary standards
5. Determination of Flash Point.
6. Chromatography: Paper, thin layer.
7. Determination of physical constants : Density, Refractive index, surface tension, viscosity

Soil Analysis : Determination of pH, Mg, Silica, Alkalinity

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Syllabus recommended by Board of studies of Industrial Chemistry
Session 2018-19

Class	:	B.Sc.
Year	:	II
Subject	:	Industrial Chemistry
Paper	:	I
Course Code	:	SC-A37(A)
Max. Marks	:	40 + CCE 10

Course Outcomes

After pursuing this course the students understand:

CO1 - inorganic materials like cement, ceramics, polymeric materials, plastics and their manufacturing processes
CO2 - glass and various types of corrosion relevant to chemical industry
CO3 - the process of nitration, halogenation
CO4 –sulphonation
CO5 -industrial pollution with reference to water and air pollutants

Unit- 1	**Cement:** Types of cement, composition, manufacturing processes, setting of cement. **Ceramic:** Introduction, types, manufacturing processes, applications, refractory materials. **Polymeric materials:** Introduction, mechanism of polymerization **Plastic :** Preparation, properties and uses of polythene, PVC, bakellite, Nylon 66. Industrial applications.
Unit- 2	**Glass:** Types, composition, manufacturing, physical and chemical properties, applications. **Corrosion:** Various types of corrosion relevant to chemical industry, mechanism, protection against corrosion.
Unit- 3	**Nitration:** Introduction, nitrating agents, kinetics and mechanism of nitration processes such as nitration of : 1:- Paraffinic hydrocarbon. 2:- Benzene to nitrobenzene and m-dinitrobenzene. 3:- Acetanilide. **Halogenation:** Introduction, kinetics of halogenation reactions, reagents for halogenation reactions, halogenation of alphatic and aromatic hydrocarbons (Nuclear & side chain halogenetion). Halogenation of aliphatic hydrocarbons with special reference to energy profile diagram. Halogenations of aromatic hydrocarbons- types of reagents & their kinetics. Commercial manufacturing of dichlorobenzene.

Unit- 4	**Sulphonation:** Introduction, sulphonating agentssulphonation of aliphatic and aromatic hydrocarbons, Mechanism of sulphonation reaction, reversibility of sulphonation concept of reversibility of sulphonation.
Unit- 5	**Industrial Pollution :** Introduction to industrial pollution with reference to water and air-statutory limits of air and water pollutants.

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Syllabus recommended by Board of studies of Industrial Chemistry
Session 2018-19

Class	:	B.Sc.
Year	:	II
Subject	:	Industrial Chemistry
Paper	:	II
Course Code	:	SC-A37(B)
Max. Marks	:	40 + CCE 10

Course Outcomes

After completion of this course the students understand:

CO1 - principle, construction and working of instruments for the measurement of temperature, pressure, liquid level, density, viscosity
CO2 - the process of oxidation and reduction
CO3 - concept of hydrogenation and esterification
CO4 - management of solid waste, soil conditioning, ozone depletion, carbon credits
CO5 - principle and equipment of aerobic and anaerobic treatment

Unit- 1	**Concept of measurement and accuracy**: Principle, construction and working of instruments for the measurement of following parameters: **Temperature:** Glass thermometer, vapor filled spring thermometer, radiation pyrometer. **Pressure:**Manometer, Barometer, Pirani gauges, Diaphragm type, pressure gauge. **LiquidLevel:** Float type liquid level gauge. **Density** **Viscosity**
Unit- 2	**A. Oxidation:** Introduction–Types of oxidising agents, kinetics and mechanism of oxidation, vapour phase oxidation, commercial manufacturer of acetic acid, benzoic acid, maleic anhydride, phathalic anhydride, acrolein and acetaldehyde. **B. Reduction:** Introduction, methods of reduction, commercial manufacture of aniline, nitroaniline, p-amino phenol.
Unit- 3	**A. Hydrogenation:** Introduction- kinetics and thermodynamics of hydrogenation, reaction catalysis of hydrogenation reaction, hydrogenation of vegetable oil, manufacturing of methanol from carbon monoxide and hydrogen. **B. Esterification:** Introduction, esterification by organic acids, commercial manufacturing of ethyl acetate, diacetyl phthalate, vinyl acetate and cellulose acetate.
Unit- 4	Solid waste management, industrial safety, removal of solid contaminants from waste water by coagulation, incineration, fuel palatization, soil conditioning and green house effect, ozone depletion, carbon credits.
Unit- 5	Principle and equipments of aerobic, anaerobic treatment such as adsorption, filtration, sedimentation, bag filters, electrostatic precipitators, mist eliminators, wet scrubbers.

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Syllabus recommended by Board of studies of Industrial Chemistry
Session 2018-19

Class	:	B.Sc.
Year	:	II
Subject	:	Industrial Chemistry
Paper	:	Pratical
Course Code	:	SC-A37
Max. Marks	:	50

Duration of practical during the semester examination : 4 hours

Course Outcomes

After completion of this course, the students can:

CO1- Do Unit process such as Preparations using nitration, sulphonation, halogenations
CO2- Make use of instrumental methods of analysis
CO3- Do sampling and analysis of different parameters of water samples
CO4- DetermineFlash point and Ignition points of oils and lubricants

Scheme of Examination

Experiment No. 1	: 15 Marks
Experiment No. 2	: 15 Marks
Viva	: 10 Marks
Sessional	: 10 Marks
Total	**:50 Marks**

Experiments

1. Unit process: Preparations using nitration, sulphonation, halogenations.
2. Instrumental Methods of Analysis: colorimetery, potentiometery, conductometry.
3. Water Analysis: Sampling, physical parameters such as- pH, conductivity, turbidity, TDS, Hardness, COD, BOD etc.
4. Flash point and Ignition points of Oils and Lubricants.

Project Report: - Students are required to visit places of industrial interest.

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Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Industrial Chemistry
Session 2019-20

Class	:	B.Sc.
Year	:	III
Subject	:	Industrial Chemistry
Paper	:	I
Course Code	:	SC-A48(A)
Max. Marks	:	40 + CCE 10

Course Outcomes

After pursuing this course, the students understand:

CO1 – basics skills of project cost estimation
CO2 – pricing policy
CO3 – concept of scientific management in industry
CO4 – basic concepts of chromatographic techniques and spectroscopy
CO5 – sampling, collecting and processing of data, NMR-Spectroscopy, Atomic Adsorption, Flame Photometry. Neutron diffraction, X-ray fluorescence.

Unit- 1	**Factors involved in project cost estimation :** Methods employed for the estimation of capital investment. Capital formation, Elements of cost accounting. Interest and investment costs. Time value of money- equivalence. Depreciation, methods of determining depreciation, Taxes Some aspect of marketing. Economics of selecting
Unit- 2	**Pricing Policy:** Profitability criteria, economics of selecting alternatives. Variation of cost with capacity, Break even point, optimum batch sizes, production scheduling etc.
Unit- 3	**Concept of scientific management in industry :** Functions of management decision making and planning organizing, location of industry, directing and control inventory control, management of human resources selection incentives. Concept of welfare and safety in industries.
Unit- 4	**Modern Instrumental methods of analysis :** Chromatography, paper chromatography, TLC, GLC, HPLC. UV-visible spectroscopy, Beer Lamberts law, IR Spectroscopy, rotational, vibrational and transitional spectra
Unit- 5	**Sampling** Procedures, sampling of bulk materials, Techniques of sampling solids liquids and gases, Collecting and processing of data. NMR-Spectroscopy, Atomic Adsorption, Flame Photometry. Neutron diffraction, X-ray fluorescence.

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Syllabus recommended by Board of studies of Industrial Chemistry
Session 2019-20

Class	:	B.Sc.
Year	:	III
Subject	:	Industrial Chemistry
Paper	:	II
Course Code	:	SC-A48(B)
Max. Marks	:	40 + CCE 10

Course Outcomes

After pursuing this course, the students understand:

CO1 - various Physical and Chemical processes used for the recovery of important compounds

CO2 - need for waste recycles, conversion of waste-in to useful products

CO3 - synthetic fibers, properties and applications of synthetic fibers

CO4 - characterization of waste, management and recovery of important compounds from the waste of some industries

CO5 - recovery of compounds from oil industries, dyestuff industries, fertilizers industries, textile industries, Soap and plant, setting of Small Scale Unitssuch as agarbatties, wax candles, shoe polish, chalk, crayons, plaster of Paris and safety matches.

Unit- 1	**Physical and Chemical processes used for the recovery of important compounds:** Adsorption, Evaporation, Distillation, Centrifugation, Coagulation, Osmosis, reverse osmosis and elctrodialysis.
Unit- 2	**Need for waste recycles :** Limitation of raw material resources, waste elimination, conversion of waste -into useful products. Domestic and agro waste, feasibility of recycle, separation of waste- solid, liquid and gases
Unit- 3	**Synthetic Fibers :** Introduction, important requirements of a fiber, difference between natural fibers and artificial or synthetic fibers, properties of synthetic fibers, method of spinning, application of synthetic fibers, rayon.
Unit- 4	**Characterization of waste :** Management and recovery of important compound from the waste of the following industries. Slaughter house rubber, sugar, heavy chemicals, fermentation, thermal power station electroplating and paper. recovery of important compound from the waste of Slaughter house
Unit- 5	**Recovery of compound:** From oil industries, dyestuff industries, fertilizers industries, textile industries. Soap and plant. **Small Scale Units :**Agarbatties, wax candles, shoe polish, chalk, crayons, plaster of Paris and safety matches,

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Syllabus recommended by Board of studies of Industrial Chemistry
Session 2019-20

Class	:	B.Sc.
Year	:	III
Subject	:	Industrial Chemistry
Paper	:	Pratical
Course Code	:	PR-SC-A48
Max. Marks	:	50

Duration of practical during the main examination: 4 hours

Course Outcomes

After completion of this course, the students can:

CO1- Determine iodine value and saponification value of oils or fats
CO2- Determine calorific value of Petroleum based fuel
CO3- Do separation of important metals Fe, Ni, Cr, etc from effluents and their estimation
CO4- Do separation of ions and metals by thin layer chromatography and paper chromatography
CO5- Study of adsorption of acetic acid on charcoal and prove the validity of Freundlich's adsorption isotherm

- be familiar with chemical industries and pollutants from these industries. Participation in seminars and workshops can develop research skills in them.

Scheme of Examination

Experiment No. 1	: 15 Marks
Experiment No. 2	: 15 Marks
Viva	: 10 Marks
Sessional	: 10 Marks
Total	**:50 Marks**

Experiments

1. Determination of iodine value of an oils or fats.
2. Determination of saponification value of oils or fats.
3. Identification of calorific value of Petroleum based fuel.
4. Separation of important metals Fe, Ni, Cr, etc from effluents and their estimation.
5. Separation of ions and metals by thin layer chromatography and paper chromatography.
6. Study of adsorption of acetic acid on charcoal and prove the validity of Freundlich's adsorption isotherm.

Project Report: - Students are required to visit industries or and to collect their product and chemical effluent analysis and submit a brief report. Students are also allowed to participate in sem

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Syllabus Recommended By Board of Studies of Zoology
Session – 2021-22

Class	:	B.Sc.
Year	:	I
Subject	**:**	Zoology
Paper Name	:	Invertebrate
Paper	:	I
Max. Marks	:	40+10 CCE
Course Code	:	SC-A25(A)

Course Outcome

CO1- To gain elementary knowledge of zoological nomenclature, international code and classification of invertebrates.

CO2- To study the protozoa, protozoan diseases, porifera and coelenterata& corals.

CO3- To understandpathogenic symptoms of nematodes and diseases, type study of Fasciola hepatica and Earthworm.

CO4- To study anatomy and physiology of Prawn and Pila, larval forms of crustacea, study of insects as vectors of human diseases.

CO5- To study the external features and water vascular system, life history of star fish. Type study & Affinities of Balanoglossus.

Unit-1	1. Elementary knowledge of Zoological Nomenclature and International Code. 2. Classification of Lower Invertebrates (According to Parker and Haswell 7th Edition) (i. Protozoa ii. Porifera iii. Coelenterata iv. Platyhelminthes v. Nemathelminthes) 3. Classification of Higher Invertebrates (According to Parker and Haswell 7th Edition) (i. Annelida ii. Arthropoda iii. Mollusca iv. Echinodermata v. Hemichordata) 1. प्राणीकीय नामकरण और अंतर्राष्ट्रीय कोड का सामान्यअध्ययन 2. निचले अकशेरुकी जीवों का वर्गीकरण)पार्कर और हैसवेल 7वें संस्करण के अनुसार((i. प्रोटोजोआ ii. पोरिफेरा iii. सीलेंट्रेटा iv. प्लेटिहेल्मिन्थीस v. निमेटाहेल्मिन्थीस(3. उच्च अकशेरुकी जीवों का वर्गीकरण)पार्कर और हैसवेल 7वें संस्करण के अनुसार((i. ऐनेलिडा ii. आर्थ्रोपोडा iii. मोलस्का iv. इकाइनोडर्मेटा v. हेमीकोर्डेटा(
Unit-2	1. **Protozoa :**Type study of Plasmodium. 2. Protozoa and Diseases. 3. **Porifera :**Type study of Sycon. 4. **Coelenterata :** Type study of Obelia. 5. Corals and Coral Reef formation. 1. प्रोटोजोआ :प्लाज्मोडियम का प्रारूप अध्ययन 2. प्रोटोजोआ और रोग

	3. पोरिफेरा :साइकॉन का प्रारूप अध्ययन 4. सीलेंट्रेंटा :ओबेलिया का प्रारूपअध्ययन 5. प्रवाल एवं प्रवाल-भित्ती का निर्माण
Unit-3	1. **Helminthes :**Type study of Fasciola Hepatica. 2. Pathogenic symptoms of Nematodes and Diseases. 3. **Porifera :**Type study of Earthworm (Pheretima). 4. Coelom and Metamerism I Annelida. 5. Structure and Significance of Trochophore Larva. 1. हेल्मिंथस -फेसिओला का प्रारूप अध्ययन 2. निमेटोडाके रोग एवं रोगजनक लक्षण 3. ऐनेलिडा -केंचुआ)फेरेटिमा (का प्रारूप अध्ययन 4. एनेलिडामे देह गुहा एवं मेटामेरिज्म 5. ट्रोकोफोर लार्वा की संरचना और महत्व
Unit-4	1. **Arthropoda :**Type study of Prawn (Palaemon). 2. Larval forms of Crustacea. 3. Different types of mouth parts in insects. 4. Insects as Vectors of human diseases. 5. **Mollusca :**Type study of Pila (An Apple Snail). 1. आर्थ्रोपोडा :झींगे का प्रारूप (पेलीमॉन)अध्ययन 2. क्रस्टेशिया के लार्वा 3. कीड़ों में विभिन्न प्रकार के मुंह के अंग 4. मानव रोगों के वाहक के रूप में कीट 1. .5मोलस्का :पाइला का प्रारूप
Unit-5	1.**Echinodermata :**External features and water vascular system of Start fish (Asterias). 2. Life history of star fish. 3. Larval forms of Echinoderms. 4. **Hemichordata :**Type study of Balanoglossus. 5. Affinities of Balanoglossus. 1. इकाइनोडर्मेटा :तारा मछली की बाहरी संरचना एवं जल संवहनतंत्र 2. तारा मछली का जीवन चक्र 3. इकाइनोडर्मेटा के लार्वा 4. हेमीकोर्डेटा ब:बैलेनोग्लोससका प्रारूप अध्ययन 5. बैलेनोग्लोसस की बंधता

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Syllabus Recommended By Board of Studies of Zoology
Session – 2021-22

Class	:	B.Sc.
Year	:	I
Subject	:	Zoology
Paper Name	:	Cell Biology and Developmental Biology
Paper	:	II
Max. Marks	:	40+10 CCE
Course Code	:	SC-A25(B)

Course Outcome

CO1- To learn about history about cell biology and cell theory. Structure and function prokaryotic, eukaryotic cell and cell organelles.

CO2- To gain knowledge about structure and function of nucleus and nucleolus. To study structure and function of typical chromosomes, and special types of chromosomes, cell cycle, mitotic and meiotic cell division.

CO3- To understand gametogenesis, fertilization, parthenogenesis, regeneration. Study of stem cells sources, types and their uses.

CO4- Study of development of frog.

CO5- Study of development of chick.

Unit-1	1. History of cell biology, cell theory. 2. Prokaryotic and Eukaryotic cells. 3. Structure and functions of Plasma membrane. 4. Structure and functions of Golgi body, Endoplasmic reticulum, Lysosomes. 5. Structure and functions of Mitochondria, Ribosome, Centriole. 1. कोशिका जीव विज्ञान का इतिहास, कोशिका सिद्धांत 2. प्रोकैरियोटिक और यूकेरियोटिक कोशिकाएं 3. प्लाज्मा झिल्ली की संरचना और कार्य 4. गॉल्जी बॉडी, एंडोप्लाज्मिक रेटिकुलम, लाइसोसोम की संरचना और कार्य 5. माइटोकॉन्ड्रिया, राइबोसोम, सेंट्रीओल की संरचना और कार्य
Unit-2	1. Structure and functions of Nucleus and Nucleolus. 2. Structure and functions of typical chromosome. 3. Basic concept of chromatin and heterochromatin. 4. Structure and functions of Lampbrush and Polytene Chromosome. 5. Cell cycle, mitotic and Meiotic cell division. 1. केन्द्रक और केन्द्रिका की सरंचनाएवं कार्य 2. प्रारूपिक गुणसूत्रों की संरचना और कार्य 3. क्रोमैटिन और हेटरोक्रोमैटिन की आधारभूत अवधारणा 4. विशेष प्रकार के गुणसूत्र -लैम्पब्रश और पॉलीटीन 5. कोशिका चक्र, समसूत्री और अर्ध सूत्री कोशिका विभाजन
Unit-3	1. Gametogenesis. 2. Fertilization. 3. Parthenogenesis. 4. Regeneration.

	5. Stem cells sources, types and their uses. 1. युग्मक जनन 2. निषेचन 3. अनिषेकजनन 4. पुनरूदभवन 5. स्टेम कोशिका -स्रोत, प्रकार और उपयोगिता
Unit-4	**Development of Frog** 1. Cleavage. 2. Blastulation. 3. Fate map construction. 4. Gastrulation and formation of three germinal layers. 5. Structure of Tadpole Larva. 1. विदलन 2.ब्लास्टुलेशन 3. फेटमेप का निर्माण 4. गैस्ट्रुलेशन और तीन जनन स्तरो का निर्माण 5. टैडपोल लार्वा की संरचना
Unit-5	**Development of Chick** 1. Cleavage. 2. Blastulation. 3. Fate map construction. 4. Gastrulation. 5. Development of chick embryo up to formation of primitive streaks. 6. Extra embryonic membranes in chicks. **इकाई-5 : चूजे का विकास** 1. विदलन 2. ब्लास्टुलेशन 3. फेटमेप का निर्माण 4. गैस्ट्रुलेशन 5. प्रिमिटिव स्ट्रीक तक चूजे के भ्रूण का विकास 6. चूजों में बाहय भ्रूण झिल्लीयाँ

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Syllabus Recommended By Board of Studies of Zoology
Session – 2021-22

Class	:	B.Sc.
Year	:	I
Subject	:	Zoology
Paper Name	:	Practical
Max. Marks	:	50
Course Code	:	PR-SC-A25

Course Outcome

CO1- Understand the museum specimens and slides of Invertebrates.

CO2- To study the dissection / demonstration of anatomy of Earthworm, Prawn and Pila.

CO3- To study the mounting of prawn statocyst, pila-radula, earthworm-septal hephridia and mouth parts of insects.

CO4- Study ofexercise related to frog and chick embryology.

CO5- Study of exercise/spotting related to cell biology.

1.Study of museum specimens and slides relevant to invertebrates studies in theory.

2. Mounting

(a) Prawn statocyst

(b) Pila : Ctenidium / Radula / Osphradium

(c) Earthworm : Septal Nephridia

(d) Mouth parts of insects.

3. Dissection / Demonstration

(a) Earthworm : Digestive System, Nervous system , Reproductive System

(b) Prawn : Nervous System, Appendages

(c) Pila : Nervous System

4. Exercise related to frog and chick embryology.

5. Exercise / spotting related to cell biology.

(a) Squash preparation of onion root tip

(b) Stages of mitotic and meiotic cell division

(c) Special types of chromosomes

DISTRIBUTION OF MARKS

1. Dissection	**08**
2. Spotting	**16**
3. Mounting	**04**
4. Exercise related to Embryology	**04**
5. Exercise related to Cell Biology	**04**
6. Viva-Voce	**04**
7. Practical Record	**05**
8. Collection	**05**
	Total 50

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Session – 2021-22

Class	:	B.Sc.
Year	:	II
Subject	:	Zoology
Paper Name	:	Vertebrates and Evolution
Paper	:	I
Max. Marks	:	40+10 CCE
Course Code	:	SC-A36(A)

Course Outcome

CO1- To understand origin of chordates, classification up to orders – according to Parker and Haswell. Type study of Herdmania and Amphioxus.
CO2- To study of comparative account of Integument, limbs and girdles, digestive system, respiratory system of vertebrates.
CO3- To study the comparative account of aortic arches and heart, brain and Urinogenital system of vertebrates.
CO4- To understand the sense organ (Eye and Ear)and. placentation in mammals.
CO5- To gain knowledge about the origin of life, modern concepts only, Lamarckism and Darwinism, De Vries with theories of Evolution. Study of micro, macro and mega evolution.
CO6- To gain knowledge about fossils, fossilization and method of age determination. Study of extinct forms of Dinosaurs and Archaeopteryx.
CO7- Study of zoogeographical distribution, evolution of man, and geological time scale and insular fauna.

Unit-1	1. Origin of Chordates, Classification of phylum Chordata up to orders according to ParkerHaswell.(latest edition)& 2. **Urochordata :** Type study of Herdmania. 3. **Cephalochordata :** Type study of Amphioxus, Affinities of Amphioxus. 4. Comparison between Petromyzon and Myxine. 1. रज्जुकियो की उत्पत्ति, रज्जुकियोका गण स्तर तक वर्गीकरण)पार्कर एवं हेसवेल के नवीन संस्करण अनुसार (2. यूरोकॉर्डटा :हर्डमेनिया का अध्ययन 3. सिफेलोकॉर्डेटा :एम्फीऑक्सस का अध्ययन, एम्फीऑक्सस की सजातियता 4. पेट्रोमायज़ोन और मिक्सिन के बीच तुलना
Unit-2	1. Comparative account of integuments and its derivatives of vertebrates. 2. Comparative account of limbs and girdles of vertebrates. 3. Comparative account of digestive system of vertebrates. 4. Comparative account of respiratory system of vertebrates. 1. कशेरुकि में अध्यावरण का तुलनात्मक विवरण एवं उनके व्युत्पन्न 2. कशेरुकि में पादआस्थियों तथा मेखला का तुलनात्मक विवरण 3. कशेरुकि में पाचन तंत्र का तुलनात्मक विवरण 4. कशेरुकि के श्वसन तंत्र का तुलनात्मक विवरण
Unit-3	1. Comparative account of aortic arches and heart of vertebrates.

	2. Comparative account of brain of vertebrates. 3. Comparative account of Urinogenital system of vertebrates. 4. Sense organs (eye & ear) of mammals. 5. Placentation in mammals. 1. कशेरुकि में हृदय एवं एओटिक आर्चेस का तुलनात्मक विवरण 2. कशेरुकि में मस्तिष्क का तुलनात्मक विवरण 3. कशेरुकि में मूत्रजनन तंत्र का तुलनात्मक विवरण 4. स्तनधारियों के संवेदी अंग)आंख और कान(5. स्तनी में जरायु विन्यास
Unit-4	1. Origin of life : Modern concepts only. 2. Lamarckism, Darwinism, De Vries. 3. Modern synthetic theories of evolution. 4. Adaptation and mimicry. 5. Micro, macro and mega evolution. 1. जीवन की उत्पत्ति :आधुनिक संकल्पना 2. लैमार्कवाद, डार्विनवाद, डीवेरीज 3. आधुनिक संश्लेषण सिद्धांत)विकास वाद (4. अनुकूलन एवं अनुहरण 5. माइक्रो, मैक्रो एवं मेगा उदविकास
Unit-5	1. Fossils, methods of fossilization, determination of age of fossils. 2. Study of extinct forms: Dinosaurs and Archaeopteryx. 3. Zoogeographical distribution. 4. Evolution of man. 5. Geological time scale and Insular fauna. 1. जीवाश्म, जीवाश्म बनने की विधियाँ, जीवाश्म के आयु का निर्धारण 2. विलुप्त प्राणियों का अध्ययन: डायनासोर और आर्कियोप्टेरिक्स 3. जंतु-भौगोलिक वितरण 4. मनुष्य का उदविकास 5. भूगभीर्य समय –तालिका और इन्सूलर जंतु-जगत

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Session – 2021-22

Class	:	B.Sc.
Year	:	II
Subject	:	: Zoology
Paper Name	:	Animal Physiology and Biochemistry
Paper	:	II
Max. Marks	:	40+10 CCE
Course Code	:	SC-A36(B)

Course Outcome

CO1- To understand physiology of digestion in mammals, protein, carbohydrate and lipid metabolism.

CO2- To study of respiration, excretion and immune system in mammals.

CO3- To gain knowledge about regulatory mechanisms of enzymes and role of vitamins.

CO4- To study of neuromuscular co-ordination.

CO5- To study of endocrine system.

Unit-1	**Nutrition and Metabolism** 1. Physiology of digestion in Mammals. 2. Protein metabolism: Deamination, Decarboxylation, Transamination of amino acids. 3. Carbohydrate metabolism, Glycogenesis, Gluconeogenesis, Glycogenolysis, Glycolysis, and citric acid cycle. 4. Lipid metabolism-Beta oxidation of fatty acids. **पाचन एवं कार्यिकी** 1. स्तनधारियों में पाचन की कार्यिकी 2. प्रोटीन उपापचय :डीअमोनीकरण, डीकार्बोक्सिलेशन, अमीनो-ट्रांसअमीनेशन एवं ऑर्निथिन चक्र 3. कार्बोहाइड्रेट उपापचय, ग्लाइकोजेनेसिस, ग्लाइकोनियोजेनेसिस, ग्लाइकोजिनोलाइसिस, ग्लाइकोलाइसिस और साइट्रिक अम्ल चक्र 4. वसा उपापचय –वसीय अम्ल का बीटा ऑक्सीकरण
Unit-2	**Respiration, Excretion and Immune System** 1. Mechanism and Physiology of respiration in mammals (transport of gases, chloride shift). 2. Physiology of Excretion – Urea and Urine formation in mammals. 3. Osmoregulation and excretory product. 4. Innate and acquired immunity, immune cells and lymphoid system, immune response: cellular and humoral immunity. **इकाई-2 :श्वसन, अत्सर्जन एवं प्रतिरक्षा तंत्र** 1. स्तनधारियों में श्वसन तंत्र की कार्यिकी एवं क्रियाविधि)गैसों का परिवहन, क्लोराइड शिफ्ट(2. उत्सर्जन की कार्यिकी -स्तनधारियों में यूरिया और मूत्र निर्माण 3. परासरण नियमन एवं उत्सर्जन उत्पाद

	4. सहज एवं अर्जित प्रतिरक्षा प्रणाली, प्रतिरक्षा कोशिकाएं और लिम्फोइड प्रणाली, प्रतिरक्षा प्रतिक्रिया :कोशकिय और हयूमोरल प्रतिरक्षा
Unit-3	**Regulatory Mechanisms of Enzymes and role of Vitamins** 1. Thermoregulation. 2. Definition, nomenclature and classification of enzymes. 3. Mechanism and regulation of enzyme action. 4. Co-enzymes. 5. Vitamins. **एन्जाइम की नियमन क्रियाविधि एवं विटामिन्स के कार्य** 1. तापनियमन 2. एंजाइमों की परिभाषा, नामकरण और वर्गीकरण 3. एंजाइम की क्रियाविधि 4. सह-एंजाइम 5. विटामिन्स
Unit-4	**Neuromuscular Co-ordination** 1. Types of neurons. 2. Physiology of nerve impulse conduction. 3. Types and structure of muscles. 4. Theory of muscle contraction and its biochemistry. **तंत्रिका –पेशीय समन्वयन** 1. न्यूरॉन्स के प्रकार 2. तंत्रिका आवेग संचरण की कार्यिकी 3. पेशियों के प्रकार और संरचना 4. पेशीय संकुचन का सिद्धांत और उसकी जैवरसायनिकी
Unit-5	**Endocrine System** 1. Structure and functions of Pituitary gland. 2. Structure and functions of Thyroid gland. 3. Structure and functions of Adrenal gland. 4. Structure and functions of Parathyroid, Thymus and Islets of Langerhans's. 5. Physiology of male and female sex hormones. **अन्तस्त्रावी तंत्र** 1. पियूष ग्रंथि की संरचना और कार्य 2. थायरॉइड ग्रंथि की संरचना और कार्य 3. अधिवृक्क ग्रंथि की संरचना और कार्य 4. पैराथाइरॉइड, थाइमस और लैंगरहैंस के आइलेट्स की संरचना और कार्य 5. नर और मादा के जनन हार्मोनसकी कार्यिकी

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Session – 2021-22

Class	:	B.Sc.
Year	:	II
Subject	**:**	Zoology
Paper Name	:	Practical
Max. Marks	**:**	40+10 CCE
Course Code	:	PR-SC-A36

Course Outcome

CO1- To gain knowledge about the computer simulation technique of dissection of locally available fishes.
CO2- To study of museum specimens, specimens of evolutionary important animals.
CO3- To study the limb bones and girdles of frog, varanus, pigeon, and rabbit.
CO4- To study biochemical tests of protein, carbohydrate and lipid, activity of human salivary enzyme.
CO5- To study the haematological experiment and histological slides of mammals.

PRACTICALS

1. Demonstration of commercially available species of locally available fishes (Computer Simulation Technique). Dissection – Cranial Nerves.

2. Study of museum specimens (Vertebrates).

3. Study of specimens of evolutionary importance (Limulus, Latimeria, Dinosaurs, Archeopteryx, Peripatus, etc.)

4. Osteology: Limb and girdles of Frog, Varanus, Pigeon and Rabbit.

5. Detection of protein, carbohydrate and lipid/study of activity of human salivary enzyme.

6. Haematological experiment – RBC and WBC counting / Blood Grouping / Estimation of Haemoglobin.

7. Histological study of various endocrine glands: T.S. of Thyroid, T.S. of Pituitary gland, T.S. of Adrenal gland, T.S. of Testis, T.S. of Ovary.

8. Histological study of Digestive and Visceral organs: T.S. of stomach, T.S. of Intestine, T.S. of Pancreas, T.S. of Liver, T.S. of Lungs and T.S. of Kidney.

DISTRIBUTION OF MARKS

1. Dissection	**06**
2. Spotting related to evolution	**04**
3. Spotting (4 specimens, 2 bones, 2 slides)	**16**
4. Biochemical test / Enzyme activity	**05**
5. Haematological Experiment	**05**
6. Viva-Voce	**04**
7. Record	**05**
8. Collection	**05**
	Total 50

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Class	:	B.Sc.
Year	:	III
Subject	:	Zoology
Paper Name	:	Genetics
Paper	:	I
Max. Marks	:	40+10 CCE
Course Code	:	SC-A47(A)

Course Outcome

CO1- To gain knowledge about the heredity and Genetic material.

CO2- To understand the Gene expression.

CO3- To know about linkage and chromosomal aberrations.

CO4- To understand human Genetics.

CO5- To gain knowledge about Genetic Engineering.

Unit-1	**Heredity and Genetic material** 1. Mendel's laws of inheritance 2. Variations-sources and types. 3. Structure, molecular organization and function of DNA and RNA and types of RNA. 4. DNA replication in Prokaryotes. 5. Nucleosome (Solenoid model). **आनुवंशिकता और आनुवंशिक पदार्थ** .1मेंडल के आनुवंशिकता के नियम .2विभिन्नतायें -स्रोत तथा प्रकार .3डी.एन.ए और आर.एन.ए की संरचना, आणविक संगठन और कार्य तथा आर.एन.ए के प्रकार .4प्रोकैरियोट्स में डी.एन.ए का द्विगुणन .5न्यूक्लियोसोम)सोलेनॉइड मॉडल(
Unit-2	**Gene Expression** 1. Genetic Code. 2. Transcription in Prokaryotes. 3. Translation in Prokaryotes. 4. Gene expression: Regulation of protein synthesis and Lac operon model. 5. Split gene, overlapping gene, pseudo gene. **जीन अभिव्यक्ति** 1. आनुवंशिक कोड 2. प्रोकैरियोट्स में अनुलेखन 3. प्रोकैरियोट्स में अनुवाद 4. जीन अभिव्यक्ति :प्रोटीन संश्लेषण का नियम तथा ऑपेरॉन मॉडल 5. स्प्लिटजीन, ओवरलैपिंग जीन, स्यूडो जीन
Unit-3	**Linkage and Chromosomal aberration** 1. Linkage and crossing over - Types and significance. 2. Sex determination- Chromosomal and genetic balance theory.

	3. Sex linked inheritance (Haemophilia, colour blindness). 4. Structural and numerical changes in chromosomes. 5. Mutation-Types and Mutagens. **सहलग्नता तथा गुणसूत्रीय विपथन** 1. सहलग्नताऔर क्रॉसिंग ओवर -प्रकार और महत्व 2. लिंग निर्धारण -गुणसूत्रीय तथा आनुवंशिक संतुलन सिद्धांत 3. लिंग सहलग्नअनुवांशिकता -हीमोफिलिया, वर्णान्धता 4. गुणसूत्रों में संरचनात्मक तथा संख्यात्मक परिवर्तन 5. उत्परिवर्तन -प्रकार तथा म्यूटाजेन
Unit-4	**Human Genetics** 1. Human Karyotype. 2. Human Genome Project. 3. Multiple allele and inheritance of blood group. 4. Autosomal and Sex Chromosome Syndromes in human. 5. Genetic diseases in human- Sickle cell anaemia, Albinism and Thalassemia. **मानवअनुवांशिकता** 1. मानव कैरियोटाइप 2. मानव जीनोम परियोजना 3. बहुविकल्पी एलील तथा रक्त समूह की अनुवांशिकता 4. मानव में ऑटोसोमल तथा लिंग गुणसूत्रीय सिंड्रोम 5. मानव में अनुवांशिकीय विमारिया रोग -सिकल सेल एनीमिया, ऐल्बिनिज़म और थैलेसीमिया
Unit-5	**Genetic Engineering** 1. Recombinant DNA technology and Gene Cloning. 2. Polymerase chain reaction. 3. Blotting- Southern ,Northernand Western 4. DNA finger printing. 5. Gene therapyand Gentic counselling **अनुवांशिकी अभियांत्रिकी** 1. रिकॉमम्बिनेन्ट डी.एन.ए तकनीक तथा जीन क्लोनिंग 2. पोलीमरेज़ चेन रिएक्शन 3. ब्लॉटिंग -दक्षिणी और उत्तरी एवं वेस्टर्न 4. डी.एन.ए फिंगर प्रिंटिंग 5. जीन थेरेपीऔर अनुवांशिकीय सलाह

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Session – 2021-22

Class	:	B.Sc.
Year	:	III
Subject	:	Zoology
Paper Name	:	Ecology and Applied Zoology
Paper	:	II
Max. Marks	:	40+10 CCE
Course Code	:	SC-A47(B)

Course Outcome

CO1- To study the concept of ecology.
CO2- To know about habitat ecology.
CO3- To gain knowledge about wild life, environment and its conservation.
CO4- To study aquaculture with relation to economic importance.
CO5- To study the commercially important insects and biological control of pests.

Unit-1	**Concept of Ecology** 1. Abiotic and biotic factors, Component of ecosystem. 2. Energy flow in ecosystem : Food chain, Food web and Pyramids. 3. Biochemical cycle : Carbon, Oxygen, Nitrogen, Phosphorus. 4. Population Concept : Characteristics of population, Factors affecting population growth. .5Community: Characteristics of communnity . **पारिस्थितिकी की अवधारणा** 1. अजैविक और जैविक घटक, पारिस्थितिकी तंत्र के घटक 2. पारिस्थितिकी तंत्र में ऊर्जा प्रवाहश्रृंखल, खाद्य जाल और पिरामिड 3. जैव रासायनिक चक्र :कार्बन, ऑक्सीजन, नाइट्रोजन, फास्फोरस 4. जनसंख्या अवधारणा :जनसंख्या के विशेषताएँ, जनसंख्या वृद्धि को प्रभावित करने वाले कारक .5समुदायसमुदाय क ीविशेषताएँ
Unit-2	**Habitat Ecology** .1Fresh waterhabitat .2Marinehabitat .3Terrestrialhabitat 4. Ecological division of India. 5. Biodiversity : Natural resources and their conservation with special reference to forests. **आवासीय पारिस्थितिकी** .1स्वच्छ जलीय आवास 2. समुद्रीआवास .3स्थलीय आवास 4. भारत का पारिस्थितिकीय विभाजन 5. जैव विविधता :प्राकृतिक संसाधन और उनका संरक्षण)वनों के विशेष संदर्भ में(

Unit-3	**Wild life and Environment** 1. Wild life protection act, National parks and sanctuaries of Madhya Pradesh. 2. Endangered species of India. 3. Types of pollution : Air, water, soil, thermal and noise pollution. 4. Urbanisation and effect of human population on environment. **वन्य जीवन एवं पर्यावरण** 1. वन्य जीव संरक्षण अधिनियम, मध्य प्रदेश के राष्ट्रीय उद्यान एवं अभ्यारण्य 2. भारत की संकटापन्न प्रजातियाँ 3. प्रदूषण के प्रकार :वायु, जल, भूमि, तापीय तथा ध्वनि प्रदूषण 4. नगरीयकरण तथा पर्यावरण पर मानव जनसंख्या का प्रभाव.
Unit-4	**Aquaculture** 1. **Prawn culture** : Culture of fresh water prawn, methods of prawn fishing, preservation and processing of prawns. 2. **Pearl culture** and pearl industry. 3. **Frog culture**. 4. **Major carp culture** : Management of ponds, preservation and processing of fishes. 5. Maintenance of aquarium. **जलसंवर्धन** 1. **झींगा संवर्धन** :स्वच्छ जलीय झींगा संवर्धन, झींगामत्सयन संरक्षण और प्रक्रमण 2. **मोती संवर्धन** तथा मोती उद्योग 3**. मेंढक संवर्धन** 4. **मेजर कार्प संवर्धन** :तालाबों का प्रबंधन, मत्स्य परिरक्षण एवं प्रक्रमण 5.जलशाला एवं उसका प्रबंधन
Unit-5	**Economic Entomology** 1. **Sericulture** : Species of silkworm, life history of Bombyx mori, Sericulture Industry in India. 2. **Apiculture**: Life cycle of honey bee, methods of bee keeping, products of bees, enemies of bees. 3. **Lac culture** : Life cycle of lac insect and host plant of lac insects. 4. **Common pests** : Stored grains : Sitophilus oryzae and Triboliumcastanaeum. **Vegetable Pest** : Piers brassicae and Dacuscucurbitae. 5. Biological control of insect pests. **व्यावसायिक कीट विज्ञान** 1. **रेशमकीटसंवर्धन** :रेशमकीट प्रजातियाँ, बॉम्बेक्स मोरी का जीवन चक्र, भारत में रेशम उद्योग 2. **मधुमक्खी पालन** -मधुमक्खी का जीवन चक्र, संवर्धन, मधुमक्खियों के उत्पाद, मधुमक्खियों के शत्रु 3. **लाखकीट संवर्धन**:लाख कीट का जीवनचक्र तथा लाख कीटों का पोषक पादप 4. **सामान्य पीड़क** :भंडारित अनाजों के पीड़क :साइटोफिलस ओराइजी तथा ट्राइबोलियम कैस्टेनियम **सब्जियों के पीड़क** :पीयर्स ब्रैसिका और डकस कुकुरबीटी 5. कीट पीड़कों का जैविक नियंत्रण

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Syllabus Recommended By Board of Studies of Zoology
Session – 2021-22

Class	:	B.Sc.
Year	:	III
Subject	:	Zoology
Paper Name	:	Practical
Max. Marks	:	40+**10 CCE**
Course Code	:	PR-SC-A47

Course Outcome

CO1- Study of fresh water , marine and terrestrial fauna.
CO2- Study of major carps, common stored grain pests and vegetable pests.
CO3- Study of Physico -chemical analysis of water.
CO4- Study of ecosystems and maintenance of aquarium.
CO5- Study of instruments.
CO6- Study of endangered species, wild life conservation, national parks and sanctuaries of M.P
CO7- Study of life cycle of honeybee, silkworm and lac insect, and pests.
CO8- Study of human genetic diseases
.

The Practical workwill be as per theory syllabus and the candidates will be required to shiw theknowledge of the following :

1. Study of fresh water, marine and terrestrial fauna, major carps, common stored grain pest and vegetable pest.
2. Water analysis – Dissolve oxygen, pH, hardness, turbidity.
3. Study of ecosystems andestablishment and maintenance of aquarium, populationpyramids.
4. Study of instruments: centrifuge,electrophoresis, DNA fingerprinting, pH meter,colorimeter, spectrophotometer.
5. Wild life – Endangered species, national parks andsantctuaries of M.P
6. Life cycle of silkworm, honey bee, lac insect.
.7Problemsrelated to genetics.

DISTRIBUTION OF MARKS

1. Spotting	**12**
2. Analysis of water	**04**
3. Exercise based on Ecology	**04**
.4Study of instruments	**04**
.5Exercise based onWild Life	**04**
.6 Life cycle	**04**
.7Problem on genetics	**04**
.8Viva-Voce	**04**
.9Practical Record	**05**
.10Collection	**05**

Total =50

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SYLLABUS RECOMMENDED BY BOARD OF STUDIES
BIOTECHNOLOGY
2018-19,2019-20,2020-21

Class	:	B.Sc.
Year	:	I
Subject	:	Biotechnology
Paper Name	:	Cell Structure and Biology
Paper	:	I
Max. Marks	:	85+15 C.C.E
Course Code	:	SC-AI8 (A)

Course Outcome

CO1- To study and learn cell theory, structure of prokaryotic and eukaryotic cells , cell cycles and their ultra structure of cell.
CO2- To study and learn about transportation across cell membrane, their receptors and extra cellular signaling.
CO3- To learn and practice about basic sterilization techniques, taxonomy of microbes and cell lines.
CO4- To learn about ultrastructure of microbes, nutritional requirement and archeabacteria.
CO5- To study about microbial metabolism

Unit-1	Cell Structure & Theory, Structure of prokaryotic cell, Eubacteria and Archaebacteria. Size, shape and arrangement of bacterial cells. Gram's positive and Gram's negative cells. Structure of Eukaryotic cell, plant cells, animal cells. Difference between prokaryotic and eukaryotic cells.
Unit-2	Structure and function of bacterial cell-flagella, pili, Cell wall, cytoplasmic membrane. nuclear region, mesosomes, ribosomes, vacuoles, metachromatic granules, spores and cysts. Structure and function of eukaryotic cell Cell wall, cell membrane, mitochondria, chloroplast, endoplasmic reticulum, Golgi bodies, nucleus, cytoskeleton, microbodies, Centriole, Lysosome.
Unit-3	Cell cycle and cell division- mitosis, meiosis. Anomalies in cell division and associated diseases Cell synchrony, Cell-cell interactions, Cell locomotion, Cell differentiation.
Unit-4	Transport Process: Cell Membrane: Models of membrane structure. Membrane proteins and their properties. Membrane carbohydrates and their roles, Transport across membranes -active and passive diffusion, mechanisms.
Unit-5	Introduction to Necrosis, Senescence. Apoptosis - Programmed cell death, Mechanism of Apoptosis, Intrin& Extrinsic pathways of cell death, Apoptosis in relation to cancer, Oncogenes – Types of cancer.

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SYLLABUS RECOMMENDED BY BOARD OF STUDIES
BIOTECHNOLOGY
2018-19,2019-20,2020-21

Class	:	B.Sc.
Year	:	I
Subject	:	Biotechnology
Paper Name	:	BOT-102 Microbiology
Paper	:	II
Max. Marks	:	85+15 C.C.E
Course Code	:	SC-AI8 (B)

Course Outcome

CO1- To study and learn about molecular interaction and mechanism of photosynthesis.

CO2- To learn about protein calculation and protein structure.

CO3- To study and learn about water properties, pH, Buffer, their concept, enzymes: their nomenclature, Michalis – Menten equation, their kinetics.

CO4- To study and learn about lipid, carbohydrates, vitamin and hormones.

CO5- To explain and practical exploration about nucleic acid structure, types, replication and central dogma.

Unit-1	Introduction of Microbiology History. Applications &Status of Microbiology in India Classification of Microorganisms-General Features, systems of Classification. Microbial Taxonomy Classification and identification of Bacteria. Bergey's manual.
Unit-2	Structure and Diversity of Bacteria&Virus, Microbes in extreme environment, Nutritional requirement of microbes. Bacteriology: Morphology and ultra structure of bacteriomorphologial types. Archaebacteria, Structure and function of cell organelles.
Unit-3	Structure and Diversity of Algae, Fungi, Protozoans, Extremophiles.General characteristics. Various methods of staining-simple. Gram. endospore, capsule, flagella and negative staining.Fungal stains, Algal stains.
Unit-4	Microbial Growth Microbial growth mathematical expression of growth, growth curve, factors affecting growth. Batch, continuous, synchronous and diauxic growth. Quantification of microbial growth. Control of micro organisms- physical & chemical, Evaluation of chemical disinfectants- tubc dilution test, agar diffusion test and phenol- coefficient.
Unit-5	Microbial Nutrition and metabolism- Microbial Metabolism- Concept of Anabolism & catabolism processes. Nitrogen Fixation- Types and mechanisms, Microbial disease in plants &Animals(Only General concept). Fermentation Process -Fermenter & its microbes of industrial importance.8. Microbiology.

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SYLLABUS RECOMMENDED BY BOARD OF STUDIES
BIOTECHNOLOGY
2018-19,2019-20,2020-21

Class	:	B.Sc.
Year	:	I
Subject	:	Biotechnology
Paper Name	:	Practice
Paper	:	I & II
Max. Marks	:	50
Course Code	:	PR-SC-AI8

Course Outcome

CO1- To study and learn the structure of plant cell, human and animal chromosome.
CO2- To learn the staining procedure for identification of different microorganisms,
CO3- It helps to learn the technique of isolation and identification of green algae and fungi.
CO4- Student learn the pH measurement procedure.
CO5- To learn the instrument Hematocytometer.

List of Practicals

1. To study the plant cell structure using various plant materials.
2. To study microbial cell by Monochrome staining and Gram staining.
3. To prepare and study the different stages of mitosis and meiosis.
4. Prepare slide for study of stomata.
5. Study of permanent slides like cell division, prokaryotic and eukaryotic cells. Muscles and Nerve cells, T.S. of stomatal cells.
6. To study the animal cell structure using cheek cells.
7. Histochemical localization offlagellin.
8. Viable cell counting using hematocytometer.
9. Measurement of cell by light microscope: Calibration of ocular micrometer, finding out average cell ze
10. Separation of cell types from blood by TI.C/differential counting.
11. Methods of cell lysis: rupture osmotic/chemical/enzymatic.
12. Study of human and animal chromosomes.
13. Aseptic techniques, Cleaning of glassware, Preparation of cotton plugging and sterilization.
14. Isolation of Microbes from Air Water and Soil.
15. Dilution and plating by Pour plate, Spread Plate Methods.
16. Staining Method-Gram Staining, Endospore Staining. Fungal Staining. Algal
17. Identification of Bacteria based on staining, shape and size.
18. Antibiotic Sensitivity of Microbes by the Use of Antibiotic Discs.
19. Isolation and Identification of aquatic Fungi from Local water body.
20. Isolation and Characterisation of green algae from Natural habitats.
21. Measurement of water and soil, pH.

Scheme of Practical Examination MM: 50
Duration: 3 Hrs

1. Major (10)

2. Major (10)

3. Minor (5)

5. Minor (5)

4. Spotting (10)

5. Live-You. (05)

6. Practical Record. (05)

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SADHU VASWANI AUTONOMOUS COLLEGE
SANT HIRDARAM NAGAR, BHOPAL
SYLLABUS RECOMMENDED BY BOARD OF STUDIES
BIOTECHNOLOGY
2018-19,2019-20,2020-21

Class	:	B.Sc.
Year	:	II
Subject	:	Biotechnology
Paper Name	:	Bioinstrumentation, Biostatistics and Bioinformatics
Paper	:	II
Max. Marks	:	85+15 C.C.E
Course Code	:	SC-A29 (B)

Course Outcome

CO1- To learn about scope, application, collection, and classification of statistical data , central tendency , probability and chi –sqaure test.

CO2- To study and practice of set theory properties of subsets, geometric functions, probability calculations, method of sampling.

CO3- To learn about various types of microscopy, chromatography, centrification, autoradiography.

CO4- To learn about principles and application of spectroscopy.

CO5- To learn about principles and application of chromatography, electrophoresis and blotting techniques.

Unit-1	Microscopy-Light, Phase contrast, fluoresenceand Electron microscopy. Centrifugation technique. Principles types & separation of biological molecules.
Unit-2	Chromatography and Electrophoresis Chromatography: Principles and applications, Principle and application of electrophoresis. Agarose gel electrophoresis, Immuno electrophoresis, Blotting: Southren, Western and Northern Blotting.
Unit-3	Spectrophotometry. Colorimetry (UV and Visible), Radio and Non radio labelling. Autoradiography.
Unit-4	Biostatistics- Introduction. Scope, application and use of statistic collection and classification of data summarization and presentation of data. Arithmetic mean, median, standard deviation. Probability, definition. Random variable and its distribution. Binomial probability distribution.
Unit-5	Computers: General introduction (characteristics, capabilities, generations), hardware: organization of hardware (input devices, memory, control unit arithmetic logic unit, output devices): software: (System software; application software, languages -low level, high level). internet application. Basic Bioinformatics: Introduction to Internet, Search Engines (Google, Yahoo, Entrez etc) Biological Databases: Sequence databases (EMBL. GenBank. DDBJ, UNIPROT. PIR. TREMBL). Protein family/domain databases (PROSITE, PRINTS. Plam, BLOCK, etc). Cluster databases-An Introduction, Specialised databases (KEGG. etc), Database technologies (Flat-file), Structural databases (PDB).

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SADHU VASWANI AUTONOMOUS COLLEGE
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SYLLABUS RECOMMENDED BY BOARD OF STUDIES
BIOTECHNOLOGY
2018-19,2019-20,2020-21

Class	:	B.Sc.
Year	:	II
Subject	:	Biotechnology
Paper Name	:	Practice
Paper	:	I & II
Max. Marks	:	50
Course Code	:	PR-SC-A29

Course Outcome

CO1- To learn the basic knowledge of instruments like colorimeter, pH meter, centrifuge, spectrophotometer

CO2- To learn different methods for the qualitative and quantitative estimation of carbohydrate protein and lipids.

CO3- Students will be able to evaluate the activity of enzyme at different parameters.

CO4- They are able to learn the RBC and WBC counting.

CO5- Students are able to learn the biostatistical data collection and various methods for the interpretation of data.

CO6- Students are able to learn the submission and retrieval of data from the different bio resources like NCBI.

CO7- They are able to learn the analysis of sequences of protein and nucleic acids.

List of Practicals

1.Principles and working knowledge of instruments like Colorimeter, pH meter. Centrifuge.

Spectrophotometer, Microscope etc.

2. Qualitative analysis of Carbohydrates, Proteins and Lipids.

3 Quantitative estimation of Protein by Folin-Lowry method.

4. Quantitative estimation of sugar by Nelson Smogyi'smethod.

5. Determination of enzyme activity by amylase.

6. Study the effect of pH on enzyme activity.

7. Study the effect of temperature on enzyme activity.

8. Separation of amino acids by TLC

9. Separation of leaf pigments by Paper chromatography.

10. Estimation of hemoglobin.

11. RBC counting by haematocytometer.

12. WBC counting by Differential/ or total cell count.

13. Measurement of bleeding and clotting time.

14. Measurement of Hemin Crystals,

15. Estimation of beta carotene in carrots.

16. Estimation of ascorbic acid in lemon juice.

17. Determination of iodine number of fat sample..

18. Determination of phosphorus content in plant material (Colorimetric method).

19. Computer Input and Output devices.

20. Prepare a Marksheet of your class Subjects

21. Design your class timetable.

22. Prepare a bar chart ,pie chart for analysis of Election Result. 23. Exercise based on power point presentation.

24. Design a presentation illustrating insertion of pictures, word art & clip art

25. Use MS Word to insert a table into document.

26. Problem based on Mean, Median, Mode.

27. Hardy Weinberg Law applied on Population Genetics.

28. Problem based on Probability.

29. Exercise based on standard Deviation.

30. Biological data resources and data retrieval.

31. Introduction to NCBI.

32. Retrieving DNA sequence from GenBank and analyzing various formats of the data stored.

33. Analyzing Protein Sequences.

34. Analyzing DNA sequence.

Scheme of Practical Examination

Duration: 3 Hrs

1. Major (10)

2. Major (10)

3. Minor (5)

4. Minor (5)

4. Spotting (10)

5. Live-You. (05)

6. Practical Record. (05)

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Sadhu Vaswani Autonomous College
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2018-19,2019-20,2020-21

Class	:	B.Sc.
Year	:	III
Subject:	:	Biotechnology
Paper Name	:	Applied Biotechnology
Paper	:	II
Max. Marks	:	85+15 C.C.E
Course Code	:	SC-A40 (B)

Course Outcome

CO1- Students will be able be to learn the techniques of aseptic transfer and culturing tissues, single cells, protoplast and another culture, hairy root culture and Somatic mbryogenesis.

CO2- Students will be able to understand the basic concepts of immunity and types of Imunity.

CO3- Students will be aware of the structure and diversity of the antibodies and they are able to understand the morphology and functions of the various immune cells such as neutrophils, macrophages and their association with the MHC molecule will be studied.

CO4- The various immunological techniques and concept of vaccine can be studied.

CO5- Students will be able to describe the design and operations of various fermenters.
Students will be able to apply the concepts of basic chemical engineering principles in a bioprocess to produce bio-products on an industrial scale using fermenters.

Unit-1	Food Microbinlogy-Microbial contamination & Spoilage Fisid preservation Industril Production of Ethyl Alcohol Penicillin, Cyanocobalamin. Glutamic Acid, Citric Acid Amylase, Protease.
Unit-2	Introduction to plant tissuc culture. Nutritional requirements. In vitreLulure. Single cell culture, Anther culture, Ovule culture, Somatic embryogenesis, Organogenesis Protoplast culture. Somatic hybridization, Genetic manipulation of plants using grobacterium.
Unit-3	**Immunology and Animal Biotechnology** Immunity Innate and Acquired. Host defense mechanisan- Inlection and its types Organs and Cells of Immune system. Vaccines and its types Antigens Properties and types Adjivants. Immunoglobulins- Structure, types and functions. Generation Antibodies Primary and Secondary response. Agglutination and Precipitation reactions History Equipment and materials for animal cell culture technology Physical requirement for animal cell and their growth curve in culture Commonly used cell lines their organization and characteristics, Differentiation of cells Organ culture - techniques advantage and applications

	Applications of animal biotechnology: Methods of Transfection and cell tusion of animal cells. Selectable markers: HAT selection, Transgenic animals. Stem cell culture. Transplantation of cultured cells, Bioreactors for large scale production of animal cells of cultured cells, Bioreactors for large scale production of animal cells.
Unit-4	**Fermentation Technology** Fernientation Technology, Primary and Secondary Screening. Strain Improvement inoculum Development, Industrial Sterilisation process. Scale-up and harrvest and Types of fermentation - batch, continuous, fed batch process. Submerged and Solid-State fermentation process, Basic design of a fermentor and factors affecting fermentor design Types of fermentors- Fluidized, Packed Bed, Air lift Fermentor. Tray Fermentor and Tower Fermentor.
Unit-5	**Environment Biotechnology** Environment: Basic concept, Significance, Public awareness, Environmental pollution, Assessment of water quality, Treatment of waste-water- Primary, secondary and tertiary treatment. Solid waste management (composting, vermi-composting, methane production). Biopesticides- Bacterial and Fungal, genetically modified crops, Biofertilizers - Nitrogen fixers, PSB. Mycorrhiza and VAM, Microbial leaching, Microbial Enhanced Oil Recovery. Bioremediation and Biodeterioration. Modern fuels- Methanogenic bacteria and biogas. microbial hydrogen production.

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SANT HIRDARAM NAGAR, BHOPAL
SYLLABUS RECOMMENDED BY BOARD OF STUDIES
BIOTECHNOLOGY
2018-19,2019-20,2020-21

Class	**:**	B.Sc.
Year	**:**	III
Subject	**:**	Biotechnology
Paper Name	**:**	Practical
Paper	**:**	I &II
Max. Marks	:	50
Course Code	**:**	PR-SC-A40

Course Outcome

CO1- Student will be able to isolate the DNA from plant, animals and microorganisms.

CO2- The are able to analyse DNA through different methods like electrophoresis and spectroscopy.

CO3- They are able to isolate RNA

CO4- They are able to do the estimation of DNA and RNA through different methods.

CO5- They will know different designs of fermenter and prepare wine through fermentation.

CO6- The use of PCR for different molecular experiments can be done by students.

CO7- They are able to understand the composition and prepration of animal cell culture media.

CO8- They get familiar with the basic concept of plant tissue culture and its applications.

List of Practical's

1. Chromosomal DNA isolation from Plant
2. Chromosomal DNA Isolation om Animal cells
3. Genomic DNA isolation from Micro Organism
4. Analysis of isolated DNA by Agarose gel electrophoresis.
5. Spectrophotometric analysis of DNA
6. UV as a physical mutagen
7. Gradient Plate Technique
8. Estimation of DNA using diphenylamine method.
9. Estimation of RNA using orcinol method.
10. Isolation of RNA from Yeast. 11. Isolation of plasmid DNA from bacteria.
12. Effect of UV radiation on microbial cell
13. Demonstration of repair mechanism in microbes
14. Bacteriophage and determination of latent period of infection
15. Isolation of total RNA from Plant tissue by SDS phenol method.
16. Elution of DNA from agarose gel band.
17. Transformation in E-coli cell.
18. Growth of plant tissue into undifferentiated mass of callus.

19. Preparation of animal cell culture media.

20. Separation and culture of lymphocyte from blood.

21. Demonstration of fermentor.

22. Preparation of wine.

23. Extraction of citric acid from Aspergillus.

24. Production of ethanol by yeast.

25. Demonstration of PCR.

26. Immobilization of microbial cells.

27. Extraction and preparation of lactic acid

28. Extraction and preparation of citric acid.

29. Demonstration of Radial immuno diffusion analysis.

30. Isolation of microorganism from polluted site/ industrial waste,

31. Blood group analysis.

32. Differential cont of WBC

33. To examine flocculation reaction using VDRL test

34. To observe the agglutination reaction using WIDAL

35. Determine the concentration of unknown antigen using Radial Immuno Diffusion technique.

Note: 78% of the above list should be compabority performed.

Scheme of Practical Examination
Duration: 3 Hrs

1. Major (10)

2. Major (10)

3. Minor (5)

5. Minor (5)

4. Spotting (10)

5. Viva- Voice (05)

6 Practical Record (05)

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SADHU VASWANI AUTONOMOUS COLLEGE
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of MICROBIOLOGY
B.Sc. – MICROBIOLOGY
Session – 2017-18

Class	:	B.Sc
Year	:	**I**
Paper	**:**	**I**
Subject	:	**Microbiology**
Title of Subject Group	:	General Microbiology and cell Biology
Max. Marks	**:**	**40**
	:	1**0** CCE
Course Code	:	SC- **A23(A)**

COURSE OUTCOME

CO1 : To learn about scope of microbiology and its application.
CO2: To learn about structure of bacteria ,cynobacteria , actinomycetes and rickettsia, Chlamydia.
CO3: To learn about general characterstics of fungi and virus and their importance.
CO4: To understand the cell cycle.
CO5: Isolation and maintenance of microorganism and their techniques.

UNIT I	Introduction to microbiology, history, scope and development of microbiology, branches of microbiology , concept of disease, contribution of eminent microbiologist of India and abroad, Application of microbiology in human welfare.
UNIT II	Morphology of bacteria, ultra structure of bacteria: Gram positive and Gram negative bacterial cell wall, cell membrane, capsule, nucleiod, ribosome, cytoplasmic inclusions, flagella, pilli, gas vacuoles, dormant structure endospore and their synthesis, archaebacteria, structures of cynobacteria, actinomycetes, mycoplasma, rickettsia and Chlamydia with emphasis on function of each part of components.
UNIT III	Classification, brief introduction to classes of fungi, general characteristics, thallus , mycelia modification, nutrition, heterokaryosis, structure with emphasis on the function of each part and components of cell, sexual and asexual reproduction, economic importance of fungi.Classification, general characteristics , structure and morphology of phages, phage nucleic acids, Virus hosts, general features of virus reproduction, lytic and lysogenic cycle and their mechanism, DNA and RNA viruses, T4, TMV, pox virus, PRION, VIRONS, virusoid and viriod.
UNIT IV	Structural organization and function of cell organelles, cell cycle, cell division,types of cell divisions and their phases,cell membrane structure and transportation(active and passive), cellular interaction, cell differentiation .
UNIT V	Isolation and maintenance of microorganism, pure, axenic , mixed culture, strain, isolate, clone definitions, pure culture techniques, dilution, plating-pour plate method ,spread plate method, streak plate method, enrichment culture and micromanipulator. Maintenance and preservation of pure culture, subculturing, overlaying culture with mineral oils, lyophilization, sand cultures, storage at low temperature, major microbial culture collection centre in India

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Syllabus recommended by Board of Studies of MICROBIOLOGY
B.Sc. – MICROBIOLOGY
Session – 2017-18

Class	**:**	B.Sc
Year	**:**	**I**
Paper	**:**	**II**
Subject	**:**	**Microbiology**
Title of Subject Group	**:**	TOOLSAND TECHNIQUES IN MICROBIOLOGY
Max. Marks	**:**	**40**
	:	1**0** CCE
Course Code	**:**	SC- **A23(B)**

COURSE OUTCOME

CO1: To learn aboutPrinciple and working of various microscopy.
CO2: To understand instrumentation techniques such as autoclave, oven, BOD, incubator , laminar air flow, colorimeter, spectrophotometer, centrifugation.
CO3: To learn micrometry and various staining techniques.
CO4: To learn about preparation of media and sterilization techniques.
CO5: To learn about Principle of biostatics and bioinformatics.

Unit 1	Principle and working of bright field microscopy, dark field microscopy, phase contrast microscopy, UV and fluorescent microscopy, electron microscopy, types of electron microscope (TEM & SEM), preparation of specimen, advantages, limitations and applications of microscopy, use of software in microscopy.
Unit 2	Instrumentation technique, basic principle, function and application of autoclave, oven, BOD, incubator , laminar air flow, colorimeter, spectrophotometer, centrifugation, basic principle of sedimentation, methods and applications, chromatography, type of chromatography and application of chromatography.
Unit 3	Ocular and stage micrometry, cell count, hemocytometer, use of camera lucida, stains and staining technique, chemistry of dyes and stains, fixation, smear, types of staining monochrome, negative staining, differential staining, Gram staining and acid fast staining, cell wall staining, metachromatic granules staining, capsule staining.
Unit 4	Chemical agents, characteristic of an ideal antimicrobial chemical agent, disinfection, antiseptic, sanitizer, germicide, bacteriacide, bacteriostasis, antimicrobial agent, criteria for selection of chemical agent for practical application, major group of chemical antimicrobial agent and their mode of action.
Unit 5	Principle of biostatistics, classification of data, tabulation and graphical representation, measure of Central tendency, mean, mode, median- merits and demerits, measure of dispersion range, mean deviation variance and standard deviation, Chi square test, t test and F test.

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Syllabus recommended by Board of Studies of MICROBIOLOGY
B.Sc. – MICROBIOLOGY
Session – 2017-18

Class	:	B.Sc
Year	:	**I**
Subject	:	**Microbiology**
Title of Subject Group	:	**Practical**
Max. Marks	**:**	**50**
Course Code	:	**PR-**SC- **A23**

COURSE OUTCOME

CO1- Demonstration and briefing about principles and working of basic instruments.

CO2- Basic media preparation.

CO3- Isolation of bacteria and fungi from different techniques.

List of practical based on paper 1 and Paper 2 for BSC 1st year

1. Demonstration and briefing about principles and working of basic instrument autoclave, incubator, hot air oven pH meter, laminar air flow, spectrophotometer and centrifuge.
2. Basic media preparation autoclaving cleaning and sterilization of glassware.
3. Media preparation of liquid media: peptone water, nutrient broth. solid media: nutrient agar, agar slant, Agar plate,Enriched medium- blood Agar, differential,media ,MacConkey Agar, enrichment medium, selenide F broth, selective medium, EMB agar.
4. Culture characteristics of microorganism on different media .
5. Demonstration of selective and differential media.
6. Isolation of bacteria from water and soil by serial dilution other plating method.
7. Isolation of fungi from water and soil by serial dilution Agar plating method.
8. Estimation of air micro flora.

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Syllabus recommended by Board of Studies of MICROBIOLOGY
B.Sc. – MICROBIOLOGY
Session – 2018-19

Class	**:**	B.Sc
Year	**:**	**II**
Paper	**:**	**I**
Subject	**:**	**Microbiology**
Title of Subject Group	**:**	**B**iochemistry and microbial physiology
Max. Marks	**:**	**40**
	:	1**0** CCE
Course Code	**:**	SC- **A34(A)**

COURSE OUTCOME

CO1: To study about General properties, classification and function of arbohydrates, lipids, protein,and amino acid and enzymes.
CO2: To study about bacterial growth and factors affect their growth.
CO3: To learn aboutenergy production in anaerobic and aerobic process andprinciple of bioenergetics.
CO4: To learn about microbial synthesis.
CO5: To learn about electron transport chain and cyclic and non cyclic phosphorylation**.**

Unit 1	General properties, classification and function of Carbohydrates, lipids, protein,and amino acid, general properties, classification and nomenclature of enzymes, factor affecting enzyme activity, mechanism of enzyme action, regulation of enzyme activity, application of enzymes.
Unit 2	growth and measurement, mathematical expression of growth, growth curve, growth yield, factor affecting growth, effect of nutrient, temperature, oxygen, pH , osmotic pressure, cell count, direct and indirect method, dry wait and wet weight method, synchronous culture, continuous culture and batch culture.
Unit 3	energy production in anaerobic and aerobic process, glycolysis, pentose phosphate pathway, entnerduodoroff pathway, fermentation, glucose fermentation by E coli, TCA cycle, heterotrophic carbon dioxide fixation, glycoxlate cycle, catabolism of lipids, alpha and beta oxidation, catabolism of protein, aerobic respiration, principle of bioenergetics, oxidation reduction reaction, redox potential and oxidative phosphorylation hypothesis.
Unit4	utilisation of energy, method of studying microbial biosynthesis, assimilation of ammonia, nitrogen and sulphate utilisation of energy in non biosynthetic and biosynthetic process, diffusion, gaseous exchange, Osmosis, plasmolysis ,transport of nutrients in bacteria, active transport, passive diffusion, facilitated diffusion, translocation.
Unit 5	energy production by photosynthesis, photochemical reaction, cyclic and noncyclic phosphorylation, role of ATP in metabolism, role of reducing power in metabolism, role of precursors of metabolism, component of electron transport chain and arrangement of etc in cell membrane

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SADHU VASWANI AUTONOMOUS COLLEGE
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Syllabus recommended by Board of Studies of MICROBIOLOGY
B.Sc. – MICROBIOLOGY
Session – 2018-19

Class	**:**	**B.Sc**
Year	**:**	**II**
Paper	**:**	**II**
Subject	**:**	**Microbiology**
Title of Subject Group	**:**	**Microbial genetics and molecular biology**
Max. Marks	**:**	**40+10 CCE**
Course Code	**:**	**SC- A34(B)**

COURSE OUTCOME

CO1: To learn about nucleic acid as genetic material, DNA, RNA
CO2: To learn about types of DNA and their replication and models of replication.
CO3: To study about genetic code , protein synthesis and lac operon model.
CO4: To study about genetic recombination.
CO5: To study about DNA mutation and repair.

Unit 1	structure and genetic material of microbes, nucleic acid as genetic material, physical and chemical structure and different forms of DNA, melting curve of DNA and TM value determination, buoyant density of DNA and its relationship with mole (G+C) content in DNA, types of RNA , tRNA , mRNA , rRNA , gene structure and functions.
Unit 2	Types of DNA, replication of DNA in prokaryotes and eukaryotes, conservative, semiconservative and dispersive mode of replication, mechanism of replication, messelson and stahl experiment , DNA topology ,supercoiling of DNA and linking number, enzymes involved in replication of DNA. molecular mechanism of chromosomal replication, modern model of chromosomal replication, cairns model, rolling circle model, translation and transcription in prokaryotes and eukaryotes.
Unit 3	Basic feature of genetic code, biological significance of degeneracy, wobble hypothesis polycistronic and overlapping genes, deciphering of geneticcodes,gene translocation, ribosomes and role in protein synthesis, tRNAs, initiation ,elongation and termination of protein synthesis in prokaryotes, post translational modification of polypeptides, regulation of protein synthesis, Lac Operon, reversible, repressible Operon
Unit 4	genetic recombination in bacteria, transformation, conjugation , F factor, Hfr strains, transduction in microbes, plasmids and binary vectors, transposons, transformation technique, use of bacteria and viruses in genetic engineering
Unit 5	DNA mutation and repair, types of mutation, evidence of spontaneous nature of mutation, fluctuation test,new comb's, experiment and replica testing, mode of action of physical, chemical and biological mutagens- UV rays, nitrous acid, 5- bromo uracil,2-amino purine, EMS, reversion in mutation, true Reversion, suppression and types of suppressor mutation, DNA repair mechanism, photoreactivation, excision, mismatch, SOS repair and dealkylation repair

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Syllabus recommended by Board of Studies of MICROBIOLOGY
B.Sc. – MICROBIOLOGY
Session – 2018-19

Class	:	B.Sc
Year	:	**II**
Subject	:	**Microbiology**
Title of Subject Group	:	**Practical**
Max. Marks	**:**	**50**
Course Code	:	**PR**-SC- **A34**

COURSE OUTCOME

CO1- To learn about determination of pH, carbohydrate, protein , lipid.
CO2- Preparation of buffer and demonstrate about DNA and enzyme activity.

List of practicals based on paper 1 and Paper 2 for Bsc 2nd year mm 50

1. To determine the pH of a given solution .
2. To prepare buffer solution .
3. Identification of biological compound, carbohydrate- molisch test, protein:biuret test, lipid- saponification test.
4. Qualitative analysis of amino acid- colour reaction of amino acid,biuret test , ninhydrin test.
5. Quantitative analysis of fat- test for oil, solubility test, emulsion test, absorption test.
6. Estimation of glucose by cole's method.
7. Estimation of protein by folinlowry method.
8. Estimation of total lipids by dichromatic method.
9. Study of enzyme activity and effect of different factors on enzyme activity.
10. Demonstration on isolation of DNA .
11. Quantitative estimation of DNA by DPA method.
12. Qualitative estimation of RNA by orcinol method.
13. To study conjugation in bacteria.
14. To transfer bacterial colonies by replica plating method.
15. Effect of UV light on growth of bacteria.
16. Effect of mutagen on the growth of bacteria.
17. To study antibiotic resistance in bacteria .
18. Primary screening of amylase proteus producers.
19. Designing of at least two innovative experiment based on the bell availability facility in the college related to the subject.

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Syllabus recommended by Board of Studies of MICROBIOLOGY
B.Sc. – MICROBIOLOGY
Session – 2018-19

Class	:	B.Sc
Year	:	**III**
Paper	**:**	**I**
Subject	:	**Microbiology**
Title of Subject Group	:	Applied and Environmental Microbiology
Max. Marks	**:**	**40**+10 CCE
Course Code	:	SC- **A45(A)**

COURSE OUTCOME

CO1: To learn about Design and types of fermenter, industrial production of amino acid , vitamin, and antibiotics etc
CO2: To learn about physical and microbial spoilage of food and food products, food borne diseases , food preservation method.
CO3: To study about physical and chemical characteristics of soil, , microbial diseases of Crop plant, nitrogen fixation and biofertilizer.
CO4: To study about concept of environment in relation to microbes.
CO5: To study about Bioremediation, biomagnification , bioleaching, biopesticides , microbial production , impact of generally modified organism and sewage treatment .

Unit 1	Introduction, history and scope of industrial microbiology, design and type of fermenters, factors affecting fermentation process, industrial production of alcohol, organic acid , economically important enzymes, amino acid, antibiotics, vitamins application and production of SCP,Methods of immobilization and applications, strategy for improvement of industrially important microorganisms.
Unit 2	Introduction, history and scope of food microbiology, physical and microbial spoilage of food and food products, spoilage of stored products , fruits and vegetables , spoilage of milk , milk products and meat, food borne diseases , food preservation method , asepsis pasteurization, Canning , desiccation, low temperature, anaerobiosis, filtration, chemical preservation of food salt and sugar, organic acids, use of Sulphur dioxide, ethylene and propylene oxide ,woodsmoke.
Unit 3	physical and chemical characteristics of soil , soil microflora, soil fertility and management of agricultural soil ,rhizosphere and phyllosphere, microbial diseases of Crop plant with special reference of wheat Rice. VAM and its importance, nitrogen fixation of symbiotic and nonsymbiotic microbes, use of microbes as biofertilizers, Mass cultivation of rhizobium and acetobacter , use of blue green algae as biofertilizer.
Unit 4	concept of environment in relation to microbes, physiological adaptation in microbes , nature of microbial population in soil water and air , microbial interaction , neutralism, commensalism , Sinha synergism.
Unit 5	Bioremediation, biomagnification , bioleaching, biopesticides , microbial H_2 production , impact of generally modified organism, biodegradation of plastics. liquid waste disposal , characteristic of soil and liquid waste, sewage treatment , Primary, secondary and tertiary treatment.

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Syllabus recommended by Board of Studies of MICROBIOLOGY
B.Sc. – MICROBIOLOGY
Session – 2018-19

Class	:	B.Sc
Year	:	**III**
Paper	**:**	**II**
Subject	:	**Microbiology**
Title of Subject Group	:	Immunology and Medical Microbiology
Max. Marks	**:**	**40**+10 CCE
Course Code	:	SC- **A45(B)**

COURSE OUTCOME

CO1: To learn about structure , composition and type of cells and organs involved in immune system, humoral and cell mediated immune response.
CO2: To learn about antigens structure, antigen antibody interaction.
CO3: To study about tumor immunology , cancer origin .
CO4: To study aboutimmunization , modern method of vaccine production, and blood groups.
CO5: To study about host microbe interaction, mechanism of pathogenicity , laboratory strategies in diagnosis of ineffective syndrome.

Unit 1	structure , composition and type of cells and organs involved in immune system, innate and acquired immunity , humoral and cell mediated immune response. antigens structure,properties and types,heptens and adjuvents,types, structure of function of MHC molecule, antigen processing and presentation .
Unit 2	immunoglobulin structure , Heterogeneity, types and sub types, physicochemical and biological properties, theories of antibody production, generation of antibody diversity , antigen-, antibody interaction, agglutination and precipitation, immunofluorescence, ELISA , radioimmunoassay, Hybridoma technology, production and application of monoclonal antibodies.
Unit 3	tumor immunology , cancer origin, oncogenes, tumor antigens, immune response to tumors, tumor evasion of the immune system, diagnosis of Tumors.
Unit 4	immunization , modern method of vaccine production, autoimmunity , hypersensitivity , immunohematology antigens of ABO and Rh blood group systems , medical importance of blood groups ABO and Rh incompatibility.
Unit 5	host microbe interaction, mechanism of pathogenicity , laboratory strategies in diagnosis of ineffective syndrome, bacterial and viral disease of human syphilis, tuberculosis,typhoid, tytanus, pox, hepatitis. fungal disease of human, Cryptococcus , candidiasis, dermatomycosis , sexually transmitted disease (STDs).

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SADHU VASWANI AUTONOMOUS COLLEGE
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of MICROBIOLOGY
B.Sc. – MICROBIOLOGY

Session – 2018-19

Class	**:**	**B.Sc**
Year	**:**	**III**
Subject	**:**	**Microbiology**
Title of Subject Group	**:**	**Practical**
Max. Marks	**:**	**50**
Course Code	**:**	**PR-SC- A45**

COURSE OUTCOME

CO1 To learn about Isolation of microorganisms from water, soil, spoiled food, and root nodules.
CO2 To learn about enumeration of microbes.
CO3 To learn about specific test for milk such as MBRT.

List of practical based paper 1 and 2 for BSC 3rd year mm 50

1. Isolation of enumeration of microorganism.
2. Isolation of microorganisms from water .
3. Isolation and enumeration of microorganisms from soil.
4. Total count of bacteria from water.
5. Measurement and confirmation of *E. coli in* water sample.
6. Isolation and identification of bacteria from spoiled food.
7. Heavy metal sensitivity in microbes.
8. Study of rhizobium bacteria from root nodules.
9. Study of symbiotic and nonsymbiotic blue green algae.
10. Determination of milk quality by reasazurin test through MBRT.
11. Determination of blood group.
12. Estimation of haemoglobin by sahli's method.
13. Estimation of haemoglobin by cyanmethemoglobin method.
14. Total count of WBC.
15. Total count of RBC.
16. Differential WBC count WBC count.
17. Flocculation reaction VDRL.
18. Agglutination reaction widal test.
19. Examination of urine –chemical, physical, microscopic and bacteriological.
20. Determination of ELISA test.

Designing of at least two innovative experiment based on the available flex faculty in university related to subject.

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SADHU VASWANI AUTONOMOUS COLLEGE
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Syllabus recommended by Board of Studies of Botany
Session – 21-20,2020-19,2019-18,2018-2017

Class	:	B.Sc.
Year	:	I st Year
Subject	:	Botany
Paper	:	First
Title	:	Diversity of Lower Plants
Max. Marks:		40
	:	10 CCE
Course code:		SC A17(A)-

Course outcome

CO1: - Student will understand the concept and economic importance of Cyanobacteria.
CO2:- Students will acquire knowledge of bacteria classification, occurrence, genetic recombination of Bacteria and Mycoplasma.
CO3:- Student will understand the structure, Life Cycle of different members of Algae.
CO4:- Student will understand structure, reproduction and Life cycle of different members of Fungi
CO5:- They will acquire knowledge of structure, reproduction and Life cycle of different Bryophyte and Pteridophyte members.

Unit-1	Viruses and Prokaryotes : Characteristics of Viruses, general account of TMV and T4 bacteriophage. Bacterial structure, nutrition, reproduction and economic importance. General account of Mycoplasma, Cynobacteria and Actinomycetes.
Unit-2	Algae: General characters, classification and economic importance. Important | features and life history of Chlorophyceae-Volvox, Oedogonium, Charophyceae-Chara, Xanthophyceae, Vaucheria, Phaeophyceae-Ectocarpus. Rhodophyceae-Polysiphonia.
Unit-3	Fungi : General characters, classification and economic importance. Important features and life history of Oomycetes-Albugo, Zygomycetes :Mucor, Ascomycetes : Yeast, Peziza. Basidiomycetes :Puccinia, Deuteromycetes : Alternaria. General account of Lichens.
Unit-4	Bryophyta : General Characters and Classification, study of morphology, anatomy and reproduction of Hepaticopsida: Riccia, Marchantia; Anthocerotopsida: Anthoceros, Bryopsida: Polytrichum.
Unit-5	Pteridophyta : Important characters and Classification. Steiarorganization.Morphology and anatomy of Rhynia. Structure; anatomy and reproduction in Lycopodium. Selaginella, Equisetum and Marsilea.

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Syllabus recommended by Board of Studies of Botany
Session – 21-20,2020-19,2019-18,2018-2017

Class	:	B.Sc.
Year	:	I st Year
Subject	:	Botany
Paper	:	Second
Title	**:**	**Diversity of** Higher Plants
Max. Marks:		40
	:	10 CCE
Course code :		SC A17(B)-

Course outcome:

CO1:- Student will be able to understand characters and classification, anatomy and life cycles of Gymnosperms. Fossil Gymnosperms

CO2:- knowledge of Herbarium Techniques, Botanical gardens andconcept of Botanical nomenclature.

CO3:- knowledge of Angiosperms and classification.

CO4:- Student will be able to understand the diagnostic characters of families
IGroup – Ranunculaceae to Apiaceae
II Group from – Asteraceae to Poaccae

Unit-1	Gymnosperm : General characters and Clssification of Gymnosperms. Heterospory and Origin of Seed Habit. Diversity of Gymnosperms. Geological Time Scale and Fossilization . Fossil Gymnosperms :Lygnopteis and Williamsonia..
Unit-2	Gymnosperm : Morphology, Anatomy, Reproduction and life cycle of Cycas, Pinus and Ephedra.
Unit-3	Taxonomy : Origin and Evolutio of Angiosperms: Principles and rules of Botanical Nomenclature, Museum, herbarium and Botanical Gradens ; Classificaiton of Angiosperms: Bentham and Hooker and Modern trends in Taxonomy including Molecular taxonomy APG IV System.
Unit-4	Taxonomy: Terminology for plant description in semi-technical language Diagnostic characteristics and Economic importance of FamiliesRanunculaceae, Brassicaceae, Malvaceae, Rutaceae, Fabaceae and Apiaceae.
Unit-5	**Taxonomy :**Diagnostic characteristics& Economic Importance of Families Rubiaceae, Asteraceae, Apocynaceae, Solanaceae, Lamiaceae, Euphorbiaceae, Liliaceae and Poaceae.

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Syllabus recommended by Board of Studies of Botany
Session – 21-20,2020-19,2019-18,2018-2017

Class	:	B.Sc.
Year	:	I st Year
Subject	:	Botany
Paper	:	Second
Title	:	Practical
Max. Marks	:	10: +40 CCE
Course code	:	PR-SC A17-

Course outcome:

CO1- Student will be able to understand characters and classification, anatomy and life cycles of Gymnosperms. Fossil Gymnosperms
CO2-knowledge of Herbarium Techniques, Botanical gardens andconcept of Botanical nomenclature.
CO3- knowledge of Angiosperms and classification.
CO4- Student will be able to understand the diagnostic characters of families
IGroup – Ranunculaceae to Apiaceae
II Group from – Asteraceae to Poaccae

PRACTICAL SCHEME
B.Sc. (BOTANY)
(BASED ON PAPER I & II)

		Marks-50
1.	Algae/ Fungi	05
2.	Bryophyte/ Pteridphyta	05
3.	Gymnosperms	10
4.	Taxonomy	10
5.	Spotting (01-05)	10
6.	Vivo Voce	05
7.	Sessional	05

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Syllabus recommended by Board of Studies of Botany
Session – 21-2020

Class : B.Sc.
Year : II
Subject : Botany
Paper : I
Title :Taxonomy and Embryology of Angiosperms
Max. Marks: 10+40 CCE
Course code: SC A28(A)–

Course outcome

CO1- Students will be able to acquire knowledge of origin and evolution of angiosperms, various systems of classification of angiosperms and modern trends in taxonomy.
CO2- Students will be able to understand herbarium techniques and rules of botanical nomenclature.
CO3- Students will be able to understand plant description in semitechnical language and diagnositic characters of various families from primitive to advance characters.
CO4- Students will be able to understand economic importance and diagnostic characters of families Group I : Ranunculaceae to Cucurbitaceae.
Group II: Rubiaceae to Orchidaceae.
CO5- Students will be able to acquire knowledge of Embryology , experimental embryology and vegetative propagation.

UNIT-1	Taxonomy :Origin and Evolution of Anigiosperms: Principles and rules of Botanical Nomenclature, Museum ,Herbarium andBotainal Gardens .Comparative account of various system of Classification ofAngiosperms: Bentham and Hooker and Modern trends in Taxonomyincluding Molecular taxonomy, APG IV System.
UNIT-2	Taxonomy :Terminology for plant description in semi technical language Disgnosticcharacteristicsand Economic Importance of Families Ranunculaceae ,Brassicaceae, Malvaceae, Rutaceae, Fabaceae, Apiaceae, Magnoliaceae RosaceaeDispterocrpaceae and Cucurbitaceae
UNIT-3	Taxonomy : Diagnostic characteristies& Economic importance of Families Rubiaceae, Asteraceae, Apocynaceae, Solanaceae, Lamiaceae, Euphorbiaceae, Liliaceae, Poaceae, Ascelpidiaceae, Verbenaceae, Arecaceae, Musaceae and Orchidaceae.
UNIT-4	Embryology: Concept of flower as a modified shoot. Structure of Anther, Microsporogenesis and Male Gametophyte Structure of Pistil, Ovules, Megasporogenesis and Development of Female Geametophyte (Embryo Sac) and its types. Pollination – Mechanism andAgencies of Pollination. Pollen -Pistil interactions and Self incompatibility.
UNIT-5	Embryology : Double Fertilization and triple fusion. Development and types of endosperm and its morphological nature, Development of Embryo in Monocot and Dicot plants, Polyembryony and Apomixis, Application of Palynology, Experimental Embrylogy including Pollen storage and test tube fertilization .Fruit development and maturation, seed structure and dispersal. Mode of Vegetative Propagation.

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Syllabus recommended by Board of Studies of Botany
Session – 21-20,2020-19,2019-2018

Class : B.Sc.
Year `: II
Subject : Botany
Paper : II
Title : Plant Ecology Biodiversity and Phytogeography
Max. Marks : 40+10 CCE
Course code : SC A28(B)–

Course outcome

CO1- Study of Ecosystems, and ecological pyramids.
CO2- Study of Biogeochemical cycles.
CO3- Study of ecological adaptations.
CO4- Study of Ecology, Biodiversity and its significance and conservation.
CO5- Study of Endangered Species, Threatened Species and Red Data Book, Development of Soil Profile, Global Warming and Ozone Hole.

Unit-1	Ecosystems : Structure and types, Biotic and Abiotic components, Trophic levels, Food chain Food web Ecological pyramids Energy flow Biogeochemical cycles: Gaseous liquid and Sedimentary cycles Carbon Nitrogen Phosphorus and Sulphur cycle
Unit-2	Ecological adaptation : Morphological, Anatomical and physiological responses Water adaptation (Hydrophytes and Xerophytes Temperature adaptation) (Thermoperiodism and Vernalization) Light adaptation (Heliophytes) and Scipophytes) Phant Succession causes trends and processes Types of succession – Hydrosere and Xerosere.
Unit-3	Biodiversity and Population Ecology : Distribution patterns , Density Natality Mortality Growth curves. Ecotypes and Ecads Community Ecology Frequency Density Abundance Cover and Life form Biodiversity Basic concept definition Importance Biodiversity of IndiaHotspots in situ and ex situ conservation, Biosphere reserves Sanctuaries and National parks of Madhya Pradesh Endangered and Threatened species red data book.
Unit-4	Soil : Pollution – physical and chemical properties Soil formation Soil Profile Soil classification Soil composition Soil factors Definition Types and Causes Global warming Acid rain Climate change and Ozone layer and Ozone hole
Unit-5	Phytogeography: Phytogeographical regions of India, Vegetation types of Madhya Pradesh. Natural resources - definition and classification. Conservation and management of natural resources. Land resources management, Water and Wet land resource management.

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Syllabus recommended by Board of Studies of Botany
Session – 21-20,2020-19,2019-2018

Class : B.Sc.
Year `: II
Subject : Botany
Paper : II
Title : Practical
Max. Marks : 50
Course code : PR-SC A28–

Course outcome

CO1- Study of Ecosystems, and ecological pyramids.
CO2- Study of Biogeochemical cycles.
CO3- Study of ecological adaptations.

Marks-50

1.	Taxonomy	10
2.	Embryology – Anther/ Ovule /Placentation	05
3.	Exercise based on Ecology	10
4.	Exercise based on Phytogeography / National parks	05
5.	Spotting (01-05)	10
6.	Viva Voce	05
7.	Sessional	05

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Syllabus recommended by Board of Studies of Botany
Session – 21-20,2020-2019

Class : B.Sc
Year `: III
Subject : Botany
Paper : I
Title : Plant Physiology and Biochemistry
Max. Marks: 10+40 CCE
Course code : SC A39(A)–

Course outcome

CO1- Students will be able to understand plant water relations,Osmosis,Ascent of sap and mechanism of Transpiration.

CO2- Student will be able to acquire knowledge of Mineral Nutrition, Translocation of organic solutes in plants and depth knowledge of structure and function of Biomolecules.

CO3- Understand photosynthesis and photorespiration.

CO4- Acquire knowledge of respiration and its different biochemical pathways.

CO5- Acquire understanding of general concept of enzymes mechanism of enzyme action and plant hormones.

Unit-1	Plant Water Relations - Properties of water, Importance of water in plant life, Diffusion, Osmosis & Osmotic relation to plant cell. Water Absorption, Ascent of Sap. Transpiration : Structure & Physiology of Stomata. Mechanism of Transpiration. Factors affecting the rate of transpiration.
Unit-2	Plant Nutrition, Blomolecules& Metabolism - Mineral Nutrition, Essential Macro & Micro Nutrients and their role, Absorption of mineral nutrients and Hydroponics, Translocation of organic solutes. Biomolecules : Structure, Classification and functions of | Carbohydrates, Amino acids, Proteins and Lipids Nitrogen fixation Nitrogen and Lipid metabolism
Unit-3	Photosynthesis: Chloroplast, Photosynthetic pigments, Concept of two photosystems, Light reaction Red drop Emerson effect, Dark reaction, Calvin cycle, hatch & Slack cycle. CAM cycle. Factors affecting rate of photosynthesis & Photorespiration**.**
Unit-4	Respiration : Mitochondria, aerobic and anaerobic respiration, fermentation,Respiratory coefficient, mechanism of respiration - Glycolysis, Kreb's cycle, Pentose Phosphate, Pathway, Electron transport system. Factors affecting rate of respiration, Redox potential and theories of ATP synthesis.
Unit-5	Enzymology& Plant Hormaones : Classification, nomenclature and characteristics of Enzymes, Concept of holoenzyme, apoenzyme, Co-enzyme and Co-factors, Mode &Mechanism of enzyme action, Factors affecting enzyme activity. Plant Harmones : Discovery, Structure Mode of action and role of Auxins, Gibberellins, Cytokinin, Abscissic acid and Ethylene

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Syllabus recommended by Board of Studies of Botany
Session – 21-2020 ,20-2019

Class	:	B.Sc.
Year	`:	III
Subject	:	Botany
Paper	:	II
Title	:	Cell Biology, Genetics andBiotechnology
Max. Marks	:	10+40 CCE
Course code	:	SC A39(B)–

Course outcome

CO1- Student will be able to understand structure of cell envelops & cell-organelles.
CO2-Student will be able to acquire knowledge of Chromosomal organization, cell division and varation in Chromosome number and DNA Structure and replication.
CO3-Will be able to understand genetic inheritance in terms of Mendel's laws and Mutations.
CO4-Will acquire knowledge of gene structure, genetic code, protein synthesis and regulation of gene expression.
CO5-Will acquire in depth knowledge of Biotechnology, genetic engineering & its applications.

Unit-1	The cell envelops and Cell organelles :Techniques of cell biology Prokaryotic and Eukaryotic cell structureand plasma membrane, lipid bilayer structure functions of the cell wall. Structure and function of cell organelles :Nucleus, Chloroplast, Mitoochondria, Golgi bodies, ER, Peroxisome and Vacuole. Cell signalling and cell receptors signal transduction.
Unit-2	Chromosomal organization : Structure and functions of chromosome, centromere and telomere Nucleosome model special types of chromosomes, Mitosis and Meiosis Variation in chromosome Structure : Deletion Duplication Translocation and Inversion: variation in chromosome number, Euploidy, Aneuploidy, DNA: The genetic material DNA Structure and replication.
Unit-3	Genetic Inheritance- Mendelism : Laws of Dominance, laws of segregation and independent assortment : Linkage analysis, interaction of genes, Cytoplasmic inheritance, Mutations: spontancous and induced : Transposable elements: DNA damage and repair.
Unit-4	Gene : Development of Genetics, Structure of Gene, Gene verses allele genetic code, transfer of genetic information: Transcription, translation, protein synthesis, tRNA and ribosomes, Regulation of gene expression in Prokaryotes and Eukaryotes. Organicevolution – Role of RNA in origin and evolution.
Unit-5	Plant Breeding : Introduction, Methods Selection and Hybridization (Pedigree backcross, mass selection and bulk method) Biotechnology : Definition : basic aspects of plant tissue culture, cellular totipotency, differentiation and morphogenesis Important achievements of

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Syllabus recommended by Board of Studies of Botany

Session – 21-20,2020-19,2019-2018

Class	:	B.Sc.
Year	`:	II
Subject	:	Botany
Paper	:	II
Title	:	Practical
Max. Marks	:	50
Course code	:	PR-SC A39–

Course outcome

CO1- Student will be able to understand structure of cell envelops & cell-organelles.

CO2-Student will be able to acquire knowledge of Chromosomal organization, cell division and varation in Chromosome number and DNA Structure and replication.

CO3-Will be able to understand genetic inheritance in terms of Mendel's laws and Mutations.

	Marks-50
1. Taxonomy	10
2. Embryology – Anther/ Ovule /Placentation	05
3. Exercise based on Ecology	10
4. Exercise based on Phytogeography / National parks	05
5. Spotting (01-05)	10
6. Viva Voce	05
7. Sessional	05

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Sadhu Vaswani Autonomous College
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2017-18

Class	:	B.Sc.
Year	:	I
Subject	:	Computer Science & Application
Title of Subject Group	:	Fundamental of Computers
Max. Marks	:	50
Course Code	:	CM- A19 (A)

Course Outcome

C01. Concepts of fundamentals of Computer, their Uses, storage, I/o devices.

C02. Text processing, formatting, editing for both official and non-official purposes.

C03. Clear understanding of digital logic circuits and computer organization.

C04. Students shall be able to demonstrate the applications of Boolean algebraic expressions in digital design.

C05. Computer architecture and data transfer techniques.

UNITI	Block diagram of computer: input unit, output unit, CPU, memory unit, generations of computers, typesof Computers: desktop, laptop. palmtop, and workstations & super computers. All types of input andoutput devices. hardware, software and firmware. Windows: features of windows — desktop, start menu,control panel, my computer, windows explorer, accessories. Managing multiple windows, arranging iconson the desktop, creating and managing folders. managing files and drives, logging off and shutting downwindows.
UNITII	Word: What is word processing, creating documents in MS-Word, formatting features of MS-Word,standard toolbar, drawing toolbar, tables and other features. Mail-merge, insertion of files, pictures,clipboard, graphs, print formatting, page numbering and printing documents. Excel - Introduction toworkbookandworksheet.Enteringinformationinaworksheet-numbers,formula,etc.,savingaworkbook, editing cells, using commands and functions, moving and copying, inserting and deleting rowsandcolumns,creatingcharts.Pagesetup:margins,addingheaders&footersbefore printing,printpreviewofworksheet,removing gridlines fromprintout, printing thetitlerows.
UNITIII	Number system: decimal, binary, octal, hexadecimal, conversions from one base to another base. Codes:ASCII code, EBCDIC code, Gray code. Boolean algebra, de-morgan's theorem, binary arithmetic: -addition, subtraction, multiplication & division, unsigned binary numbers, signed

	magnitude numbers, I'scomplement & 2's complement representation of numbers. 2's complement arithmetic. Boolean functions& truth tables, SOP, POS form, minterms/maxterms, simplification of logic circuits using boolean algebraand karnaugh maps. Logic gates: - AND, OR, NOT, NAND, NOR, X -OR and X - NOR gates, theirsymbolsandtruthtables,circuitdesign withgates:adder/subtractor circuit
UNITIV	Memory cell, primary memory: RAM, static and dynamic RAM, ROM, PROM, EPROM, EEPROM,cache memory, secondary memory and its types, virtual memory concept, memory accessing methods:serial and random access. Data bus, control bus &address bus. Word length of a computer, memoryaddressingcapabilityofacpu,processingspeedofacomputer,microprocessors ,singlechipmicrocomputers(microcontrollers).
UNITV	General architectureofa CPU,instruction format, anddata transfer instructions,data manipulationinstructions and program control instructions. Types of CPU organization: accumulator based machine,stackbasedmachineandgeneral-purposeregisterbasedmachine,addressingmodes,datatransferschemes: (i) programmed data transfer: synchronous, asynchronous and interrupt driver data transfer (ii)directmemoryaccessdatatransfer: Cyclestealingblocktransferandburstmode ofdata transfer. DepartmentofHigherEducation,GovernmentofMadhyaPradeshYearlySyllabusforUndergraduatesAs recommended by Central Board of Studies of Computer Science and Approved by H E the Governorof M.P.

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Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2017-18

Class	:	B.Sc
Year	:	I
Subject	:	Computer Science & Application
Title of Subject Group	:	Programming in C
Max. Marks	:	50
Course Code	:	CM- A19 (B)

Course Outcome

C01. Gain the basic knowledge on Object Oriented concepts.
C02. Use different data types in a computer program.
C03. To demonstrate the differences between traditional imperative design and object-oriented Design
C04. To explain class structures as fundamental, modular building blocks.
C05. To understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code.

UNITI	Classificationofprogramminglanguage:procedurallanguages,problemorientedlanguages, non-procedurallanguages.Structuredprogrammingconcepts:modularprogramming:top-downanalysis,bottom-up analysis, structured programming. Problem solving using computers: problem definition andanalysis,problemdesign, coding,compilation,debuggingandtesting, documentation, implementationandmaintenance.
UNITII	Introduction to C language: constants, variables, keywords, data types, operators, expressions, operatorprecedence and associatively. Structure of C program: variable declaration, declaration of variable asconstant.
UNITIII	Managing Input/output Operators: Formatted and Unformatted. Control Statements: Branching, Jumping& Looping. Scope Rules, Storage Classes.
UNITIV	Arrays (one and two dimensional). Functions: user defined function, standard function, categories infunctions,passingargumentstoafunction,recursion.Pointers:operators,declaration,pointertoarithmetic,arrayofpointers.Structures:declaring,accessing,initializing,arrayofstructures.
UNITV	File handling in c: opening and closing a data file, inserting data to data file. Graphics programming - introduction,functions,stylishlines,drawingandfillingimages,palettesandcolours,justifyingtext,bitof animation

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Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2017-18

Class	:	B.Sc
Year	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++
Max. Marks	:	40
Course Code	:	CM- A30 (A)

Course Outcome

CO1. Understand importance of object oriented programming and difference between structured oriented and object oriented programming features. Develop an in-depth understanding of object oriented paradigm with principles of classes, object and functions.

CO2. Abletomakeuseofobjectsandclasses fordevelopingprograms.

CO3. Implementvariousobjectoriented conceptstosolvedifferentproblems.

CO4. Concept of Constructors and Destructors, Inheritance with their Implementation.

CO5. Implement pointer and arrays in real life.

UNIT I	Introduction to C++: Programming paradigms, Key concepts of Object-oriented Programming,Advantages of OOP's. Input and Output in C++: Pre-defined streams, Unformatted console I/Ooperations,formatted console I/Ooperations.
UNIT II	C++ Declarations: Parts of C++ Program, types of Tokens, Keywords, Identifiers, data types, constants,Operators,Precedenceofoperators,referencinganddereferencingoperators,scopeaccess operator.Controlstructures:DecisionMakingStatements,loopingstatement.
UNIT III	Functions: main (), parts of function, passing arguments: value, address, reference, inline functions,functionoverloading:principles,precautions,libraryfunctions.Classesandobjects:declaring classesandobjects, accessing class members, keyword: public, private, protected, defining member functions:member function inside the class, member function outside the class, static member variables andfunctions,friendfunction, friendclasses, overloadingmember functions.
UNIT IV	Constructors and Destructors: characteristics, applications, constructors with arguments, overloadingconstructors,typesofconstructors.Operatoroverloading:overloadingunaryoperator,binaryoperator.Inheritance: access specifiers: public inheritance, private inheritance, protected data with privateinheritance, Types of inheritances: single, multiple, hierarchical, multilevel, hybrid, multipath, virtualbaseclass.
UNIT V	Pointers & arrays: pointer declaration, pointer to class & object, Array: declarations & initialization,arraysofclasses.Polymorphism:Static(Early)binding,Dynamic(Late)Binding,virtualfunction,purevirtual function.

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Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2017-18

Class	:	B.Sc
Year	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	DATASTRUCTURES
Max. Marks	:	40
Course Code	:	SC- A30 (B)

Course Outcome

C01. Gain the basic knowledge on Object Oriented concepts.

C02. Use different data types in a computer program.

C03. To demonstrate the differences between traditional imperative design and object-oriented Design.

C04. To explain class structures as fundamental, modular building blocks.

C05. To understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code.

UNIT I	Concept of data structure and analysis of algorithm, abstract data structure, introduction to stack andprimitive operations on stack, stack as an abstract data type, stack application: infix, prefix, postfix andrecursion, introduction to queues, primitive operation on queues, circular queue, dequeue , priority queueandapplications ofqueue.
UNIT II	Introduction to linked list, basic operations on linked list, stacks and queues using linked list, doublylinkedlist, circularlinkedlist,applications of linked list.
UNIT III	Trees-basic terminology ,binary trees, tree representations as array and linked list, basic operations onbinary tree, traversal of binary trees:- inorder, preorder, postorder. Applications of binary tree, threadedbinarytree, AVL tree, binarytree representations of trees.
UNIT IV	Sequentialsearch,binarysearch,insertionsort,selectionsort,quicksort,bubblesort,heapsort,comparisonofsortingmethods.
UNIT V	Hash'Table.Collisionresolutiontechnique,Introductiontographs,Definition,Terminology, Directed,Undirected and Weighted Graph, Representation of Graph, Graph Traversal-Depth first, Breadth firstsearch,Spanning tree, Minimum Spanningtree, Shortest path algorithm.

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Sadhu Vaswani Autonomous College
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2017-18

Class	:	B.Sc.
Year	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	DATABASEMANAGEMENTSYSTEM
Max. Marks	:	40
Course Code	:	SC- A40 (A)

Course Outcome

C01. Concepts of SQL,DDL,DML,DCL,TCL
C02. Illustration of data models, functional dependency, integrity and schema of database.
C03. Concept of Various Functional Keys, Joins and Relation Algebra.
C04. Normalization of the database.
C05. Basic Concept of B- tree, Hashing, Indexing.

UNITI	Purpose of database system, views of data, data models: relation, network, hierarchical, instancesand schemas, data dictionary, types of database languages:-DDL, DML, structure of DBMS,advantages and disadvantages of DBMS. 3-level architecture proposal:-external, conceptual &internallevels.
UNITII	Entity relationship model as a tool of conceptual design: entities & entities set, relationship andrelationship set, attributes and mapping constraints, keys, ER diagram:-strong and weak entities,generalization,specialization & aggregation, reducing ERdiagram to tables.
UNITIII	Fundamentals of set theoretical notations: relations, domains, attributes, tuples, concept of keys:primary key,super key,alternate key,candidate key,foreignkey,fundamentalsof integrityrules:entity&referentialintegrity,extensionandintention,relationalalgebra:select,project,cartesianproduct,differenttypes ofjoins:theta,equi,natural,outer joins,setoperations.
UNITIV	FunctionalDependencies,Good&BadDecompositionandAnomaliesasadatabase:Aconsequences of bad design. Universal relation, Normalization: INF, 2NF, 3NF, &BCNF normalforms,multivalued dependency, join dependency,4NF, 5NF.

UNITV	Basic concepts: -Indexing and Hashing, B-tree Index tiles, Hashing: Static & Dynamic hashfunction,Index definition in SQL: Multiplekey accesses.

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Session – 2017-18

Class	:	B.Sc.
Year	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	OPERATINGSYSTEMCONCEPTS
Max. Marks	:	40
Course Code	:	CM- A40 (B)

Course Outcome

C01. Concepts of basic working process of an operating system.

C02. Illustration of process States and Process scheduling.

C03. Understand the issues in synchronization and memory management .

C04 .Implementation of Deadlock Detection, prevention and recovery.

C05. Linux Operating System, Commands and files System.

UNITI	Operating system definitions, its component, evolution of operating system, types of operatingsystems: batch, multiprogramming, multitasking, multiprocessor, real time, client-server, peer-to-peer,distributed,clustered,operatingsystemservices,systemcalls,protectionofI/O.memoryand CPU.
UNITII	Process scheduling: concept of a process, process states, PCB, process life cycle, operations onprocesses,contextswitch,typesofschedulers,CPUburst-I/Oburstcycles,dispatcher,scheduling criteria, scheduling algorithms:- FCFS, SJF, STRN, Round Robin, priority, eventdriven,multilevelqueue. Performanceevaluationofalgorithmsthroughdeterministicmodelling.
UNITIII	Memory Management:addressbinding, logical and physicaladdressspace, dynamic loadingandlinking.Contiguousmemoryallocation:staticanddynamicpartitionedmemory.Fragmentation, swappingrelocation,compactionandprotection.Non-contiguousmemoryallocation:Paging,Segmentation.VirtualMemory:demandpaging,pagefault,pagereplacementalgorithms-FIFO, LRU,optimal, thrashing, pagefaultfrequency.

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Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Mathematics
Session 2019-20,2020-21

Class	:	B.SC
Year	:	I
Subject	:	Mathematics
Title of Subject	:	Algebra and Trigonometry
Paper	:	I
Course Code	:	SC-A22(A)
Max. Marks	:	40

Course Outcomes

CO1- Study definitions of matrix and find rank, inverse, Eigen values and Eigenvectors.

CO2- Application of matrix to solve linearr system & system of lines equation for solving the problems up to three unknowns.

CO3- Student will understand relation between roots and co efficient, transformation and reciprocaldescart's rule.

CO4- To understand logical concepts and show logical equation by using truth tables and ruler in logics.

CO5- Study different type of functions and Gregory's series and summations of trignometrical series.

Unit-1	Rank of a matrix, Normal & Echelon form of a matrix. Characteristic equations of a matrix. Eigen values Figen vectors. Linear Independence of row and column matrix
इकाई–1	आव्यूह की जाति, आव्यूह का प्रासामान्य एवं ऐसेलॉन रूप, आव्यूह का अभिलाक्षणिकसमीकरण, आयगेनमान, आयगेनसदिश, पंक्ति एवंस्तम्भआव्यूह की स्वतंत्रता।
Unit-2	Cayley Hamilton theorem and its use in finding inverse of a matrix, application of matrix to solve a system of linear (homogenous and non-homogenous) equations. Theorems on consistency and inconsistency of a system of linear equations. Solving linear equations upto three unknows.
इकाई–2	केली–हैमिल्टनप्रमेय एवंआव्यूह का व्युत्क्रमआव्यूह (समघात एवं असमघात) ज्ञातकरनेमेंइसकाउपयोग, रैखिकसमीकरणों के निकाय के हल के लियेआव्यूह का प्रयोग, रैखिकसमीकरणों के निकाय की संगतता एवंअसंगततापरप्रमेय, तीनअज्ञातआशियोंतक के रैखिकसमीकरणों के हल।
Unit-3	Relation between the roots and coefficients of a general polynomial equation in one variable, transformation of equations. Reciprocal equations, Descart's rule of sings.
इकाई–3	एकचर के सामान्य बहुपदों के समीकरण के गुणांकों एवंपूलों के बीचसंबंध, समीकरणों का रूपांतरण, व्युत्क्रमसमीकरण, चिन्हों का दिकोर्तेनिमय।
Unit-4	Logic- Logical connectives, Truth Tables, Tautology, Contradiction, Logical Equivalence, Algebra of Propositions, Boolean Algebra-definition and properties switching circuits and its applications, logic gates and circuits.
इकाई–4	तर्कशास्त्र–तर्कसंयोजक, सत्यता सारणी, पुनरूक्तिऔरव्याघात, तार्किकतुल्यता, साध्यों का बीजगणित।बूलीय बीजगणित–परिभाषा एवंउसकेगुणधर्म।स्विचनपरिपथ एवंउसकेअनुप्रयोग, तर्कद्वार

	एवंपरिपथ।
Unit-5	De-Moivre's theorem and its applications, direct and inverse circular and hyperbolic functions, expansion of trigonometric functions, logarithm of complex quantities, Gregory's series. Summations of trignometrical series.
इकाई–5	डी–मोइवर्सप्रमेय एवंइसकेअनुप्रयोग, प्रत्यक्ष एवंव्युत्क्रमवत्तीय एवंअतिपरवलयिकफलन। त्रिकोणमितिय फलनों का विस्तार, सम्मिश्र संख्याओं का लघुगणक, ग्रीगोरी श्रेणी त्रिकोणमितिय श्रेणियों का योग।

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Syllabus recommended by Board of studies of Mathematics
Session 2019-20,2020-21

Class	:	B.SC
Year	:	I
Subject	:	Mathematics
Title of Subject	:	Calculus and Differential Equations
Paper	:	II
Course Code	:	SC-A22(B)
Max. Marks	:	40

Course Outcomes

CO1- Learn How to find n^{th} derivation of function and apply maclaurin's and Taylor 's series, n^{th} derivation of product of two function by Leibnitz's theorem.
CO2- Study tracing of curve in Cartesian and polar co-ordinates & test of concave, convex and point of inflexion
CO3- Study multiple integration,quadrature and rectification.
CO4- Student will be able to solve first order differential equation utilizing the standard technique for separable, exact, linear, Homogenous, Bernoulli's equation.
CO5- Student will be able to find the complete solution of Homogenous second order equationby finding complementary function and particular integral and also method of variationof parametres.

Unit-1	Successive differentiation. Leibnitz theorem. Maclaurin's and Taylor's series expansions. Asymptotes.
इकाई–1	उत्तरोत्तरअवकलन, लैबनीजप्रमेय, मॅक्लारिन एवंटेलर श्रेणी मेंविस्वार।अनंतस्पर्शी।
Unit-2	Curvature, tests for concavity and convexity. Points of inflexion, multiple points tracing of curves in Cartesian and polar coordinates.
इकाई–2	वक्रता, उत्तलता एवंअवतलता का परीक्षण, नतिपरिवर्तनबिन्दु, बहुबिन्दुकार्तीय एवं ध्रुवीय निर्देशांकोमेंवक्रो का अनुरेखण।
Unit-3	Integration of transcendental functions, Definite Integrals. Reduction formulae, Quadrature, Rectification.
इकाई–3	अबीजीय फलनों का समाकलन, निश्चितसमाकलनसमानयनसूत्र, क्षेत्रकलन एवंचापकलन।
Unit-4	Linear differential equations and equations reducible to the linear form, Exact differential equations reducible to the linear form, Exact differential equations, first order and higher degree equations solvable for x, y and p, Clairaut's equation and singular solutions, geometrical meaing of a differential equation. Orthogonal trajectories.
इकाई–4	रैखिकअवकलसमीकरण एवंरैखिकसमीकरणमेंसमानेंय अवकलसमीकरण, यथातथअवकलसमीकरण, गए ल और च मेंहलहोने योग्य प्रथमकोटि एवंउच्च धातीय अवकलसमीकरण, क्लोरो का समीकरणऔरविचित्र हल।अवकलसमीकरण का ज्यामितीय अर्थः लांबिकसंछेदियां।
Unit-5	Linear differential equation with constant coefficients. Homogoenocous linear ordinary differential equations, Linear differential equations of second order.

	Transformation of equations by changing the dependent variable independent variable. Method of variation of parameters.
इकाई–5	अचरगुणांकोवालेरैखिकअवकलसमीरण, साधारणरैखिकसमघातअवकलसमीकरण, द्वितीय कोटि के रैखिकअवकलसमीकरण, स्वतंत्र चर/परतंत्र चर के परिवर्तन द्वारासमीकरणों का रूपांतरण, प्राचलविचरणविधि।

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Syllabus recommended by Board of studies of Mathematics
Session 2019-20, 2020-21

Class	:	B.SC
Year	:	I
Subject	:	Mathematics
Title of Subject	:	Vector Analysis and Geometry
Paper	:	III
Course Code	:	SC-A22(C)
Max. Marks	:	40

Course Outcomes

CO1- Student will learn to differentiae vector, product of three vector in symbolic form and Gradient, Divergece and curl.

CO2- Student learn meaning of vector Integration and problems on it.

CO3- Student will understand the meaning of conic and How to trace in Cartesian and polar equation.

CO4- Student study equation of cone, right circular cone, cylinder and its properties.

CO5- Student study conicoids, praboloids and generating lines.

Unit-1	Product of four vectors, Reciprocal vectors, vector differentiation, Gradient, Divergence and curl in Cartesian and cylindrical co-ordinates, higher order derivatives, vector identities and vector equations.
इकाई–1	तैनसदिशें का अदिश एवंसदिशगुणन, चारसदिशों का गुणन, व्युत्क्रमसदिश, सदिशअवकलन, ग्रेडियंट, डायवरजेन्स एवंकर्ल।
Unit-2	Vector Integration, Theorems of Gauss, Green, Stoke (without proof) and problems based on them, Application to geometry, Curves in space, Curvature and torsion , serret-Frenet's formula.
इकाई–2	सदिशसमाकलन, गोंस, ग्रीन एवंस्टोक की प्रमेय (बिना उपपति) एवंइनपरआधारितप्रश्न।
Unit-3	General equation of second degree, tracing of conics, system of conics, polar equation of a conic.
इकाई–3	द्वितीय घात के व्यापकसमीकरण, शांकवो का अनुरेखण, शांकवनिकाय, शांकव का ध्रुवीय समीकरण।
Unit-4	Equation of cone with given base, generators of cone, condition for three mutually perpendicular generators,Right circular cone, equation of cylinder and its properties.
इकाई–4	दिय गए आधारपर शंकु का समीकरण, शंकु के जनक, तीनपरस्परजम्बवतजनकोहेतुप्रतिबंध, लम्बववत्तीय शंकु, बेलन का समीकरणऔरइसकेप्रगुण।
Unit-5	Central conicoids, paraboloids.ellipsoid ,hyperboloid of one and two sheets and their roperties.
इकाई–5	केन्द्रीय शांकवज, परवलयज, शांकवज के समतलप्रच्छेद, जनकरेखाऐं।

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Syllabus recommended by Board of studies of Mathematics
Session 2018-19

Class	:	B.SC
Year	:	II
Subject	:	Mathematics
Title of Subject	:	Advanced calculus
Paper	:	II
Course Code	:	SC-A33(B)
Max. Marks	:	40

Course Outcomes

CO1- Gain skills sequences and series and list converging and divergence by applier different types of test.

CO2- Understand the meaning of continuity sequential continuity and its properties, and chain ruleof differentiability.

CO3- Student understand the concept of continuity and differentiality for two variable, partial differential and Jacotran

CO4- Student will be able to analyze Enveloper, Evolutes, maxima, minima for function of two variables and Beta gamma function.

CO5- Study Double and triple integration, Volume and surface and change order of double and triple integration.

Unit-1	Definition of sequence. Theorems on limits of scqucnces. Bounded and monotonic sequences. Cauchy's convergence criterion, series of non-negative terms comparison test Cauchy's intergral test. Cauchy's root test, ratio test, Raabe's convergence.
इकाई–1	अनुक्रम की परिभाषा, अनुक्रम की सीमापरप्रमय परिवद्ध एवं एकदिष्टअनुक्रमकाशी का अभिसरणमापदण्उ अत्रणात्मकपदों की श्रेणी, तुलनापरीक्षणकॉशी का समाकलपरीक्षणकॉशी का मूलपरीक्षण, अनुपातपरीक्षणराबी का परीक्षणलघुगण्कीय परीक्षा....श्रेणी, लिबनीजपरीक्ष्ज्ञण, निरपेक्ष एवंप्रतिबंधीअभिसरण।
Unit-2	Continuity of functions of single variable. Sequential continuity. Properties of continuous functions. Uniform continuity. Chain rule of differentaiability. Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives.
इकाई–2	सांतत्य (एकचार फलन), अनुक्रमणीय सांतत्या, संततफलनी के गुणधर्म एवंसमानसांतत्य अवकलनीयता का श्रृंखलानियम, मध्यमानप्रमेय एवंउनकाज्यामततियि अर्थअवकला के लियेडार्बू का मध्यवर्तीमानप्रमेय।
Unit-3	Limit and contiruity of functions of two variables. Patral differentiation…..variables. Euler's theorem on homogeneous function…..theorem for functions of two variables. Jacobins.
इकाई–3	दोचरों के फलनों की सीमा एवंसातत्याआंशिकअवकलनचरों के परिवर्तनसमघातफलनोंपरआयलर का प्रमेय दोचरों के फलनों के लियेटेलर क प्रमेय जकोबियन।
Unit-4	Enveloper, Evolutes. Maxima and Minima of functions of two variables. Langrange's multiplier method, Beta and Gamma Funcions.
इकाई–4	अन्वालोर्प, केन्द्रेज, दोचरों के फलनों का उच्चिष्ठ एवंनिम्निष्ठ, लेग्राज के गुणाकों की विधि बीटा एवंगामाफलन।

Unit-5	Double and triple integrals, volumes and surfaces of solids of revolution Dirichler's integrals. Change of order of integration in double integrals.
इकाई–5	द्विक एवं त्रि–समाकल, ठोस के परिप्रमण से जनितआयतन एवंप्रष्टड्रिक्लेटसमाकल द्विक समाकल के कम का परिवर्तन।

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Session 2018-19

Class	**:**	B.SC
Year	**:**	II
Subject	:	Mathematics
Title of Subject	**:**	Differential Equations
Paper	**:**	III
Course Code	:	SC-A33(C)
Max. Marks	**:**	40

Course Outcomes

CO1- Applies the theory to shove series method of deferential equation also learn generating function and ortuogonality function.

CO2- Understand the meaning of Laplace transform and its properties, differential and integration of L.T

CO3- Student study inverse Laplace transform and its Application to solve problems of linear differcutial elution.

CO4- Apply Lagrange and carpets method to solve partial differential equation.

CO5- Student learn partial differential equation of second order and Homogenous and non homogenous equation.

Unit-1	Series solutions of differential equations, Power series method Bessel and legendre equations, Bessel's and Legendre's functions and them properties… generating function Orthogonality of functions.
इकाई–1	अवकलसमीकरण का श्रेणी हल, घत श्रेणी हल, बेसल एवंलेजेन्ड्र समीकरणबेसल एवंलेजेन्ड्रीफलन एवं उनके गुणधर्म, पुनरावृत्त एवंजनकफलन, फलन की लम्बिकता
Unit-2	Laplace Transformation, Linearity of the Laplace transformation. Existence theorem for laplace transforms. Laplace transforms of derivatces and integrals. Shifting theorems. Differentiation and intergration of transforms.
इकाई–2	लॉप्लास रूपांतरण, लॉप्लास रूपांतरण की रैखिकता, लॉप्लास रूपांतरण के लियेआरित्वप्रमेय।अवकलजों एवंसमाकली का लॉप्लास रूपांतरणस्थनत्तरप्रमेय रूपांतरणों के अवलकन एवंसमाकली का लॉप्लास रूपांतरणस्थानत्तरप्रमेय रूपांतरणअवकलन एवंसमाकलन।
Unit-3	Inverse Laplace transform, Convolution theorem, Application of Laplace transformation in Solving linear differential equations with constant coefficients.
इकाई–3	प्रतिलोमलॉप्लास रूपांतरणसयलनप्रमेय अचरगुणांकवालेरैखिकअवकलसमीकरणहलकरनेमेंलॉप्लास रूपांतरण के अनुप्रयोग।
Unit-4	Partial differential equations of the first order, Lagrange's solution some special types of equations which can be solved easily by methods other than the general method, Charpit's general method.

इकाई–4	प्रथमकोटि के आंशिकअवकलनसमीरणलैग्राजविधि, लैग्राजविधि, विशिष्टप्रकार के अवकलसमीकरण का व्यापकविधि के अतिरिक्तअन्य विधि द्वारासरलता से हल, चारपिट की व्यापकविधि।
Unit-5	Partial differential equations o second order, Homogencous and non-homogeneous equations with constant coefificints, Partial differential equations re…….. equations with constant coefficients.
इकाई–5	द्वितीय व उच्चकोटि के आंशिकअवकलसमीकरण द्वितीय के कोटि के आंशिकअवकलसमीकरणें का वर्गीकरणअचलगुणाकों के समघात एवंअसमघातसमीयरणअचरगुणाकरमेंसमानेय आंशिकअवकलसमीकरण।

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Syllabus recommended by Board of studies of Mathematics
Session 2019-20

Class	:	B.SC
Year	:	III
Subject	:	Mathematics
Title of Subject	:	Linear Algebra and Numerical **Analysis**
Paper	:	I
Course Code	:	SC-A44(A)
Max. Marks	:	40

Course Outcomes

Note – Scientific Calculator will be allowed in the examination of this paper.

CO1- Student will be able to understand vector space, subspace, quotient space , basis and dimension.

CO2- Student study change of basic dual ,Bidual Space Diagonalization, Bilinear, Quadratic and Hermitian form.

CO3- Understand the Meaning of Inner product space and apply in gram-Schmidt orthogonalization process.

CO4- Applay Numerical methods is Final our solution of algebraic equation using different method. And apply various interpolation method and finite difference method.

CO5- Student Study to solve by linear equations direct methods by using different types of decomposition and ordinary difficult equation.

Unit-I	Definition and examples of Vector spaces, Subspaces, sum and direct sum of subspaces, Linear span, Linear dependence, independence and their basic properties, Basis Existence Theorem for basis, Extension Theorem, invariance of the number of element of a basis, Dimension, Finte dimensional vector spaces, Existence of complementary subspaces of a subspace of a finite dimensional vector space, Dimension of sum of subspafces. Quotient space and its dimension.
ईकाई–1	संदिशसमष्टि की परीभाषा एवंउदाहरण, उपसमष्टि, उपसमिष्टयों का योग एवंप्रत्यक्ष योगः रैखिकविस्तृतिरैखिकपरतंत्रता, स्वतंत्रता एवं उनके मूलगुणधर्म, आाधार, परिमितविमीय सदिशसमष्टियांआाधार का अस्त्तिवप्रमेय, विस्तारप्रमेय, आाधारमेंअवयवों की संख्या की अपरिवर्तनशीलता, विमा, परिमितविमीय सदिशसमषि की उपसमष्टि का अस्तित्व, उपसमष्टियों के यो की विमा, विभागसमष्टि एवंउसकीविमा।
Unit-II	Leniar transformation and their representation as matrices,algerbra of leniar transformation ,rank nullity theorm,chaneof,dual space, bi-dual space and natural isomorphism ajoint of leniar transformation, eigenvalues of eigen vectors of a leniar transformation diagaonalisation, bilinear, quadratic and Hermition form.
ईकाई–2	रैखिक रूपान्तरण एवंउनकाआव्यूहनिरूपण, रैखिक रूपान्तरणों की बीजगणित, जाति शून्यताप्रमेय, आधार का परिवर्तन, द्वैत समष्टि, द्विद्वैत समष्टि एवंप्राकृतिकतुल्यकारिता, रैखिक रूपान्तरण का, रैखिक रूपान्तरणों के आइगेनमान एवंआइगेनसदिश, विकर्णीकरण, द्विएकधाती, द्विघाती एवंहर्मितीय समघात ।
Unit – III	Inner Product Space – Cauchy-Schwarz inequality, orthogonal vectors orthogonal complements, orthonormal sets and bases bessel's inequality for finite dimensional spaces, Gram-Schmidt orthogonalization process.
ईकाई–3	आन्तरगुणनसमष्टि–कौशीस्वार्जअसमिका, लाम्बिकसंदिश, लाम्बिकपूरकप्रसामान्य लाम्बिकसमूच्चय

	एवंआधार, परिमितविमीय समष्टियोंहेतुबेसल की असमिका, ग्रामश्मिटलांबिकताप्रक्रम ।
Unit – IV	Solution of Equations : Bisection Secant, Regula Falsi, Newton's Method, Roots of second degree Ploynomials. Interpolation, Lagrange interpolation, Divided differences, Interpolation formula using Differences, Numerical Quadrature, Newton – Cote's formulae, Gauss Quadrature formulae.
ईकाई–4	स्मीकरणों के हल– द्वि विभाजनविधि, सकेण्टविकध, रेग्यूलाफाल्सीविधि, न्यूटनविधि, द्वितीय घात के बहुपदसमीकरण के मूल । अनर्तवेशन–लैंग्राजअर्न्तवेशन, विभाजितअंतर, अंतरउपयोग से अर्न्तवेशनसूत्र, सांख्यात्मक क्षेत्रफल, न्यूटनकोट्ससूत्र, गोंउस क्षेत्रफलसूत्र ।
Unit – V	Linear equation direct methods for solving systems of Linear equations (Gauss elimination, LU decomposition, Cholesky). Decomposition Iterative Qrdinary differential equations : Euler method, Single step method, Rimge-Kutta's method, Multistep methods, Milne Simpson method. Methods based on Numerical integration, Methods based on numerical differentiation.
ईकाई–5	रैखिकसमीकरण, रैखिकसमीकरणें के निकाय कोहलकरने की प्रत्यक्ष विधियों : (गोंउस विलोपन एव–यू वियोजन, चोलेस्की वियोजन), पुनरावृतीविधियॉ (जैकोबी विधि, गोंउससिडेलविधि), साधारणअवकलनसमीकरण, ऑयलरविधि, एकलचरणविधि, रूंग कुट्टाविधि, बहुचरणविधि, मिलने–सिम्परसविधि, संक्ष्यात्मकसमाकलनपरआधिरितविधियॉ एवं संख्यात्मकअवकलनपरआधारितविधियॉ

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Sadhu Vaswani Autonomous College
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SADHU VASWANI AUTONOMOUS COLLEGE
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Mathematics
Session 2019-20

Class	:	B.SC
Year	:	III
Subject	:	Mathematics
Title of Subject	:	Real and Complex Analysis
Paper	:	II
Course Code	:	SC-A44(B)
Max. Marks	:	40

Course Outcomes

CO1- Describe Properties of Riemann Integral and theorem on it and different and practical difference of seal valued function.
CO2- Understand to test improper integral by applying different test.
CO3- Student Study Defication of matrix space and subspace and theorem on it.
CO4- Study Continuous function uniform and coparceners and some theorem.
CO5- Understand Continuity different in complex function , Harmonic function and Mobius transformation.

Unit-I	Riemann integral, Inerrability of continuous and monotonic functions. The fundamental theorem of integral calculus. Mean value theorem of integral calculus. Partial derivatives and derivatives and differentiability of real – valued functions of two variables. Schwarz's and Young's theorem Implicit function theorem.
ईकाई–1	श्रीमान, समाकल, संतत एवं एकदष्टिफलनों की समाकलनयीता, समाकलन का मूलभूतप्रमेय, समाकलनों के माध्यमानप्रमेंय दोचरों के वास्तविकमानफलनों के आंशिकअवकलज एवंअवकलनीयता, स्वार्ज एवं यंग के प्रमेय अस्पष्टफलनप्रमेय ।
Unit-II	Improper integrals and their convergence. Comparison tests, Able's and Dirichlet's tests. Frullani's integral as a function of a parameter, Continuity derivability and intergrability of an integral of a function of a parameter. Fourier series of half and full intervals.
ईकाई–2	टनुचितसमाकल एवंउनकाअभिसरण, तुलनापरीक्षण, आबेल एवंडिख्ले का परीक्षणप्रचालिकफलनों के रूपमेंफुलानीसमाकल, संतात्य, एक प्रचल के फलन के समाकलअवकलनीयता एवंसमाकलनीयता, अर्ध्द एवंपूर्णअन्तरालों की फेरियर श्रेणी ।
Unit-III	Definition and examples of matrix spaces. Neighbourhoods. Limit points. Interior point. Open and closed sets. Closure and interior. Boundary points. Subspace of metric space. Cauchy sequences. Completeness. Cantor's intersection theorem. Contraction principle, Real Number as a complete orderd field. Dense subsets. Baire Category theorem. Separable, Second countable and first countable spaces.
ईकाई–3	दूरीकसमष्टि की परिभाषा एवंउदाहरण, सामीप्य, सीमाबिन्दुआन्तरिकबिन्दु, विवृत एवंसंवृतसमुच्य, संवरक एवंअभ्यन्तरपरिसीमाबिन्दु, दूरीकसमष्टि की उपसमष्टि, कौशीअनुक्रम, पूर्णताकेन्टर का सर्वनिष्ठप्रमेय संकुचन, पूर्णक्रमित क्षेत्र के रूपमेंवास्तविक संख्यायेंसघनउपसमूच्चय बायरकेटेगरीप्रमेय, पृथक्कलरण, द्वितीय गणनीय एवंप्रथमगणनीय समष्टि ।
Unit-IV	Continuous Functions. Extension theorem, Uniform continuity. Compactness. Sequential compactness. Totally bounded spaces. Finite intersection property Continuous functions and compact sets Connectedness.
ईकाई–4	स्ंतत फलनविस्तारप्रमेय, एकसमानसांतत्य, संहतता, अनुक्रमणीय संहततापूर्णपरिबध्द समष्टि, परिमितसर्वनष्टिप्रगुणसंततफलन एवंसंहतसमुच्चय, संबध्दता ।

Unit-V	Complex number as orderd pairs. Geometric representation of complex numbers. Continuity and differentiability of complex function. Analytic functions. Couchy – Riemann equations. Harmonic functions. Mobius transformations. Fixed points. Cross ratio. Inverse points, Conformal Mappings.
ईकाई–5	सम्मिश्र संख्या, क्रमित युग्म के रूपमेंसम्मिश्र संख्या का ज्यामितीय निरूपरण, सम्मिश्रफलनों की सांतत्यताऔरअवकनीयताविश्लेषिकफलन, कौशी का रीमानसमीकरण, प्रसंवादीफलन, मोबियस रूपान्तरण, स्थिरबिन्दुतिर्यकअनुमानप्रतिलोमबिन्दुकोन्फार्मलफलन ।

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SADHU VASWANI AUTONOMOUS COLLEGE
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Mathematics
Session 2019-20, 2020-21

Class	:	B.SC
Year	:	III
Subject	:	Mathematics
Title of Subject	:	Discrete Mathematics
Paper	:	III
Course Code	:	SC-A44(C)
Max. Marks	:	40

Course Outcomes

CO1- Student study Mean mode median mean and standard deviation and present
CO2- Student Understand is alone different types of probability problems in event / sample and continuous probability distribution.
CO3- Student learn Binomial, Poisson Rectangular and Exponential distribution its properties.
CO4- Student Study different types of curve fitting and types correlation
CO5- Student Study Test of Significanu based on Chi,t,f and Z statistics also study sampling.

Unit-I	Boolean Function – disjunctive &conjunctive normal forms (canonical dual canonical), Bool's expansion theorem. Relation – Binary relation. Inverse relation, Composite relation. Equivalence relation. Equivalence classes & its properties Partition of a set.
ईकाई–1	बूलीय फलन–वियोजनीय एवंसयसोजनीय प्रसामान्य रूप (केनोलिकल एवंडयूल केनानिकल) बूल का विस्तारप्रमेय । संबध – द्विचर संबध प्रतिलोग संबध सयसोजित संबध तुल्यतासंबंध तुल्यतावर्ग एवंउसकेगुण धर्म, समुच्चय का विभाजन ।
Unit-II	Partial order relation, Partiallyorderd sets, totally orderd sets. Hassedragram. Maximal and minimal element. First and last element Lattice – detention and example, dual lattice. Bounded lattice. Distributive lattice. Complemented lattive.
ईकाई–2	अंशतः क्रम संबध, अंशतः क्रमितसमुच्चय, पूर्णतः क्रमितसमुच्चय, हैसूहआरेख, उच्चिष्ठ एवंनिमष्ठिअवयव, प्रथम एवंअन्तिमअवयव, जालक–परिभाषा एवंउदाहरण द्वैत जालक, परिबध्द जालक, वितरणीय जालक, पूरकजालक ।
Unit-III	Graph – Definition, types of graphics. Subgraphs. Walk. Path, circuit. Connected and disconnected graphs. Euler graph. Hamiltonian path and circuit. Shortest path an weighted graph. Dijkstra's Algorithm for shortest paths.
ईकाई–3	आलेख–परिभाषा एवंप्रकार उप आलेख, गमनपथ एवंपारपथ,सबध्द एवंअसबंध्द ग्राफआयॅलरग्राफ, हेमिल्टोनियनपथऔरपरिपथ, भारितआलेख मेंलघुत्तमपथहेतुडॉइजकस्त्रा, एल्गोरिथम ।
Unit-IV	Trees and its properties, Rooted tree, Binary tree, Spanning tree, Rank and nullity of a graph, Kruskal's Algorithm and Prim's Algorithm.
ईकाई–4	वृक्ष एवंउसकेगुण धर्म, नियत वृक्ष, द्विवचर वृक्ष, जनक वृक्ष, आलेख की जाति एवं शून्यता, कुस्क्ल एवंप्राईम की एल्गोरिथम ।
Unit-V	Matrix representation of graphs – Incidence and Adjaccncy matrix. Cutset and its properties. Plannar graphs (definition) Kuratowski's two graphs.
ईकाई–5	आलेख का आव्यूहनिरूपण–इन्सीडेंसआव्यूहकटसट्स एवंउसकेप्रगुणप्लानरआलेख (परिभाषा) कुराटोव्हस्की के द्विआलेख ।

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SADHU VASWANI AUTONOMOUS COLLEGE
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of Physics
Session 2019-20

Class	:	B. Sc. First Year
Subject	:	Physics
Paper	:	(I)
Title	:	Mathematical Physics, Mechanics and Properties of Matter
Course Code	:	SC-A24 (A)
Max. Marks	:	40+(CCE) 10 = 50

Course Outcomes

CO1- Communicate mathematical and physical ideas to the students and apply them to formulate scientific reasoning.

CO2- Elasticity helps the students to identify the materials suitable for the construction of buildings, houses etc and properties of fluids especially knowledge of viscosity and surface tension help the students in their daily life.

CO3- Develop basic skills to perform experiments to understand the concept of existing theories of basic physics.

CO4- Students shall be familiar with the fundamental principles of the general theory of relativity and they shall know the meaning of basic concepts like inertial frames, Lorentz Contraction and time dilation. `

CO5- Understanding of Doppler Effect, Four dimensional momentum vectors.

Unit-1	**Mathematical Physics** Addition, subtraction and product of two vectors: Polar and axial vectors and their examples from physics: Triple and quadruple product (without geometrical applications), Scalar and vector fields: Differentiation of a vector: Repeated integral of a function of more than one variable: Unit tangent vector and unit normal vector, Gradient, Divergence and Curl Laplacian operator; Idea of line, surface and volume integrals, Gauss's, Stokes and Green's Theorems. दोसदिशोका योग, अंतर व गुणनफल, ध्रुवीय एवं अक्षीय सदिश एवं उनके भौतिकीउदाहरणतीन व चारसदिशों का गुणन (ज्यामितीय अनुप्रयोग के बिना), अदिश व सदिश क्षेत्र, सदिश का अवकलन एक से अधिकचरों के फलन का बारम्बारसमाकलन, इकाईस्पर्शसदिश व इकाईनार्मलसदिश, सदिश का ग्रेडियन्ट, डायवर्जेस एवंकर्ल, लाप्लासीयनआपरेटर, रेखीय, पृष्ठीय आयतनसमाकलन, गॉसस्टोक व ग्रीनप्रमेय ।
Unit-2	**Mechanics** Position velocity and acceleration vectors, Components of velocity and acceleration in different coordinate systems, Newton's Laws of motion and its explanation with problems various types of forces in nature (explanation). Pseudo Forces (e.g. Centrifugal Force). Coriolis force and its applications, Motion under a central force, Derivation of Kepler's laws Gravitational law and field, Potential due to a spherical body, Gauss & Poisson's equation of Gravitational self-energy, System of particles, Centre of mass and reduced Mass, Rutherford scattering, Elastic and inelastic collisions. स्थिति, वेग एवंत्वरणसदिश, गति व त्वरण के विभिन्ननिर्देशांकपद्धतियोंमें घटक । न्यूटन के गति के नियम व

	इसकीव्याख्याः प्रकृतिमेंविभिन्न बल व व्याख्या, छद्म बल (उदाहरणः अभिकेंद्रीय बल) कोरियालिस बल व इसकेउदाहरण, केंद्रीय बल के अर्न्तगतगति, केप्लर के नियमों की निष्पतिगुरूत्वाकर्षण का नियम व क्षेत्र, गोलाकारपिण्ड का गुरूत्वीय विभव, गॉस व पायसन की गुरूत्वीय स्व उर्जा की समीकरण, कणों का निकाय, द्रव्यमानकेंद्र व समानीतद्रव्यमान, रदरफोर्डप्रकीर्णन , प्रत्यास्थ व अंप्रत्यास्थटक्कर ।
Unit-3	**General Properties of Matter** Elastic moduli and their relations, Determination of Y of rectangular thin bar loaded at the centre; Torsional oscillations, Torsional rigidity of a wire, to determine η by torsional oscillations, Surface Tension, Angle of Contact, Capillary Rise Method; Energy required to raise a liquid in capillary tube: Factors affecting surface tension. Jeager's method for Determination of surface tension: Applications of surface Tension. Concept of Viscous Forces and Viscosity: Steady and Turbulent Flow, Reynolds's number: Equation of Continuity; Bernoulli's Principle: Application of Bernoulli's equation – (i) Speed of Efflux (ii) Venturimeter (iii) Aspiratior Pump (iv) Change of plane of motion of a spinning ball. **प्रत्यास्थतागुणांक एवं उनके संबंध मध्य मेंभारितपतलीआयताकार छड (केन्टीलीवर)** के Y निर्धारण ऐठनदोलनकिसीतार की ऐंठन दृढ़ता व इसका ऐंठनदोलनविधि से निर्धारण । पृष्ठ तनावस्पर्शकोण, केशकीय उन्नयनविधि, केशिकामेंद्रव चढानेमेंआवश्यक उर्जा, पृष्ठ तनावकोप्रभावितकरनेवालेकारकजेगर की विधि से पृष्ठ तनाव का निर्धारणपृष्ठ तनाव के अनुप्रयोग । श्यान बल की संकल्पना व श्यानतागुणांक धारारेखीय व विक्षुब्ध प्रवाहरेनॉल्ड संख्या, सातत्य समीकरणबरनॉली का सिद्वांतबरनॉलीप्रमेय के अनुप्रयोग 1. एफ्कलक्स की चाल 2. वेन्चुरीमीटर 3. एस्पिरेटरपम्प 4. स्पिनिंगबॉल के तल का परिवर्तन।
Unit-4	**Oscillations** Concept of Simple, Periodic & Harmonic Oscillation with illustrations: Differential equation of harmonic Oscillator: Oscillations of two masses connected by a spring; Translational and Rotational motion, Moment of Inertia and their Product, Principal moments and axes, Theorem of parallel and perpendicular axes, Motion of Rigid Body, Euler's equation. सरलआवर्ती व हार्मोनिकगति की सचित्र संकल्पनाआवर्तीदोलित्र का समीकरण, आवर्तीदोलित्र की गतिज व स्थितिजउर्जा, स्प्रिंग से जुड़ेदोपिंण्डो का दोलन स्थानान्तरणीय व घूर्णीय गति, जड़त्वआधूर्ण व उनकागुणन मुख्य आधूर्ण एवं अक्ष समानान्तरतथालंबवत् अक्ष प्रमेय, दृढ़ पिण्ड की गति यूलरसमीकरण ।
Unit-5	Relativistic Mechanics; Michelson-Morley experiment and its outcome; postulates of Special Theory of Relativity: Lorentz Transformations. Simultaneity and order of events; Lorentz contractions; Time dilation; Relativistic transformation of velocity, Frequency and wave number; Relativistic addition of velocities; Variation of mass with velocity, Doppler effect, Four dimensioinal momentum vector, Covariance of equatins of physics. Earlier Developments in Physics up to 18^{th} Century Contributions of Aryabhatt, Archimedes, Nicolus Copernicus, Galileo Galilei, Huygens. Robert Hooks. Torricelli, Vernier, Pascal Kepler, Newton, Boyle, Young, Thompson, Coulomb, Amperes Gauss, Biot-Savarts, Cavendish, Galvani, Franklin and Bernoulli

	सापेक्षकीय यांत्रिकी माइकल्सन व मोरले का प्रयोग एवंइसकेनिष्कर्षविशिष्टसापेक्षिकता के सिद्धांत की अवधारणाएं, लॉरेंज रूपांतरण, समकालिक घटना एवं घटनाओं के क्रमलॉरेजसंकुचन समय विस्तारण, वेग, आवृत्तितथावेवनम्बर का सापेक्षकीय रूपान्तरण, वेगो का सापेक्षिकीय योग, वेग के साथद्रव्यमानपरिवर्तन।डॉपलरप्रभाव।चारआयामीसंवेगसदिश, भौतिकी के समीकरणों का सहसंयोजन।

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Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of Physics
Session 2019-20

Class	:	B. Sc.
Year	:	I
Subject	:	Physics
Paper	:	(II)
Title	:	Thermodynamics and Statistical Physics
Course Code	:	SC-A24(B)

Max. Marks: 40+(CCE) 10 = 50

Course Outcomes

CO1- The objective of this course is to learn how to apply thermodynamic principles in order to interpret thermodynamic systems and predict their behaviors.

CO2- The principles used in this course are based on "laws of thermodynamics" developed historically, the concept of entropy in different thermodynamics process. And also understand the different type thermodynamics scale.

CO3- An additional objective is to become familiar with the use of simple statistical mechanical models to predict thermodynamic properties.

CO4- Basic idea of number of microstates, most probable distribution of particles in discrete energy states under different constraints.

CO5- Students will understand the importance of studying statistical mechanics with the behavior of particles under classical and quantum conditions.

Unit-1	**Thermodynamics- I** Reversible and irreversible process, Heat engines, Definition of efficiency, Carnot's Ideal Heat engine Carnot's cycle, Effective way to increase efficiency, Carnot's engines and refrigerator, Coefficient of performance, Second law of thermodynamics, Various statements of Second law of thermodynamics, Carnot's theorem, Clapeyron's latent heat equation Carnot's cycle and its applications, Steam engine, Otto engine, Petrol engine, Diesel engine. उत्क्रमणीय एवं अनुत्क्रमणीय प्रक्रम, कार्नो का आदर्शचक्र, इसकी दक्षता बढ़ाने के प्रभावीतरीकें, कार्नों का उष्मीय इंजन व प्रशीतक, दक्षतागुणांक, उष्मागतिकी का द्वितीय नियम व इसकेविभिन्नकथन, कार्नो का प्रमेय, क्लेपरियॉन की गुप्तउष्मासमीकरण, कार्नोचक्र एवंउसकेअनुप्रयोग । उष्मीय इंजिन, ऑटोइंजिन, पेट्रोलइंजिन, डीजलइंजिन ।
Unit-2	**Thermodynamics – II** Concept of entropy, Change in entropy in adiabatic process, Change in entropy in reversible cycle, Principle of increase of entropy, Change in entropy in irreversible process, T-S Diagram, Physical significance of Entropy, Entropy of a perfect gas, Kelvin's thermodynamic scale of temperature, The size of a degree, Zero of absolute scale, Identity of a perfect gas scale and absolute scale, Third law of thermodynamics, Zero point energy, Negative temperatures (not possible), Heat death of the universe, Relation between thermodynamic variables (Maxwell's relations), Adiabatic demagnetisatin, Joule-Kelvin effect and Liquefaction of gases. एल्ट्रोपी की संकल्पना रूद्वोष्मप्रक्रममें एन्ट्रापी का परिवर्तन, चक्रीय प्रक्रममें एन्ट्रापी का परिवर्तन एन्ट्रापी के वृद्वि

	का सिद्वांत, उत्क्रमणीय प्रक्रममें एन्ट्रापी का परिवर्तन । T-Sआरेख एन्ट्रापी का भौतिकमहत्व, आदर्शगैस की एन्ट्रापी, केलविन का उष्मागतिकतापपैमाना, परमपैमाने का शून्य ताप, आदर्शगैस व परमतापपैमानेमेंसाम्यता । उष्मागतिकी का तृतीय नियम, शून्य बिन्दूउर्जा, ऋणात्मकतापक्रम (सम्भव नही), ब्रहमाण्ड की उष्मीय समाप्ति । उष्मागतिकीचरोंमेंसंबंध (मेक्सवेल के समीकरण), रुद्धोष्म विचुम्बकन, जूलकैल्विनप्रभावतथागैसों का द्रवीकरण।
Unit-3	**Statistical Physics – I** Description of a system : Significance of statistical approach, Particle-states, System-states, Microstates and Macro-states of a system, Equilibrium states, Fluctuations, Classical & Statistical Probability, The equi-probability postulate, Statistical ensemble, Number of states accessible to a system, Phase space, Micro Canonical Ensemble, Canonical Ensemble. Helmholtz free energy, Enthalpy, First law of thermodynamics, Gibbs free energy, Grand Canonical Ensemble. निकाय का वर्णन : सांख्यिकीय अवधारणा का महत्व, कण एवंनिकाय की अवस्थाएँनिकाय की सूक्ष्म एवंस्थूलअवस्थाएँ, साम्य अवस्थाएं, विचलन, चिरसम्मत व सांख्यिकी प्रायिकता, पूर्वप्रायिकतासिद्वांत एन्सेम्बल, केनोनीकल एन्सेम्बल, हेल्मोल्टजमुक्तउर्जा, एन्थलपीऊष्मागतिकी का प्रथमनियम, गिब्समुक्तउर्जा, ग्रेंडकेनोनीकल एन्सेम्बल ।
Unit-4	**Statistical Physics – II** Statistical Mechanics: Phase space, the probability of a distribution, the most probable distribution and its narrowing with increase in number of particles, Maxwell-Boltzmann statistics. Molecular speeds, Distribution and mean, RMS and most probable velocity Constraints of accessible and inaccessible states. Quantum Statistics: Partition Function Relation between Partition Function and Entropy, Bose-Einstein statistics, Black-body radiation, The Rayleigh-Jeans formula, The Planck radiation formula, Fermi-Dirac statistics, Comparison of results, Concept of Phase transitions. सांख्यिकी यांत्रिकी : कलाआकाशवितरण की प्रायिकताअधिकतमसंभाव्य वितरण व इसकाकणों की संख्या बढ़ने परसंकुचन, मेक्सवेलबोल्टजमैनसांख्यिकी, आणविकचाल का वितरणऔसतचाल, वर्ग–माध्य–मूलचालऔरअधिकतमप्रसम्भाव्य वेग, प्रतिबंध, अभिगम्य एवं अन अभिगम्य अवस्थाओं के प्रतिबंध । क्वांटमसांख्यिकी : पार्टीशनफलन एट्रापी व पार्टीशनफलनमेंसंबंध, बोसआइन्सटीनसांख्यिकी कृष्णपिण्डविकिरण, रेलेजीन्ससूत्र, प्लांकविकिरणसूत्र, फर्मी–डिराकसांख्यिकी, परिणामों की तुलना, फेससंक्रमण की संकल्पना ।
Unit-5	**Contributions of Physicists** S.N. Bose. M.N. Saha, Maxwell, Clausius, Boltzmann, Joule, Wien, Einstein, Planck, Bohr, Heisenberg, Fermi, Dirac, Max Born, Bardeen. एस. एन. बोस, एम. एन. साहा, मैक्सवेल, क्लासियस, बोल्टजमैन, जूल, वीन, आइन्सटीन, प्लांक, बोहरहाईजनबर्ग, फर्मी, डिराक, मेक्सबार्न, बार्डीन ।

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Syllabus recommended by Board of Studies of Physics
Session 2019-20

Class	**:**	B. Sc. First Year
Subject	**:**	Physics
Paper	**:**	Practical
Course Code	**:**	PR-SC-A24
Max. Marks	:	50

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex- Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practicals

1. To verify laws of parallel and perpendicular axes for moment of inertia
2. To determine acceleration due to gravity using compound pendulum.
3. To determine damping coefficient using a bar pendulum
4. To determine Young's Modulus by bending of beam method.
5. To determine Young's Modulus using Cantilever method.
6. To determine coefficient of rigidity by static method.
7. To determine coefficient of rigidity by dynamic method
8. To determine Surface Tension by Jaegar's method.
9. To determine Surface Tension of a liquid by capillary rise method.
10. To determine Viscosity of fluid using Poiseuille's Method.
11. To study conversion of mechanical energy into heat using Calender&Barne's method.
12. To determine Heating efficiency of electrical Kettle with various voltages.
13. To determine heating temperature coefficient of resistance using platinum resistance thermometer.
14. To determine thermo electromotive force by a thermocouple method.
15. To determine heating efficiency of electrical Kettle with various voltages.
16. To determine heat conductivity of bad conductors of different geometry by lees method.
17. To verify Newton's Laws of cooling.
18. To determine specific heat of Coefficient of thermal conductivity by Searl's method.
19. To determine specific heat of a liquid.
20. To compare Maxwell-Boltzmann, Bose Einstein and Fermi-Dirac Distribution function Vs temperature using M.S. Excel / C++.
21. To plot equation of state and Vander-Wall equation with temperature using M.S. EXCEL.

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Class	**:**	B. Sc. Second Year
Subject	**:**	Physics
Paper	**:**	(I)
Title	**:**	Optics
Course Code	**:**	SC-A35 (A)
Max. Marks	:	40+10 CCE

Course Outcomes

CO1- Understanding of the use of geometrical optics in daily life.
CO2- Theoretical and experimental knowledge of wave optics phenomenon like interference and diffraction.
CO3- Use of principle of polarization in different experiments by using double refracting crystals.
CO4- Applying concept of Laser.
CO5- Understanding of Photo Sensors.

Unit-1	**Geometrical Optics** Reflection and refraction Fermat's Principle, Refraction at a spherical surface, Aplanatic points and its application, Lens formula Combination of thin lenses and equivalent focal length. Dispersion and dispersive power, chromatic aberration and achromatic combination, different type of aberration (qualitative and their remedy) Need for multiple lenses in eyepieces, Ramsden and Huygens eye-piece, Simple Harmonic Motion, Demped oscillations, Forced oscillations and resonance, Beats, Stationary wave in a string, pulse and wave packets: Phase and group velocities, Reflection and Refraction from Huygen's principle. परावर्तनओरअपवर्तन, फर्मेट का सिद्धांत, गोलाकारसतहपरअपवर्तन, अपलांटिकबिन्दु एवंअनुप्रयोग, लैंससूत्र, पतलेलैंसों का संयोजन व समतुल्य फोकसदूरी।विक्षेपण व विक्षेपण क्षमता, वर्णविपथन व अवर्णकसंयोजन।विभिन्नप्रकार के विपथन (गुणात्मक) एवंउनका समाधान, नेत्रिका मेंबहुललैंसनिकाय की आवश्यकता।रेम्सडन व हाइगननेत्रिकाएं।सरलआर्वतगति, अवमंदितदोलन, प्रणोदितदोलनतथाअनुनाद, विस्पंदन।तनीहुईडोरीमेंअप्रगामीतंरगे, स्पंद तथातंरगपैकिट, कला एवंसमूहवेग, हायगनसिद्धांतपरावर्तन एवंअपवर्तन।
Unit-2	**Interference of Light** The principle of superposition, two slip interference, coherence requirement for the sources, optical path retardation. Lateral shift of fringes, Rayleigh interferometer and other applications, Localised fringes, thin films, Interference by a film with two non-parallel reflecting surfaces. Newton's rings, Haidinger fringes (Fringes of equal inclination), Michelson interferometer. its application for precision determination of wavelength, wavelength difference and the width of spectral lines, Intensity distribution in multiple beam interference, Fabry-Perot interferometer and etalon. अध्यारोपण का सिद्धांत, द्विस्लिटव्यतिकरण, स्त्रोतों की कला संबद्धता की आवश्यकता, प्रकाशीय पथ का मंदन, फिर्जों का पार्श्विकविस्थापन, रेले का रिर्फेक्ट्रोमीटर व अन्य अनुप्रयोग, स्थानीयकृतफ्रिंजे, पतलीफिल्म, दोअसमानान्तरपरावर्तकसतह से बनीफिल्म से व्यतिकरण, न्यूटनवलय।हैडिन्जरफ्रिंजे (समान झुकाव की फ्रिंजे) माइकल्सनव्यतिकरणमापी, इसके द्वाराप्रकाश की तरंगदैर्ध्य (γ), दो अत्यंत समीपस्थ तरंगदैर्ध्य का अंतरतथावर्णक्रमरेखा की चौड़ाई का परिशुद्ध निर्धारण।बहुलपुंजव्यक्तिकरणमेंतीव्रता का वितरण,

	फेब्रीपैरोव्यतिकरणमापी एवंइटालॉन।
Unit-3	**Diffraction** Fresnel's theory of half period Zone, Diffraction at straight edge, rectilinear propagation, Diffraction at a slit, Phasor diagram and integral calculus methods Diffraction at a circular aperture and a circular disc, Rayleigh criterion of resolution of image, resolving power of telescope and microscope, Outline of phase contrast microscopy, Diffraction at N-parallel slits, Intensity distribution, Plane diffraction grating, Resolving power of a grating and comparison with resolving power of prism and of a Fabry Parot etalon. फ्रेनल के अर्द्धकालिककटिबंध का सिद्धांत, सीधीकोरपरविवर्तनसरलरेखीय गमन एकल झिरीपरविवर्तन का आरेख एवंसमाकलनविधिया, वृत्तीय द्वारक, वृत्तीय चकतीपरविवर्तनप्रतिबिन्दों के विभेदन की रैले की कसौटी।दूरदर्शी व सूक्ष्मदर्शी की विभेदन क्षमता, फेजकन्ट्रास्टसूक्ष्मदर्शी की विभेदन क्षमता, फेजकन्ट्रास्टसूक्ष्मदर्शी की सामान्य रूपरेखा।Nसमानान्तर झिर्रियोंपरविवर्तन, तीव्रताविवरण, समतलविवर्तनग्रेटिंग, परावर्तनग्रेटिंग, ग्रेटिंग की विभेदन क्षमतातथाइसकीप्रिज्म व फेब्रीपैरोइटलॉन की विभेदन क्षमता से तुलना।
Unit-4	**Polarisation** [15 Lectures] Transverse nature of light waves, Polarization of electromagnetic waves. Plane polarized light- production and analysis, Description of Linear, Circular and elliptical polarization, Propagation of electro magnetic waves in anisotropic media, uniaxial and biaxial crystals. Symmetric nature of dielectric tensor, Double refraction, Hygen's principle, Ordinary and extraordinary refractive indices, Fres,el's formula. Light propagation in uniaxial crystal, Nicol prism, Production of circulary and elliptically polarized light, Babinet compensator and applications, Optical rotation, Optical rotation in liquids and its measurement through Polarimeter. प्रकाशतरंग की अनुप्रस्थप्रकृति, विद्युतचुम्बकीय तरंग का ध्रुवण, समतल ध्रुवितप्रकाशउत्पादन व विश्लेषण।रेखिक, वृत्तीय व दीर्घवृत्तीय ध्रुवण का वर्णन।विद्युतचुम्बकीय तरंग का असंमागी माध्यम मेंसंचरण, एक–अक्षीय व द्वि–अक्षीय क्रिस्टल, परावैद्युतटैन्सर की सममितप्रकृति, द्वि–अपर्वतन, हाइगन का सिद्धांत, साधारण व असाधारणअपवर्तनांक, फ्रेनल का सूत्र, एक अक्षीय क्रिस्टलमेंप्रकाशसंचरण।निकॉलप्रिज्म, वृत्तीय व दीर्घवृतीय प्रकाश का उत्पादन व विश्लेषणबेबिनेटसंकारक व अनुप्रयोग, प्रकाशीय घूर्णन व पोलारीमीटर से इसकामापन।
Unit-5	**Laser and Photo Sensors Fibre Optics and Laser** Principle of fiber optics, attenuation: pulse dispersion and step index and parabolic index fibres, A brief history of lasers, characteristics of laser light, Einstein prediction, Relationship between Einstein's Coefficients (qualitative discussion), Pumping schemes, Resonators, Ruby laser, He-Ne Laser, Applications of lasers, Principle of Hologrphy, Photodiodes. Phototransistors and Photomultipliers फायवरआप्टिक्स का सिंद्धात, स्पंद विसरण एवंइंडेक्स, परवलायिकइंडेक्सफाायवर, लेजर का संक्षिप्तइतिहास, लेजरप्रकाश के अभिलाक्षणिकगुण, आइन्सटीन की सकल्पना, आइन्सटीनगुणांकोमेंसम्बन्ध (गुणात्मक विवेचना), पम्पिंगप्रणालियॉ, रेजोनेटर्स, रूबीलेजरहीलियम–निआनलेजर, लेजर के उपयोग, होलीग्राफी का सिद्धांत।फोटोडायोड, फोटोट्रांजिस्टर व फोटोमल्टीप्लायर।

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Session 2020-21

Class	**:**	B. Sc. Second Year
Subject	**:**	Physics
Paper	**:**	(II)
Title	**:**	Electrostatics, Magneto statics and Electrodynamics Course
Code	**:**	SC-A35 (B)
Max. Marks	:	40+(CCE) 10 = 50

Course Outcomes

CO1- Develop skills in the basic concept of electric forces and electric fields due to various charge distributions.

CO2- Students will be able to explain concepts of classical electromagnetism and to show a working knowledge of a broad array of physical phenomena that are based upon fundamental concepts of charges, fields, and their interactions with matter.

CO3- Students will have strong physical reasoning and problem solving skills and apply these skills to the solution of theoretical and applied problems.

CO4- Understanding of the Maxwell's equations

CO5- Understanding of Fresnel's Law.

Unit-1	**Electrostatics** Fundamental's of Electrostatics, Gauss's law and its application for finding E for symmetric charge distributions,Capacitors, Conducting sphere in a uniform electric field, point charge in front of a grounded infinite conductor, Dielectrics, Parallel plate capacitor with a direlectric, dielectric constant, polarization and polirization vector P, relation between displacement vector D.E. and P. Molecular interpretation of Claussius-Mossotti equation. Laplace and possonequatios in electrostatics and their appplicatons, Energy of system of charges, multiple expression of scalar potential, method of images and its application, potential and field due to a dipole, force and torque on a dipole in an external electric field. स्थिरवैद्युतिकी के मूलभूततत्व, गॉस का नियम व इसकाससमितआवेशवितरणहेतुE के परिकलनमेंउपयोग। संधारित्र, समरूपविद्युत क्षेत्र मेंगोलकारचालक, किसीपृथ्वीकृतअनन्तचालक के सम्मुख बिन्दुपरआवेश।पराविद्युत, पराविद्युत की उपस्थितिमेंसमानांतरप्लेट संधारित्र, परावैद्युतांक, ध्रुवण व ध्रुवणसंदिशP,विस्थापनासंदिशD, P, ,एवं Eमेंसंबंध, क्लासियस–मोसाटीसमीकरण की आणविकव्याख्यइं स्थिरवैद्युतिकीमेंलाप्लास व पाइजन के समीकरण एवं उनके अनुप्रयोग।आवेशो के निकाय की उर्जा, अदिशविभव का बहुलिकविस्तार, प्रतिबिम्बों की विधि एवंअनुप्रयोग, विद्युत् द्विध्रुव के कारणउत्पन्न क्षेत्र की तीव्रता एवंविभव, बाह्य विद्युत द्विध्रुव का बल एवंबलयुग्म।
Unit-2	**Magnetostatics** Force on a moving charge, Lorentz force equation and definition of B, force on a straight conductor carrying current in a uniform magnetic field, Torque on a current loop, Magnetic dipole moment, angular momentum and gyromagnetic ratio, Biot and Savart's law, calculation of H for simple geometrical situations

	such as Solenoid. Anchor ring. Ampere's Law, $\nabla \times B = \mu_o J$, $\nabla . B = 0$, Field due to a magnetic dipole, Free and bound currents. Magnetization vector (M), relationship between B, H and M. Derivation of the relation $\nabla \times M = J$ for non-uniform magnetization. किसीगतिमानआवेशपर बल लारेंज बल समीकरण एवंB की परिभाषा, सीधे धारावाहीचालककोचुम्बकीय क्षेत्र में रखनेपर बल, धारालूपपर बल आधूर्ण, चुम्बकीय बल आधूर्ण, कोणीय संवेग व जाइरोमैग्नेटिकअनुपात, बायोट–सेवार्ट का नियम, सरलज्यामितीय परिस्थितियोंमेंHकीगणना (परनलिका एवं एंकर वलय), एम्पीयर का परिपर्थीय नियम,$\nabla \times B = \mu_o J$ व$\nabla . B = 0$. चुम्बकीय द्विध्रुव द्वारा बद्ध व मुक्त धाराएँ, चुम्कबनसदिश(M); B, H एवंM मेंसंबंध, असमरूप से चुम्बकितपदार्थहेतु$\nabla \times M = J$ का निगमन।
Unit-3	**Current Electricity and Bio electricity** [15 Lectures] Steady current, current density J, non-steady currents and continuity equation, Kirchoffs laws and analysis of multiloop circuits. Growth and decay of current in LR and CR circuits, decay constant. LCR circuits, Mean and RMS values of AC, AC circuits, Complex numbers and their applications in solving AC circuit's problems, Complex impedance and reactance, Series and parallel resonance. Q-factor, power consumed by an A.C. circuit, power factor. Y and Δ networks and transmission of electric power, Electricity observed in living systems, Origin of bioelectricity. स्थाई धारा, धारा घनत्वJअस्थाई धारासमीकरण एवंसांतत्य समीकरण, किरचॉफ के नियम व मल्टीलूपपरिपथविश्लेषण, LR व CRपरिपथमें धारा की वृद्धि व क्षय, क्षय-नियतांक LCR परिपथ।प्रत्यावर्ती धारा का ताध्य एवंवर्गमूल माध्य मान, AC परिपथ, सम्मिश्र संख्याएंऔर उनके अनुप्रयोग द्वाराACपरिपथमेंसम्मिश्रप्रतिबाधा, रीएक्टेंस, श्रेणी एवंसमानांतरअनुनादकोहलकरना।QगुणांकACपरिपथ द्वारा शक्ति का उपयोग, शक्तिगुणांकY एवंΔनेटवर्क व विद्युत शक्ति का प्रेषण।जैविकनिकायोंमेंविद्युत का अवलोकन, जैवविद्युत की उत्पति।
Unit-4	**Motion of Charged Particles in Electric and Magnetic Fields** [15 Lectures] *(Note : The emphasis here should be on the mechanical aspects and not on the details of the apparatus mentioned which are indicated as applications of principles involved.)* E as an accelerating field, electron gun, discharge tube, linear accelerator, E as deflecting field – CRO Sensitivity of CRO, Transverse B field; 180^o deflection, Mass spectrograph and velocity selector, Curvatures of tracks for energy determination for nuclear particles; Principle and working of Cyclotron, Mutually perpendicular and parallel E & B fields; Positive ray parabolas, Discovery of isotopes, Elements of Mass Spectrographs, Principle of magnetic focusing (lenses). **विद्युत व चुम्बकीय क्षेत्र मेंअविशितकणों की गति** [15 Lectures] (*यहाँ उपकरणों के वर्णन की अपेक्षा उनके यांत्रिकीय पक्ष परअधिक ध्यानदियाजाना चाहिए।)* त्वरण क्षेत्र के रूपमेंE इलेक्ट्रान गन, विर्सजननलिका, रेखीय त्वरक, E विक्षेपक क्षेत्र के रूपमेंCRO, CRO,कीसुग्राहिता।अनुप्रस्थB क्षेत्र 180^oविचलन, द्रव्यमानस्पेक्ट्रोग्राफ या वेगसिलेक्टर, नाभिकीय कणों के संसूचनहेतुकणों के पथों की वक्रता, साइक्लोट्रॉन (उर्जा मापन) का सिद्धांत व कार्यपद्धति, समानान्तर व लम्बवतE व Bक्षेत्र, धन–किरण के परवलय,आइसोटोप की खोज, द्रव्यमानस्पेक्ट्रोग्राफ के मूलतत्व, चुम्बकीय फोकस का सिद्धांत (लैंस)।

Unit-5	**Electrodynamics** [15 Lectures] Electromagnetic induction, Faraday's Laws, Electromotive force, Integral and differential forms of Faraday's laws, Self and mutual inductance, Transformers, Energy in a static magnetic field, Maxwell's displacement current, Derivations of Maxwell's equations, Electromagnetic field energy density, Poynting vector, Electromagnetic wave equation, Plane electromagnetic waves in vacuum and dielectric media Reflection at a plane boundary of dielectrics, Fresnel's waves, Polarization by reflection and total internal reflection, Waves in a conducting medium, Reflection and refraction by the ionosphere. विद्युतचुम्बकीय प्रेरण, फेराडे के नियम, विद्युतबाहक बल, फेराडेनियम के अवकलन व समाकलन रूप, स्व व अन्योन्य प्रेरण, ट्रान्सफार्मर, स्थिरविद्युत क्षेत्र मेंउर्जा, मेक्सवैल की विस्थापन धारा घनत्व की संकल्पना, मैक्सवेल के समीकरणों की स्थापना, विद्युतचुम्बकीय क्षेत्र का उर्जा धनत्व।पॉयंटिगसदिश, विद्युतचुम्बकीय तरंगसमीकरण, निर्वात एवंपरावैद्युत माध्यम मेंसमतलविद्युतचुम्बकीय तरंग, परावैद्युत की समतलसतह से परावर्तन, फ्रेनेल के नियम, परावर्तन से ध्रुवण व पूर्णआंतरिकपरावर्तन, चालक माध्यम मेंतरंग, आयनमण्डल के द्वारापरावर्तन व अपवर्तन।

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SADHU VASWANI AUTONOMOUS COLLEGE

Sant Hirdaram Nagar, Bhopal

Syllabus recommended by Board of Studies of Physics

Session 2020-21

Class	:	B. Sc. Second Year
Subject	:	Physics
Paper	:	Practical
Course Code	:	PR SC-A35
Max. Marks	:	50

Course Outcomes

CO1- Develop skills in the basic concept of electric forces and electric fields due to various charge distributions.

CO2- Students will be able to explain concepts of classical electromagnetism and to show a working knowledge of a broad array of physical phenomena that are based upon fundamental concepts of charges, fields, and their interactions with matter.

CO3- Students will have strong physical reasoning and problem solving skills and apply these skills to the solution of theoretical and applied problems.

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex- Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practicals

1. Study of interference using biprism.
2. Study of diffraction at straight edge.
3. Use of plane diffraction grating to determine D_1, D_2 lines of Sodium lamp.
4. Resolving power of telescope.
5. Polarization by reflection and verification of Brewster's Law.
6. Study of optical rotation in Sugar solution.
7. Refractive index and dispersive power of prism using spectrometer.
8. Absorption spectrum of material using constant deviation spectrograph.
9. Beam divergence of He-Ne Laser.
10. Determination of wavelength of Laser by diffraction.
11. Determination of radius of curvature of plano-convex lense by Newton's rings.
12. Characteristics of a Ballistic galvanometer.
13. Setting up and using an electroscope or electrometer.
14. Measurement of low resistance by Carey-Foster bridge or otherwise.
15. Measurement of inductance using impedance at different frequencies.
16. Measurement of capacitance using, impedance at different frequencies.
17. Response curve for LCR circuits and response frequencies.
18. Sensitivity of a cathode-ray oscilloscope.
19. Use of a vibration magnetometer to study a field.
20. Study of Magnetic field due to current using Tangent Galvanometer.
21. Study of decay of currents in LR and RC circuits.
22. Study of Lissajous figures using CRO.
23. Verification of Network theorems.

Note : Any other experiment of similar standard may also be incorporated.

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Syllabus Recommended by Board of Studies of Physics
Session 2019-20

Class	**:**	B. Sc. ThirdYear
Subject	**:**	Physics
Paper	**:**	(I)
Title	**:**	Quantum Mechanics and Spectroscopy
Course Code	**:**	SC-A46 (A)
Max. Marks	:	40+(CCE) 10

Course Outcomes

CO1 To become familiar with Blackbody radiation, PhotoElectric effect.

CO2 Compton Effect and hence be aware how quantum theory emerged.

CO3 Have gained a clear knowledge about De Broglie's hypothesis for waves and its implications on the uncertainty principle.

CO4 Students will be able to understand L-S and J-J Coupling, Zeeman Effect.

CO5 Students will be able to understand Interaction of Charged Particles and Basic Properties of Nucleus.

Unit-1	**Quantum Mechanics-1** Particles and Waves: Photoelectric effect, Black body radiation. Compton Effect, De Broglie hypothesis, Wave particle duality, Davisson-Germer experiment, Wave packets, Concept of phase and group velocity. Two slit experiment with electrons, Probability Wave amplitude and wave functions. Heisenberg's uncertainty principle with illustrations, Basic postulates and formalism of schrodinger's equation, Eigenvalues, Probabilistic interpretation of wave function, Equation of continuity, Probability current density, Boundary conditions on the wave function, Normalization of wave function. कण एवंतरंगः प्रकाशविद्युतप्रभाव, कृष्णपिण्डविकिरण, काम्पटनप्रभाव, डी–ब्रोगलीपरिकल्पना, तरंग–कण द्वेतता, डेवीसजर्मरप्रयोग, तरंगपैकेट, तरंग व समूहवेग की अभिधारणा, इलेक्ट्रॉन का द्वि–स्लिटप्रयोग, प्रायिकता, तरगआयाम व तरंगफलन, हाइजनबर्ग का अनिश्चितता का सिद्धांत व उदाहरण, श्रोडिंजरसमीकरण व उसकीमूलभूतअवधारणाएँ।आइगनमान, तरंगफलन की प्रायिकताआधारितव्याख्या, सातत्य समीकरण, प्रायिकता धारा धनत्व, तरंगफलनपरसीमांत शर्ते।तरंगफलन का प्रसामान्यीकरण।
Unit-2	**Quantum Mechanics-2** Time independent Schrodinger equation: One dimensional potential well and barrier, Boundary conditions, Bound and unbound state, Reflection and transmission coefficients for a rectangular barrier in one dimension. Explanation of alpha decay, Quantum phenomenon of tunneling, Free particle in one-dimensional box, Eigen functions and eigenvalues of a free particle, One-dimensional simple harmonic oscillator, energy eigenvalues from Hermite differential equation, wave function for ground state, Particle in a spherically symmetric potential, Rigid rotator. समय अनिर्भरश्रोडिंजरसमीकरणः एक–विमीय विभवकूप व प्राचीरसीमांत शर्ते बद्ध व अबद्ध अवस्थाएँ, आयाताकारप्राचीर(I-D) से परावर्तन व पारगमनगुणांक।α-क्षय की व्याख्या, सुरंगन की क्वाटंम घटना। एक–विमीय बाक्समेंमुक्तकण, मुक्तकणहेतुआइगनफलन एवंआइगनमान। एक विमीय सरलआवर्तदौलित्र हरमाइटअवकलसमीकरण से

	उसकेआइगनमान, स्थूलअवस्था का आइगनफलन, गोलीय सममितविभवमेंकण, दृढ धूर्णक।
Unit-3	**Atomic Spectroscopy** Atoms in electric and magnetic fields: Quantum numbers, Bohr model and selection rules. Stern-Gerlach experiment, Spin as an intrinsic quantum number, Incompatibility of spin with classical ideas, Orbital angular momentum, Fine structure, Total angular momentum, Pauli Exclusion Principle, Many particles in one dimensional box, Symmetric and anti-symmetric wave functions, Atomic shell model, Spectral notations for atomic states, Spin-orbit coupling, L-S and J-J coupling, Zeeman Effect, Continuous and characteristic α-rays, Mossley's law. विद्युतीय व चुम्बकीय क्षेत्र मेंपरमाणु–क्वांटम संख्यांकबोहरमॉडल व वरण(Sclection) के नियम, स्टर्न–गर्लकप्रयोगचक्रण–मूलभूत(Intrinsic) क्वांटम संख्या। चक्रण की चिरसम्मतसिद्धांत से असंगति। कक्षीय कोणीय संवेग, फाइनस्ट्रेक्चरकुल कोणीय संवेग, पाउली का अपवर्जनसिद्धांत। एक विमीय बाक्समेंबहुलकण–सममिती व असममितीतरंगफलन, परमाणुकोशमॉडल।परमाण्वीय अवस्थाहेतुस्पेक्ट्रमीसंकेतन, स्पिनआरबिटकपलिंगL-S व J-J युगमन, जीमनप्रभाव । सतत व अभिलाक्षणिकX-किरणस्पेक्ट्रा, मोसले का नियम।
Unit-4	**Molecular Spectroscopy** Various types of spectra, Rotational spectra, Intensity of spectral lines and determination of bond distance of diatomic molecules, Isotope effect, Vibrational energies of diatomic molecules, Zero point energy, Anharmonicity, Morse potential. Raman Effect, Stokes and anti-Stokes lines and their intensity difference, Electronic spectra, Born-Oppenheimer approximation, Frank-Condon principle, Singlet and triplet states, Fluorescence and phosphorescence. विभिन्नप्रकार के स्पेक्ट्रा (वर्णक्रम), धूर्णीस्पेक्ट्रा, वर्णक्रमरेखाओं की तीव्रताव द्वि–परमाणविक अणु की बद्ध दूरी, समस्थानिकप्रभाव/द्वि–परमाणविकअणु की कम्पनउर्जा, शून्य बिन्दुउर्जा, अनहार्मोनिसीटी (अनावृति)। मोर्सविभव, रमन प्रभाव।स्टोक व प्रतिस्टोकरेखाएँ व इनकीतीव्रता, इलेक्ट्रॉनिकवर्णक्रम।बार्नऑपनहायमरसन्निकटता, फ्रेंककार्डनसिद्धांत, एकल व त्रिक अवस्थाएँ, प्रतिदीप्त व स्फुरदीप्ति।
Unit-5	Basic properties of nucleus: Shape, Size, Mass and Charge of the nucleus, Stability of the nucleus and Binding energy, Alpha particle spectra- velocity and energy of alpha particles, Geiger-Nuttal law, Nature of beta ray spectra, the neutrino. Energy levels and decay schemes, Positron emission and electron capture, Selection rules, Beta absorption and range of beta particles, Kurie plot, Nuclear reactions, pair production, Q-values and threshold of nuclear reactions, Nuclear reaction cross-sections, Examples of different types of reactions and their characteristics, Compound nucleus, Bohr's postulate of compound nuclear reaction. Semi empirical mass formula, Shell model, Liquid drop model, nuclear fission and fusion (concepts).

	नाभिक के मूलभूतगुणः न्युट्रॉनतथाआवेशितकणों की द्रव्य के साथअनुक्रिया, नाभिकीय संसूचक–आयननकोष्ठ, गाइगरमूलरगणक, अनुपातिकगणक, प्रस्फुरणगणक, अभ्रकोष्ठनाभिक के मूलगुण, नाभिक की आकृति, सहति, आवेशतथाआकारनाभिक का स्थायित्व एवं बंधनउर्जा, अल्फा–कण का वेग एवंउर्जा, गाइगर–नेटलनियम, बीटा–किरणवर्णक्रम की प्रकृति, न्यूट्रीनों, उर्जास्तर एवं क्षय पद्धति, पोजीट्रानउत्सर्जन एवंइलेक्ट्रॉनप्रग्रहण, चयन (वरण) नियम, बीटाअवशोषण एवंबीटाकण का परास, क्यूरीआरेख,नाभिकीय अभिक्रियाएँ, युग्मउत्पादन,Q-मान एवंनाभिकीय अभिक्रिया की देहली, नाभिकीय अभिक्रिया का अनुप्रस्थकाट, विभिन्नप्रकार की अभिक्रियाओं के उदाहरण एवंअभिलाक्षणिक, यौगिकनाभिक, यौगिकनाभिकीय अभिक्रिया की बोहरअभिकल्पना, अर्धमूलानुपातीसूत्र द्रवबूंदमॉडल, कोशमॉडलनाभिकीय विखंडन एवंसंलयन।

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Sant Hirdaram Nagar, Bhopal
Syllabus Recommended by Board of Studies of Physics
Session 2019-20

Class	**:**	B. Sc. Third Year
Subject	**:**	Physics
Paper	**:**	(II)
Title	**:**	Solid State Physics and Devices
Course Code	**:**	SC-A46 (B)
Max. Marks	:	40+(CCE) 10

Course Outcomes

CO1 Understanding of reciprocal lattice.
CO2 Students will be able to understand Specific heat of Solid, Wiedemann Franz Law, Halleffect.
CO3 To understand the principles of semiconductor diodes, transistors and their characteristics.
CO4 To understand the characteristics of FET.
CO5 The student will develop a fundamental knowledge of nanomaterials and applications.

Unit-1	**Solid State Physics-1** Crystal Structure and bonding : Crystalline and amorphous solids, Translational symmetry, Lattice and basis, Unit cell. Reciprocal lattice, Fundamental types of lattices (Bravias Lattice), Miller indices Lattice planes, Simple cubic, Face centered cubic. Body centered cubic lattices, Laue and Bragg's equations, Determination of crystal structure with X-rays, X-ray spectrometer,Lonic, covalent, metallic, Van der Waals and hydrogen bonding, Band theory of solids, Periodic potential and Bloch theorem, Kronig-Penny model (Qualitative). क्रिस्टलीय, संरचना एवंआबंधनः क्रिस्टलीय व अक्रिस्टलीय ठोस, स्थानांतरणसममिति, जालक व आधार, इकाईसेल, व्युत्क्रमजालक, जालकों के मौलिकप्रकार (ब्रेवाइस लेटिस), मिलरसूचकांक, जालकतल।सरल घनाकार, फलककेन्द्रित घनाकार, अन्त' केन्द्रित घनाकारलेटिसेस।लॉवे व ब्रेग का समीकरण, X-किरणों से क्रिस्टल की संरचनाज्ञातकरना, X-किरणस्पेक्ट्रममापी।आयनिकसह–संयोजक, धात्विकवॉण्डरवाल एवंहायड्रोजन बंधन।ठोसपदार्थों के लिए बैण्डसिद्धांत, आवर्तीविभव एवंब्लॉचप्रमेय।क्रोनिंग–पैनीमॉडल (गुणात्मक विवेचना)।
Unit-2	**Solid State Physics-2** Lattice structure and properties : Dulong Petit, Einstein and Debye theories of specific heats of solids, Elastic and atomic force constants, Dynamics of a chain of similar atoms and chain of two types of atoms, Optical and acoustic modes, Electrical resistivity, Specific heat of electron, Wiedemann-Franz law, Hall effect, Response of substances in magnetic field, Dia-para- and ferromagnetic materials, Classical Langevin theory of dia and paramagnetic domains, Curie's law, Weiss theory of ferromagnetism and ferromagnctic domains, Discussion of B-H Hysteresis. विशिष्टउष्मा का ड्यूलॉग–पेटिट, आइन्सटीन व डिबाईसिद्धांत, प्रत्यास्थ एवंपरमाण्विक बल नियतांक। एक परमाण्विकव द्विपरमाण्विक कड़ी(Chain)का गतिकसमीकरण, प्रकाशीय व ध्वनिकीविधाएँ, विद्युतीय प्रतिरोधकता, इलेक्ट्रॉन की विशिष्टउष्मा, वाइडमेन–फ्रेंजनियम।हॉलप्रभावचुम्बकीय क्षेत्र मेंपदार्थों की अनुक्रिया।प्रति, अनु एवंलौहचुम्बकीय पदार्थ।प्रति एवंअनुचुम्बकीय डोमेन्स का चिरसम्मतसिद्धांत।क्यूरी का नियम, लौहचुम्बकत्व

	एवंलौहचुम्बकीय डोमेन्स के लिए Weiss का सिद्धांतB-H शैथिल्यता की विवेचना।
Unit-3	**Semiconductor devices-1** Electronic devices: Types of Semiconductors (p and n), Formation of Energy Bands, Energy level diagram, Conductivity and mobility, Junction formation, Barrier formation in p-n junction diode. Current flow mechanism In forward and reverse biased diode (recombination), drift and saturation of drift velocity, Derivation of mathematical equations for barrier potential, barrier width, Single p-n junction device (physical explanation, current voltage characteristics and one or two applications), Two terminal devices, Rectification, Zener diode, Photo diode, Light emitting diode. Solar cell Three terminal devices, Junction field effect transistor (JFET), Two junction devices, Transistors as p-n-p and n-p-n, Physical mechanism of current flow, Characteristics of transistor. उर्जाबैण्डों का बनना, उर्जास्तर का डायग्राम, अर्धचालक के प्रकार(p - n), चालकताऔरगतिशीलता, संधि का बनना, p-nसंधि, डायोडमेंरोधिकाविभव का बनना, अग्र व पश्चअभिनतिडायोडमें धाराप्रवाह (पुनः संयोजन), अनुगमनवेग व अनुगमनवेग की संतृप्तता, रोधिकाविभव के गणितीय समीकरण की व्युत्पत्ति, रोधिकाचौड़ाई, एकलp-n संधि। डायोड (भौतिकीय विवेचना), धारा–विभवअभिलाक्षणिक (एक–दो अनुप्रयोग), द्वि–टर्मीनल युक्ति, दिष्टकरणजेनरडायोड, फोटोडायोड, प्रकाशउत्सर्जकडायोड, सोलरसेल, त्रि–टर्मीनल युक्ति, संधि क्षेत्र प्रभावट्रांजिस्टर(JFET), द्वि–संधि युक्तियॉ,p-n-p व n-p-nट्रांजिस्टर, धारा–प्रवाह की भौतिकीय प्रक्रिया, ट्रांजिस्टर के अभिलाक्षणिकवक्र।
Unit-4	**Semiconductor devices-2** Amplifiers (only bipolar junction transistor), CB, CE and CC configurations, Single stage CE amplifier (biasing and stabilization circuits), Q-point, equivalent circuit, Input impedance, Output impedance, voltage and current gain, Class A, B, C amplifiers (definitions), RC coupled amplifiers (frequency response), Class B push-pull amplifier, Feedback amplifiers, Voltage feedback and current feedback, Effect of negative voltage series feedback on input impedance, Output impedance and gain, Stability, distortion and noise, Principle of an Oscillator, Barkhausen criterion, Colpitts, RC phase shift oscillators, Basic concepts of amplitude, frequency and phase modulations and demodulation. प्रवर्धक (द्वि–ध्रुवसंधि ट्रांजिस्टर) CB, CE व CC विधा, एकलस्टेज (चरण) CE प्रर्वधक (अभिननव स्थायीकरण परिपथ),Q बिन्दुसमतुल्य परिपथ, निवेशी व निर्गतप्रतिबाधा, विभव एवं धारालाभ।वर्गA, B, C प्रवर्धक (परिभाषा), RC युग्मितप्रवर्धक(आवृति अनुक्रिया वर्क), वर्ग-Bपुश–पुलप्रवर्धक, पुर्ननिवेशनप्रवर्धक, विभव एवं धारा, पुर्ननिवेशन, निवेशीप्रतिबाधा पर ऋणात्मकविभव, श्रेणी फीडबेक, निर्गमनप्रतिबाधा एवंलाभ।स्थायित्व, विकृति व शोर, दोलित्र का सिद्धांततथाबार्क–हाउसन का प्रतिबन्ध, कॉलपिटदोलित्र, RC कलाविस्थापीदौलित्र, आयाम, आवृति एवंकलामाडुलेशन एवंसंसूचक की मूलअवधारणा।
Unit-5	**Nano materials** Nanostructures: introduction to nanotechnology, structure and size dependent properties, 3D, 2D, 1D, 0D nanostructure materials and their density of states, Surface and Interface effects, Modelling of quantum size effect, Synthesis of nanoparticles – Bottoms Up and Top Down approach, Wet Chemical Method,

	Nanolithography, Metal and Semiconducting nanomaterials, Essential differences in structural and properties of bulk and nano materials (qualitative description), Naturally occurring nano crystals, Applications of naonmaterials. नैनोंसंरचनाएंः नैनोटेक्नॉलाजी की प्रस्तावना, संरचना, आकारनिर्भर गुण।3D, 2D, 1D, 0D नैनोसरंचनाप्रदार्थ एवंउनकीअवस्थाओं का घनत्व, सतह एवंअंतराफलकप्रभाव, क्वांटमआकारप्रभाव का प्रतिरूपण, नैनोकणों का संश्लेषण–नीचे से उपर (बॉटम अप) औरउपर से नीच (टॉप डाउन) विधियॉ, वेटरसायनिकविधि, नैनोलिथोग्राफी (नैनो मुद्रण), धातु एवं अर्द्ध चालकों के नैनोपदार्थ (गुणात्मक विवरण), विस्तृत (Bulk) औरनैनोपदार्थों की संरचना एवंगुणोंमेंअन्तर (गुणात्मक विवरण), प्राकृतिक रूपमेंपायेजानेवालेनैनोक्रिस्टल।नैनोपदार्थों के अनुप्रयोग।

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SADHU VASWANI AUTONOMOUS COLLEGE
Sant Hirdaram Nagar, Bhopal
Syllabus Recommended by Board of Studies of Physics
Session 2019-20

Class	:	B. Sc. Third Year
Subject	:	Physics
Paper	:	Practical
Course Code	:	PR-SC-A46
Max. Marks	:	50

Course Outcomes

CO1 Understanding of reciprocal lattice.

CO2 Students will be able to understand Specific heat of Solid, Wiedemann Franz Law, Halleffect.

CO3 To understand the principles of semiconductor diodes, transistors and their characteristics

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex- Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practicals

1. Specific resistance and energy gap of a semiconductor
2. Study of half wave and full wave rectification.
3. Characteristics of Zener diode.
4. Characteristic of a tunnel diode
5. Characteristics of JFET.
6. Characteristic of a transistor
7. Study of regulated power supply.
8. Study of RC coupled amplifiers.
9. Determination of Planck's constant.
10. Determination of e/m using Thomson's method.
11. Determination of e by Millikan's method.
12. Study of spectra of hydrogen and deuterium (Rydberg constant and ratio of masses of electron to proton).
13. Absorption spectrum of iodine vapour.
14. Study of Zeeman Effect for determination of Lande g-factor.
15. Study of Ramn spectrum using laser as an excitation source.
16. To draw B-H curve of ferro-magnetic material with the help of CRO.
17. Hysteresis curves a transformer core.
18. Hall Probe method for measurement of resistivity.

Note: Any other experiments of similar standard may also be incorporated

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Syllabus recommended by Board of studies of Electronics
Session 2017-18 To 2020-21

Class	:	B.Sc.
Year	:	I
Subject	:	Electronics
Paper	:	I
Title	:	Basics of Semiconductors & Devices
Course Code	:	SC-A20(A)
Max. Marks	:	40+ (CCE) 10

Course Outcomes

CO1- Analyze the electric circuit using network theorems.

CO2- To study basics of semiconductor & devices and their applications in different areas.

CO3 - Reproduce the I-V characteristics of diode/BJT devices.

CO4- To recall various BJT parameters, connections and configurations.

CO5- Hybrid Equivalent and Hybrid Models.

Unit-1	PASSIVE COMPONENTS – Resistors – Symbol, colour coding, resistor tolerance, Power rating, Types of resistors. Capacitors- Symbol, Colour coding, Tolerance, Voltage rating, Types of capacitors, Inductors- Symbol, Types of Inductors, Knowledge of values available in the market, Introduction of Chokes, Practical Significance of above Components. Transformers- Principle, Turns ration, Voltage ratio, Current ratio, transformer efficiency, Types of Cores; Air, Iron and ferrite cores, Types of Transformers, PCB: Introduction to Insulating materials & their types, PCB- Types of PCB, Layout Techniques, Cables and Connectors. निष्क्रिय अवयव : प्रतिरोध–प्रतीकचिन्ह, कलरकोड, प्रतिरोधकता, टॉलरेन्स, पॉवररेटिंग, प्रतिरोध के प्रकार, संधारित्र प्रतीकचिन्ह, कलरकोड, टॉलरेन्स, वोल्टेजरेटिंग संधारित्र के प्रकार।प्रेरकत्व–प्रतीकचिन्ह, प्रेरकत्वों के प्रकार, बाजारमेंउपलब्ध मानों का ज्ञान, चोक की भूमिका, उपर्युक्तअवयवों का व्यवहारिकमहत्व।ट्रांसफार्मर–सिद्धांत, चवकरों की निष्पत्ति, वोल्टेजअनुपात, धाराअनुपात, ट्रांसफार्मर दक्षता, कोरों के प्रकार, वायु, लोह एवंफैराइटकोर।ट्रांसफार्मर के प्रकार।पी.सी.बी. कुचालकपदार्थों की प्रस्तावना एवं उनके प्रकार।पी.सी.बी.–पी.सी.बी. के प्रकार, लेआउट, तकनीकियॉकेबल एवंकनेक्टर्स।
Unit-2	RESONANCE CIRCUITS AND NETWORK THEOREMS – Phasor Representation of Voltage and Current, Basic Idea of the Impedance of LCR Circuits, Series and Parallel Resonance, Quality Factor, Integration and Differentiation using R.C. Circuits, Network Theorems-Network definition, loop and nodal analysis, Superposition theorem, Thevenin's theorem. Norton's theorem, Maximum Power transfer theorem, Reciprocity Theorem. अनुनादीपरिपथ एवंनेटवर्कप्रमेय–धारा एवंवोल्टता की कला रूपीय प्रदर्शन। एल.सी.आर. परिपथोंमेंप्रेरकत्व की मूलअवधारणा, श्रेणी एवंसमानान्तरअनुपाद, दक्षतागुणांकप्रतिरोध संधारित्र परिपथों की सहायता से अवकलन एवंसमाकलन।नेटवर्कप्रमेय–नेटवर्कपरिभाषा, लूपतथासंधि विश्लेषण, अध्यारोपणप्रमेय, थेवनिनप्रमेय, नोर्टनप्रमेय अधिकतम शक्ति रूपांतरणप्रमेय, व्युत्क्रमणप्रमेय।

Unit-3	SEMICONDUCTOR PHYSICS- Basic idea of crystal structure and energybands, Difference between Conductor, Semiconductor and Insulator Carrier concentration at normal equilibrium in ainstrinsic Semiconductor, Law of Mass Action Donors and acceptors physical picture of electrons and holes as majority carriers, Fermi level for intrinsic and extrinsic semiconductors,dependence ofFerm Level on donor and acceptor concentration idea of draft and diffusion. अर्द्धचालकभौतिकी–क्रिस्टलसंरचना एवंउर्जाबैण्डों की मूलअवधारणा, चालक, अर्द्धचालक एवंकुचालकमेंअन्तर, आन्तर अर्द्धचालकों की सामान्य साम्यावस्थामेंवाहको की सांद्रता, द्रव्यमानक्रियानियम, दाता एवंग्राही, इलेक्ट्रानों एव विवरों के मुख्य वाहकों का भौतिकचित्रण। आन्तर एवंवाह्य अर्द्धचालकोंमेंफर्मीस्तर।फर्मीस्तर की दाता एवंग्राहीसांद्रतापरनिर्भरता।अनुगमन एवंविसरण की अवधारणा।
Unit-4	PN JUNCTION – Formation of depletion region and Potential barrier, PN junction as a Diode, Forward & Reverse Bias, The resistance of P-N junction diode and its variation with biasing, Static and dynamic resistance of a diode, Current-Voltage characteristics, Derivation of potential barrier, Definition of transition capacitance, Junction capacitance voltage relationship for an abrupt p-n junction diode, Avalanche breakdown and Zener effect, Zener diode, The basic idea and working of a varactor diode, Solar cell, LED, Schottky diode, Tunnel diode. पी.एन.संधि–अवक्षय क्षेत्र एवंविभवप्राचीर का निर्माण, डायोड के रूपमेंपी.एन.संधि, अग्र एवंपश्चअभिनति।पी.एन.संधि डायोड का प्रतिरोध एवंइसकाअभिनति के साथपरिवर्तनडायोड का स्थैतिक एवंगतिजप्रतिरोध। धारा–वोल्टता का अभिलाक्षणिकवक्र।विभव–प्राचीर के सूत्र की व्युत्पत्ति।संक्रमण धारिता की परिभाषा–एब्रप्टपी.एन.संधि के लिए संधि धारिता एवंविभवमेंसंबंध। एवलांचीभजन एवंजेनरप्रभाव, जेनरडायोड, वेरेक्टरडायोड की मूलअवधारणा एवंकार्यविधि, सोलरसेल, एल.ई.डी. शॉटकीडायोड, टनलडायोड।
Unit-5	TRANSISTOR-PNP and NPN transistor, Transistor Action, Definition of alpha, Beta & Gamma and their inter relationship, Characteristics curve of bipolar transistors, Interpretation of Active, Cutoff and saturation regions, Determination of A.C. & D.C. load lines, Operating Point for CB, CE and CC configurations. Hybrid models of a CE, CB & CC transistor circuit and their equivalent circuits, Basic idea of junction capacitance. Transistor biasing, bias stability factor, stabilization against change in I_{Co} for fixed bias, collector to base bias and self bias. ट्रांजिस्टरः PNP एवंNPN ट्रांजिस्टर।ट्रांजिस्टरक्रिया, अल्फा, बीटातथागामा की परिभाषा एवंउनमेंअन्तरसंबंध, द्विध्रुवीय ट्रांजिस्टर के अभिलाक्षणिकवक्र, सक्रिय, कट–ऑफतथासंतृप्त क्षेत्रों की व्याख्या, ए.सी. एवंडी.सी. लोडलाइन का निर्धारण, उभयनिष्ठ–आधार, उभयनिष्ठउत्र्सजक एवंउभयनिष्ठसंग्राहकअभिविन्यासों के लिए कियाबिन्द्र।उभयनिष्ठ–आधार, उभयनिष्ठउत्र्सजक एवंउभयनिष्ठसंग्राहकट्रांजिस्टरपरिपथों के हाइब्रिडमॉडलतथा उनके तुल्य परिपथ।संधि–धारिता की मूलअवधारणा, ट्रांजिस्टरअभिनति एवंअभिनतिस्वायित्वगुणांक।स्थिरअभिनति, संग्राहकआधारअभिनति एवंस्वअभिनतिमेंI_{Co}मेंपरिवर्तन से स्वायित्व।

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Syllabus recommended by Board of studies of Electronics
Session 2017-18 To 2020-21

Class	:	B.Sc.
Year	:	I
Subject	:	Electronics
Paper	:	II
Title	:	Electronic Circuits and Fundamentals of Digital Electronics
Course Code	:	SC-A20(B)
Max. Marks	:	40+ (CCE) 10

Course Outcomes

CO1- To Explain and Demonstrate Amplifiers
CO2- To explain construction and characteristics of JFETs
CO3- Understand and represent numbers in powers of base and converting one from the other, carry out arithmetic operations.
CO4- Apply the knowledge gained of Multivibrators.
CO5- Understanding of Oscillators.

Unit-1	RECTIFIERS AND POWER SUPPLY – Half wave, Full wave and Bridge rectifier Ripple factor and Power conversion efficiency for the half wave and full wave rectifiers, Filter Need for filter in Power Supply, Series inductor, shunt capacitor, L section, π section, T section filters. Power supply-Block diagram of simple power supply, regulated power supply link & load regulation, Characteristics of Power Supply, Zener diode as a voltage regulator, three terminal IC Power supply (IC 78XX & 79XX). दिष्टकारी एवंपॉवरसप्लाई : अर्द्ध तरंग, पूर्णतरंग एवंब्रिजदिष्टकारीउर्मिका घटक एवं अर्द्धतरंग एवंपूर्णतरंग शक्ति रूपांतरण दक्षता, फिल्टर–पॉवरसप्लाईमेंफिल्टर की आवश्यकता, श्रेणी प्रेरक, शंट सधांरित, L-सेक्शनπ–सेक्शन, T-सेक्शनफिल्टर्स ।पॉवरसप्लाई–साधारणपॉवरसप्लाई का ब्लाकआरेख, नियमितपॉवरसप्लाई, लाइन एवंलोडनियमन, पॉवरसप्लाई के अभिलक्षण, वोल्टेजनियामक के रूपमेंजेनरडायोड, त्रिटर्मिनलआई.सी. पॉवरसप्लाई(IC 78XX & 79XX)
Unit-2	FIELD EFFECT TRANSISTORS- The construction and working of JFET, The idea of channel width, Field dependent mobility showing current dependence of voltage, Physical explanation of different regions of I-V curves, Various paramenters of JFET. MOS Devices, Basic Structure and energy level diagram, the basic contruction of MOSEFT and its working, Physical explanation of the curves, enhancements and depletion modes, MOSFET parameters. क्षेत्र प्रभावट्रांजिस्टर : JFET की संरचना एवंकार्यविधि, चेलनविद्थ (चौड़ाई) की अवधारणा, क्षेत्र निर्भरगतिशीलता एवंविभवपर धारा की निर्भरता,I-V वक्रों के विभिन्न क्षेत्रों की भौतिकव्याख्या JFET के विभिन्नप्रचालक ।MOS युक्तियॉ, मूलसंरचना एवंउर्जास्तरचित्र MOSFETकीसंरचना एवंकार्यविधि, ऐनहॉन्समेन्ट एवंडिपलीशनविधा वक्रों की भौतिकव्याख्या, MOSFET के प्रचालक।
Unit-3	AMPLIFIERS – Amplifiers – Different terms used in Amplifiers, such as Single Source, Input, Output, Voltage and current Gain, Power Gain, Decibel, Input and Output Impedance, Classification according to the frequency Response. Class A, Class B and Class C amplifiers, Power amplifiers, Analysis and design considerations of Push pull amplifiers, RC Coupled Amplifier – Gain for high, mid and low frequency range, Calculation of half power points, Band width and figure of merit, Feedback in amplifiers,

	Advantage of negative feedback in amplifiers, Voltage and current feedback circuits. प्रवर्धक : प्रवर्धकोंमेंउपयोगकियेजानेवालेविभिन्न पद जैसेसिग्नल स्त्रोत, निवेशी एवंनिर्गत, विभव एवं धारालाभ, शक्तिलाभ, डेसीबल, निवेशी एवंनिर्गतप्रतिबाधा।प्रवर्धकों की आवृतिअनुकिया के अनुसारवर्गीकरण, वर्ग-A, वर्ग-B, एवंवर्ग–C, प्रवर्धक, शक्तिप्रवर्धक, पुश–पुलप्रवर्धक की बनावट एवंविश्लेषणआरसीप्रवर्धकनिम्न, मध्यम एवंउच्चआवृतिपरासमेंलाभ अर्द्ध शक्तिबिन्दुओं की गणनाबैडचौडाई एवंफिगरऑफमेरिटप्रवर्धकमेंपुनर्निवेशप्रव्रधकोमें ऋणात्मकपुनर्निवेश के लाभ धारा एवंविभवपुनर्निवशीपरिपथ।
Unit-4	APPLICATION OF Diodes AND TRANSISTORS- clipping circuts, clamping circuits, Multivibrators; Astable, Monostable and Bistable-Cireuit, Working and Applications Oscillators – Barkhausen criterion for self sustained oscillations, Circuit and Working of Hartley, Colpitt, Phase shift and Wein bridge oscillators. डायोड एवंट्रांजिस्टर के अनुप्रयोग : क्लिपिंगपरिपथ, क्लेम्पिगपरिपथ, मल्टीवाइब्रेटर्स एस्टेबल, मोनो–स्टेबल एवंबाई–स्टेबल के परिपथ, कार्यविधि एवंअनुप्रयोग दोलित्रः स्वपोषितदोलनो के लिए बार्कहाउसनकसौटी, हार्टले, कॉलपिट, फेसशिफ्ट एवंवीनब्रिजदोलित्रों के परिपथ एवंकार्यविधि।
Unit-5	BASICS OF DIGITAL ELECTRONICS- Binary numbers, Binary to Decimal conversion, Decimal to Binary conversion, Binary additions, Binary subtraction, I's Complements, 2's Complements, Binary multiplication and division, Octal and Hexadecimal numbers, Inter-coversions of various number systems, BCD code and Grey code. डिजीटलइलेक्ट्रॉनिक्स की मूलअवधारणाः बाइनरी संख्या बाइनरी से डेसीमल रूपांतरण, डेसीमल से बाइनरी रूपांतरण, बाइनरी योग एवंअन्तर 1'sकॉम्प्लीमेन्ट, 2'sकॉम्प्लीमेन्ट, बाइनरीगुणांक एवंभाग, आक्टल एवंहेक्साडेसिमल संख्याऐंविभिन्नअंकपद्धतियोंमेंअन्तः रूपांतरण, बी.सी.डी. कोड एवंग्रेकोड।

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Syllabus recommended by Board of studies of Electronics
Session 2017-18 To 2020-21

Class	:	B.Sc.
Year	:	I
Subject	:	Electronics
Course Code	:	PR-SC-A20

Course Outcomes

CO1- To Explain and Demonstrate Amplifiers

CO2- To explain construction and characteristics of JFETs

CO3- Understand and represent numbers in powers of base and converting one from the other, carry out arithmetic operations.

Note : A Student is required to do at least 10 experiments
Any other experiments of similar standerd may also be incorporated
The scheme of practical examination will be as follws:

Scheme of Examination:

1. One experiment of three hours duration.
2. Marks :

Experiment	30
Sessional	10
Viva	10
Total Marks	50

List of Experiments

1. Testing & Identification of different Components (Resistance, Capacitors, Inductors, Cables).
2. Measurement of frequency and voltage of sine, square and triangular waves using CRO and function generator.
3. Study of charging & Discharging of an Electrolyte Capacitor and Calculate the Time Constant.
4. Study of forward bias & reverse bias characteristics of PN junction diode.
5. Study of reverse bias characteristics of Zener diode.
6. Study of Thevenin's Theorem for two mesh network.
7. Designing of PCB for a given electronic circuit.
8. Study of series and parallel resonance.
9. Study of Half and Full wave rectifiers.
10. Study of Regulated Power Supply using Zener Diode.
11. Study of Output Characteristics curve of Bipolar Juction Transistor in Common Emitter/Common base/common collector Configuration.
12. Study of R.C. Coupled Amplifier.
13. Study of RC Phase Shift Oscillator.
14. Study of Hartley Oscillator.
15. Study of Simple Clipping circuits using PN Junction Diode.
16. Fabrications of PCB using Software developed layout.
17. Study of Regulated Power Supply using IC 78XX & 79XX series.
18. Testing and Identification of different types of Diodes & Transistors.

Note : Any other experiment of similar standard may also be incorporated

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Session 2018-19 To 2020-21

Class	:	B.Sc.
Year	:	II
Subject	:	Electronics
Paper	:	I
Topic	:	Digital Electronics & Microprocessor
Course Code	:	SC-A31(A)
Max. Marks	:	40+ (CCE) 10

Course Outcomes

CO1- Understand the basic working of different logic gates and laws of Boolean algebra, De Morgan's theorem, NOR & NAND logic for simplification of circuits.

CO2- Understand the concepts of Registers, Counters.

CO3- Understand the concepts of D/Aand A/D converters.

CO4- Describe different modes of operation of 8085 microprocessor.

CO5- Understand different instruction set of microprocessor.

Unit-1	Logic Gates: Basic Logic Gates- Symbols and truth tables of AND, OR, NOT, NAND, NOR, XOR AND XNOR logic Gates, Positive and Negative logic, Transistorized Circuits of Basic Logic gates. Arithmetic Circuits: Half Adder and Full adder, Boolean Laws, De'Morgan's Theorems, Karnaugh Map Simplifications upto 4 variables. Flip Flops: RS Flip, D Flip Flop, J.K.Flip Flop, Positive and Negative triggered flip flop, JK Master Slave Flip Flop, Elementary idea of MUX, DMUX, encoder and decoder circuits. लॉजिकगेट्सः मूललॉजिकगेट्सAND, OR, NOT, NAND, NOR, XOR एवंXNORगेट्स के सांकेतिकचिन्ह एवंसत्यता सारणी, धनात्मक एवं ऋणात्मकलॉजिक, मूललॉजिकगेट्स के ट्रांजिस्टरपरिपथ। आंकिकपरिपथः हाफ ऐडर एवंफुल ऐडर, बूलियन के नियमडीमॉर्गन्सप्रमेय, कारनॉफचित्र का सरलीकरण (चार चरो तक)। फ्लिपफ्लाप्स : आर.एस. फ्लिसफ्लाप्स, जे.के. फ्लिपफ्लाप्स, धनात्मक व त्रणात्मकट्रिगर्डफ्लिसफ्लाप, जे.के. मास्टरस्लेवफ्लिपफ्लाप।MUX, DMUX एनकोडरऔरडीकोडरपरिपथ की प्रारंभिकअवधारणा।
Unit-2	Logic Families: Classification of logic families, Definition of fan-in, fan-out, noise immUnity, Propagation dely time, Various Logic Families-RTL, DTL, TTL, ECL, CMOS. Counter and Registers: Ripple counter synchronous counter, Up-Down Counter, Decade Counter, Buffer Register, Shift Registers-Types and Uses. लॉजिकफेमिलीज : लॉजिकफेमिलीज का वर्गीकरणफेनइन–फेनआउट की परिभाषा, नॉइसइम्यूनिटी, प्रोपेगेशनडिले समय, विभिन्नलॉजिकफेमिजीज–RTL, DTL, TTL, ECL, CMOS. काउन्टर एवंरजिस्टर : रिपिलकाउन्टरसिक्रोनसकाउन्टरअप–डाउनकाउंटरडिकेडकाउंटर, बफररजिस्टर, शिफ्टरजिस्टर–प्रकार एवंउपयोग।

Unit-3	D/A and A/D Converter : D/A converters Binary Weighted Resistor method, R-2R Ladder method, A/D Converters Counter Method, Dual Ramp method, Successive Approximation Method. Memories, Volatile and Non volatile memories, Read only memory (ROM) PROM, EPROM, EEPROM, Random Access Memory. D/A/ एवंA/D रूपांतरक : D/A रूपांतरक, बाइनरीवेटेडरजिस्टरविधि, R-2R लेडरविधि, A/D स्पांतरक : काउंटरविधि, डुअलरेम्पविधि, कमागतसंनिकटविधि। मेमोरीज : वोलाटाइल एवंनॉनवोलाटाइलमेमोरीज, ROM, PROM, EPROM, EEPROM रेन्डम एक्सेसमेमोरी।
Unit-4	Itroduction to Microprocessor: Pin Out diagram of Microprocessor INTEL 8085, Microprocessor 8085 Architecture- Bus Organiztion Addressing modes, Memory organization Gereral Purpose Registers, Stack Pointer and Program Counter. Status flags. Instruction Set of Microprocessor 8085: Types of Instructions, Data Transfer, Arithmetic, Logical, Branching & Looping, Stack, I/O & machine control instructions.Programming-Basic Straight line programming (Addition Subtration Multiplication and Division). माइक्रोप्रोसेसर की प्रस्तावनाः इन्टेल 8085 माइक्रोप्रोसेसर का पिद आउटडाइग्राम, 8085 माहक्रोप्रोसेसर की अद्योसंरचना, बस आर्गनाइजेशन, एड्रेसिंगमोड, मेमोरीआर्गनाइजेशन, रजिस्टर्स का सामान्य उद्देश्य, स्टेकपॉइन्टर एवंप्रोग्रामकाउन्टर, स्टेटसफ्लेग्स। माहक्रोप्रोसेसर 8085 के निर्देशसमूह : निर्देश के प्रकार, डाटाट्रांसफर, आंकिकतर्क, ब्राचिंग एवंलूपिंग, स्टेक, इनपुट/आउटपुट एवंमशीनकन्ट्रोलनिर्देश, प्रोग्रामिंग–मूलसरलरेखीय प्रोग्राम (योग, घटाना, गुणा एवं भाग)।
Unit-5	Interfacing and Interfacing Devices: Interoduction to Interfacing with microprocessor 8085, Interfacing with ROM, Interfacing with Ram, Input/Output interfaching Internal Architecture and pin out diagram of the 8155/8156 and 8355/8755 multipurpose programmable Devices. Personal Computers: Introduction to Personal Computer, Classification and Architecture (Block Diagram only), Input and Output Devices. इन्टरफेसिंग एवंइन्टरफेसिंग युक्तियॉ : मॉइक्रोप्रोसेसर 8085 की इन्टरफेसिंग की प्रस्तावना, रोम के साथइन्टरफेसिंग, रेम के साथइन्टरफेसिंग, इनपुट/आउटपुटइन्टरफेसिंगआन्तरिकअद्योसंरचना एवं 8155/8156 एवं 8355/8755 का पिनआउटडाइग्राम्स, बहुउद्देशीय प्रोग्रामेबल युक्तियॉ। पर्सनलकम्प्यूटर : पर्सनलकम्प्यूटर की प्रस्तावना, वर्गीकरण एवंअद्योसंरचना (केवल ब्लॉक डाइग्राम), इनपुट एवंआउटपुट युक्तियॉ।

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Class	:	B.Sc.
Year	:	II
Subject	:	Electronics
Paper	:	II
Topic	:	Operational Amplifier and Instrumentation
Course Code	:	SC-A31(B)
Max. Marks	:	40+ 15CCE

Course Outcomes

CO1- Elucidate and design the applications of an op-amp.

CO2- Understand difference amplifier.

CO3- Analyze the different parameters of OP-AMP.

CO4- Understand the Active Filters and Signal Generators.

CO5- Understand working and block diagram of biomedical instruments.

Unit-1	Difference Amplifier: Emitter coupled differential amplifier and its different configurations, DC and AC analysis, Voltage Gain, Imput and Output Impedence of difference amplifier. Operational Amplifier: Block diagram of Ideal Operational amplifier, Equivalent circuit of an Op-Amp, Symbol, and Integrated circuits. Pin-out configuration of IC 741, Inverting and Non Inverting Amplifiers. Parameters of Op Amp: Input offset voltage, Input Bias current, differential input resistance, Common Mode Rejection Ratio (CMRR) Slew rate, large signal voltage gain, Output Resistance. डिफरेन्शियल एम्प्लीफायर : उत्सर्जक युग्मितडिफरेन्शियल एम्पिफायर एवं उनके विभिन्नअभिविन्यास, डी.सी. एवं ए.सी. विश्लेषण, विभवलाभ, डिफरेन्शियल एम्प्लीफायर की निवेशी एवंनिगतप्रतिबाधा। ऑपरेशनलप्रवर्धकः आदर्शआपरेशलनप्रर्वधक का ब्लॉकडाइग्रान, आपरेशनल एम्प्लीफायर (आपेम) का समतुल्य परिपथ, इंटीग्रेटेडसर्किट, आई.सी.741 का पिनआउटअभिविन्यास, इनवर्टिगं एवंनॉनइनवर्टिगंप्रवर्धक। आरपेशलन एम्प्लीफायर के प्रचालक : निवेशीटॉफसेटवोल्टेज, निवेशीअभिनत धारा, डिफरेन्शियननिवेशीप्रतिरोध, उभयनिष्ठविधा निरस्तीअनुपात (CMRR), स्लयूरेट, लार्जसिंग्नलविभवलाभ, निर्गतप्रतिरोध।
Unit-2	Applications of Op_amp: Adder, Subtractor, Integrator, Differentiator and Comparator Instrumentation Ampliier: construction and working. Active Filters; Elementary idea of Active Filters, Butterworth & Chebyshev response, First order Low pass, High pass & Band pass, Butterworth filters; working and frequency response. Signal Generators: Sweep Frequency generator, Pulse and Square wave generator, Astable Multivibrator using transistors, IC 555 timer for square and triangular wave generator, Block diagram of Function generator, IC 8038 as complete function generator. ऑपरेशलनप्रर्वधक के अनुप्रयोगः एडर, सब्ट्रेक्टर, समाकलित, अवकलित एवंकम्परेटर।इन्सट्रूमेन्टेशनप्रवर्धक : संरचना एवंकार्यविधि। सक्रिय फिल्टर्स : सक्रिय फिल्टर्स की मूलअवधारणा, बटरवार्थ एवं शैबीशेवअनुक्रिया, प्रथमकोटिनिम्नपारक, उच्चपारक

	एवंबैण्डपारक ।बटरवार्थफिल्टरकार्यविधि एवंआवृत्तिअनुक्रिया। सिंग्लनजनित्र : स्वीपआवृत्तिजनित्र, पल्स एवंवर्गतरंगजनित्र, ट्रांजिस्टर युक्त एस्टेबलमल्टीवाइब्रेटर,IC 555 का उपयोगकरवर्ग एवं त्रिभुजाकारतरंगजनित्र, फलनजनित्र का ब्लॉकडाइगाम, IC 8038 के द्वारापूर्णफलनजनित्र।
Unit-3	Cathode Ray Oscilloseope : Block diagram of a CRO, Basic operation, Electrostatic focusing, Electrostatic deflection. Screen for CRT, Horizontal deflection system,Vertical deflection system Lissajous Figures, Freouency and Phase measurement using CRO. Liquid Crystal Displays: Liquid Crystal, Modes of Operation, Operation of twisted nematic LCD, Operating characteristics of LCD, Liquid Crystal Materials, Construction and advantages of LCD. कैथोडकिरणकम्पनदर्शी : सी.आर.ओ. का ब्लॉकडाइग्राम, मूलसंचालन, विद्युतस्थैत, फौकसिंग, विद्युतस्थैतविक्षेपण, कैथोडकिरणढ्यूबमेंपरदा, क्षतिजविक्षेपण तंत्र, उर्ध्वाधरविक्षेपण तंत्र लिसाजूआकृतियॉ, कैथैडकिरणकम्पनदर्शी की सहायता से आवृति एवंकलामापन। लिक्विडक्रिस्टलडिरप्ले : लिक्विडक्रिस्टल, प्रचालन की विधाएं, ट्विस्टेडनिमेटिक एल.सी.डी., एल.सी. डी. के क्रियाअभिलाक्षणिकगुण, लिक्विडक्रिस्टलपदार्थ, लिक्विडक्रिस्टलडिस्प्ल की संरचना एवंलाभ।
Unit-4	Measuring Instruments : Q meter – Basic circuits : measuring method in series and parallel connections, Electronic Voltmeter, DC Voltmeter. AC Voltmeter, Digital Voltmeter Integrating type, Staircase Ramp, Sample and Hold circuits. Multimeters : Analog Multimeter – Voltage, Current and Resistance measurement, Digital Multimeter, Voltage, Current and Resistance measurement, Comparison between Analog and Digital Multimeter, Elements of Electronic Counter, Universal Counter, Measurement modes- Frequency, Time interval and Period measurement. मापन यंत्र : क्यूमीटर–प्राथमिकपरिपथः श्रेणी एवंसमानांतरसंयोजनमेंमापनविधियॉ, इलेक्ट्रॉनिकवोल्टमीटर, डी.सी. वोल्टमीटर, ए.सी. वोल्टमीटर, डिजिटलवोल्टमीटरः समाकलितप्रकार, स्टेयरकेसरेम्प, सेम्पल एवंहोल्डपरिपथ। मल्टीमीटरः एनालॉगमल्टीमीटर–विभव, धारा एवंप्रतिरोध मापन, डिजिटलमल्टीमीटर–विभव, धारा एवंप्रतिरोध मापन, एनालॉग एवंडिजिटलमल्टीमीटर की तुलना, इलेक्ट्रोनिकगणक के मूलतत्व, सार्वत्रिक गणक, मापनविधाऐं–आवृत्ति, समयान्तराल एवंकालमापन।
Unit-5	Biomedical Instrumentation : ECG Fundamentals – Electrodes, Block Diagram of ECG machine, ECG Leads, Direct Writing Recorder, Inkjet recorder, Multi channel ECG Machines, Cardiac Monitor, Cardiac Monitor Using Digital Memory. X-Ray Machne: Production of X-rays, X-ray machine, High Voltage Generator, High Frequency Generators, High Tension Cable. बायोमेडिकलइंस्ट्रूमेन्टेशन : म्ळ के मूल तंत्र–इलेक्ट्रोड, ई.सी.जी. मशीन का ब्लॉकआरेख, ई.सी.जी. लीड्सडायरेक्टराइटिंगरिकार्डर, इंकजेटरिकार्डर, बहुचेनलई.सी.जी. मशीनें, कार्डियकमॉनीटरडिजिटलमेमोरीप्रयुक्तकार्डियकमॉनीटर, एक्सरेमशीन : एक्स किरणों का उत्पादन, एक्स किरणमशीन, उच्चविभवजनित्र, उच्चआवृत्ति का जनित्र, हाईटेंशनकेबल।

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Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Electronics
Session 2018-19 To 2020-21

Class : B.Sc.
Year : II
Subject : Electronics
Course Code : PR-SC-A31

Course Outcomes

CO1- Elucidate and design the applications of an op-amp.
CO2- Understand difference amplifier.
CO3- Analyze the different parameters of OP-AMP.

PRACTICALS

Note : A students is required to do at least 10 experiments.

Any other experiments of similar Standerd may also be incorporated.

The Scheme of practical examination will be as follows:

Scheme of Examination:

One experiment of three hours duration

	Marks
Experiment	30
Sessional	10
Viva	10
Total Marks	50

List of Experiments

1. Verification of truth table of Basic logic Gates AND, OR, NOT, NAND, NOR, XOR, XNOR using diodes transistor
2. Verification of truth table of Basic logic Gates AND, OR, NOT, NAND, NOR, XOR and XNOR using ICs 74XX.
3. Study of R-S Flip-Flop.
4. Study of J-K Flip-Flop.
5. Study of Half and Full adder.
6. Study of Digital to Analog converter and Analog to Digital.
7. Write a Program in Assembly language for microprocessor 8085:
   (I) Addition (III) Multiplication
   (II) Subtraction (IV) Division
8. Write a program in Assembly language for Microprocessor 8085:
   (I) Largest No. finding (II) Smallest No. finding.
9. Write a program in Assembly language for Microprocessor 8085:
   (I) Data Block Transfer (II) Data Block Interchange
10. Verification of De'Morgan's Theorems using logic gates.
11. Realization of Boolean Circuits
12. Study of Operational Amplifier in Inverting and Non Inverting mode.
13. Study of Operational Amplifier as an Adder.
14. Study of Operational Amplifier as Integrator and differentiator

15. Study of the first order Low pass &High pass Butterworth Active Filters.
16. Study of Astable Multivibrator using Transistor.
17. Measurement of amptitude, frequency and phase difference using CRO.
18. Study of 555 Timer as Triangular wave generator.
19. Study of 555 Timer as Square wave generator.
20. Study of Zener Diode as a voltage regulator.
21. Study of IC 78XX series as a voltage regulator.

Circuit designing by using multiple software

Note : Any other experiment of similar standard may also be incorporated

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Syllabus recommended by Board of studies of Electronics
Session 2019-20 To 2020-21

Class	:	B.Sc.
Year	:	III
Subject	:	Electronics
Paper	:	I
Topic	:	Thyristors, IC Technology, Microprocessor and Electrical Motors
Course Code	:	**SC-A42(A)**
Max. Marks	:	**40+ 15CCE0**

Course Outcomes

CO1- Explain the behavior and characteristics of power devices such as SCR/UJT etc.

CO2- Applications of Power Devices.

CO3- To understand 8086 microprocessor.

CO4- Understand different instruction set of microprocessor.

CO5- To understand Electrical motors.

Unit-1	Power Devices: UJT Structural Description and working and Characteristic Curve of Unijunction Transistor (UJT)[UJT as a relaxation Oscillator. SCR: Structural description, Working and Characteristic Curve of Silicon Controlled Rectifier, Two Transistor Analogy of SCR, Forward and Reverse Blocking States, Triggering Methods, Construction, Working and Characteristic curves of DIAC and TRAC, TRIAC as a switch. पॉवर युक्तियॉ : UJT एकलसंधि ट्रांजिस्टर की संरचनाविवरण, कार्यविधि तथाअभिलाक्षणिकवक्र, रिलेक्सेशनदोलित्र के रूप मे UJT SCR: सिलिकोनकन्ट्रोलदिष्टकारी का संरचनाविवरणकार्यविधि तथाअभिलाक्षणिकवक्रSCR की द्वि ट्रांजिस्टर एनालॉजी, अग्र एवंश्चब्लॉकिगंअवस्थाएँ, ट्रिगरिंगविधियॉ, DIAC एवंTRIAC की संरचना, कार्यविधि एवंअभिलाक्षणिकवक्र । स्विच के रूपमेंTRIAC.
Unit-2	Applications of SCR: SCR as a static AC switch, Phase Controlled Rectification, Half Wave and Full wave Rectifiers using SCR with resistive, capacitive and inductive load. Power Inverters using SCR: with and without reactive feedback. SCR के अनुप्रयोग : स्थैतिक ए.सी. स्विच के रूपमेंSCR कलानियंत्रित दिष्टकरण, SCR का प्रतिरोधक, संधारित्रोंतथाप्रेरकत्वलोड के साथ अर्द्धतरंग एवंपूर्णतरंगदिष्टकारी। SCR युक्तपॉवरइनवर्टर : प्रतिघातीपुर्ननिवेशतथागैरप्रतिघातीपुर्ननिर्वेशी।
Unit-3	IC Technology : Refining and growth of silicon crystals: Production of electronic grade silicon, Crystal growth apparatus, Silicon Wafer Preparation: Ingot Trimming and Slicing, Wafer Polishing and Cleaning, Wafer Proessing Considerations, Diffusion of Dopant Impurities, Diffusion Systems. Ion Implantation, Ion Implantation System, Properties of Ion Implantation, Thermal Oxidation: Utility of Thermal Oxidation, Photolithography Process steps, Idea of relative plasma etching, Chemical Vapour Deposition: Epitaxial deposition. ICटेक्नालॉजीसिलिकॉनक्रिस्टलों का परिष्करण एवंनिर्माणइलेक्ट्रानिकग्रेडसिलिकॉन का उत्पादन, क्रिस्टलनिर्माणउपकरण, सिलिकॉनवेफरनिर्माणइनगॉटट्रिमिंगतथास्लाइसिंग, वेफरपॉलीशिंगतथाक्लीनिंग, वेफरप्रोसेसिंग के घटक, अपमिश्रणअशुद्धियों का विसरण, विसरण तंत्र। आयनआरोपण, आयनआरोपण तंत्र, आयनआरोपण के गुण।तापीय आक्सीकरणः तापीय आक्सीकरण का उपयोग, फोटोलीथेग्राफीप्रक्रिया के स्तर, रिलेटिवप्लाज्मा ऐचिंग की अवधारणा, रासायनिकवाष्पडिपोजीशन, एपिटेक्सियलडिपाजीशन।

Unit-4	INTEL 8086 Microprocessor : Register Organiztion of INTEL 8086, Architecture, Pinout Description of 8086, Physical memory Organization, General Bus Operation.I/O Addressing Capability, Minimum and maximum modes. Addressing Modes of 8086, Instruction set of 8086: Data Copy/Transfer Instructions, Arithmetic and Logical Instructions, Branch Instructions, Loop Instructions, Machine Control Instructions, Shift and Rotate Instructions, Simple Programs for arithmetic operations. इंटेल 8086 माइक्रोप्रोसेसर : INTEL 8086का रजिस्टरसंगठन, आर्कीटेक्चर, 8086 का पिनआउटविवरण, फिजीकलमेमोरीसंगठन, सामान्य बस प्रचालन, I/o एड्रेसिंग क्षमता, न्यूनतम एवंअधिकतमविधाऐं 8086 की एड्रेसिंगविधाऐं, 8086 के निर्देशसेट : डाटाकॉपी/ ट्रांसफरनिर्देश, आंकिक एवंतार्किकनिदेश, ब्रांचनिर्देश, लूपनिर्देश, मशीननियंत्रक निर्देश, शिफ्टतथारोटेटनिर्देश, आंकिकऑपरेशन के लिए सामान्य प्रोग्राम।
Unit-5	Electrical Motors: Types of motors, DC Motor: Design and Working Principles; Induction motors; idea of rotating magnetic field, Starting and Rotating Torque, Slip Asynchronous Motor, Equivalent circuit of an induction motor, Synchronous motor; principle of operation. Single phase induction motor; different circuits to make it self starting. विद्युतमोटर : मोटर के प्रकार, दिष्टधारामोटर : संरचनातथाकार्यविधि सिद्धांत, प्रेरणमोटर्सः घूर्णीय चुम्बकीय क्षेत्र की अवधारणा, प्रारम्भिकतथा घूर्णीय बल–आघूर्ण, स्लिप, अतुल्य कालिकमोटर, प्रेरकत्वीमोटर का समतुल्य परिपथ, तुल्य कालिकमोटरः प्रचालन का सिद्धांत, एकलकला, प्रेरकत्वीमोटरः इसे स्वचलितबनानेहेतुविभिन्नपरिपथ।

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Syllabus recommended by Board of studies of Electronics
Session 2019-20

Class	:	B.Sc.
Year	:	III
Subject	:	Electronics
Paper	:	II
Topic	:	Communication Electronics
Course Code	:	SC-A42(B)
Max. Marks	:	40+10

Course Outcomes

CO1- Design basic digital communication systems to solve a given communications problem and they become conversant with the requirements and the protocols employed in the fundamental components in a communication network.

CO2- Describe the concept of "noise" in analog and digital communication systems.

CO3- Understand Analog and Digital Modulation.

CO4- Understand Fibre optics communication.

Unit-1	Noise: Thermal Noise, Shot Noise, Partition Noise; Low Frequency and transit time noise, Generation and Recombination Noise, Equivalent Noise Resistance, Signal-to-noise ratio, Noise Factor, Temperature. Radio Wave Propatgation : Introduction, Propagation in free Sapce, Tropospheric Propagation, Ionopheric Propagation, Surface Wave, HF, and VHF propagation, Ground wave, sky wave and Space wave propagations, Dead zones, Skip Distance, Maximum Usable Frequencey, Stratification of Ionosphere. शोर–उष्मीय शोर, शॉट शोर, पार्टीशन शोर, निम्नआवृत्ति एवं दमन समय शोर, उत्पादन एवंसंयोजन शोर, समतुल्य शोरप्रतिरोध, सिग्नल शोरनिष्पत्ति, शोर घटक, शोरताप । रेडियोतंरगसंचरण : प्रस्तावना, मुक्तआकाशमेंसंचरण, टोपोस्फेरिकसंचरण, आयनमण्डलीय संचरण, पृष्ठीय तरंग, उच्चआवृत्ति एवंअतिउच्चआवृत्तिसंचरण, भूस्तरीय तरंग, आकाशीतरंग एवंआकाशीय तरंगसंचरण, डेडजोन, मूकअन्तराल, अधिकतमउपयोगीआवृत्ति, आयनमण्डल का स्तरीयकरण ।
Unit-2	Modulation : Principle of Modulation, Amplitude Modulation : Principle and wavefrom, Modulation Index Derivation for the modulated wave and modulation index, Linear and Square Modulatiors Balanced Modulator, Single side band transmission: advantages, disadvantagesand methods of generation. Elements of Frequencey and Phase Modulation, frequency spectrum of FM waves, Phase modulation: Modulation Indices. माडुलेशन : माडुलेशन का सिद्धांत, आयाममाडुलेशन : सिद्धांत एवंतरंगरूप, माडुलेशनसूचकांक, माडुलिततरंगतथामाडुलितसूचकांक के लिए व्यजंक की उत्पत्ति, रेखीय एवंवर्गमाडुलक, संतुलितमाडुलक, एकलपार्श्वबैण्डप्रेषणः लाभ, हानि एवंउत्पादन की विधियॉ।
Unit-3	Generation of Frequency Modulation: Direct and Indirect Methods; Varactor Diode and FET circuits. FM Demodulation: Foster Seelay Discriminator and Ratio Detector Pulse Modulation, Pulse Transmission, Pulse Amplitude Modulation, Pulse Position and Pulse Width Modulation, Time Division Multiplexing. Grequency Division Multiplexing. Pulse Code Modulation: Block diagram of PCM, Transmitting and receiving Systems of PCM. आवृत्तिमाडुलेशन की उत्पत्ति : प्रत्यक्ष एवंअप्रत्यक्ष विधियॉ, वेरक्टरडायोड एवं एफ.ई.टी. परिपथ, एफ. एम. डिमोडुलेशन : फोस्टरसीले, डिस्क्रिमिनेटर एवंरेशोडिटेक्टर। पल्समाडुलेशन, पल्सट्रांसमीशन, पल्सआयाममाडुलेशन, पल्सपोजीशन एवंपल्सचौड़ाईमाडुलेशनटाइमडिवीजन, मल्टीप्लेक्सिंग, आवृत्तिविभाजितमल्टीप्लेक्सिंग। पल्सकोडमाडुलेशनः पी.सी.एम. का ब्लाकडायग्राम, ट्रासंमीटिंग एवंरिसीविगंसिस्टम्स।

Unit-4	Antenna :Antenna Equivalent Circuits, Radiation Fields, Polarization, Isotropic Radiator, Power Gain, Effective area, Half Wave Dipole, Vertical Antenna, Folded Elements, Loop and ferrite core receiving antennas, YAGI Antenna, non-resonant antenna, driven arrays, parasitic arrays, Microwave antenna. Television Engineering : Characteristics of Human Eye, Persistence of Vision and Flicker, Scanning Process, Interlaced Scaning, Composite Video Signal.Vestigial Sideband Signal, Standard Channel Characteristics. Block diagram of TV Transmitter and Receiver. एन्टीना : एन्टीनासमतुल्य परिपथ, विकिरण क्षेत्र, ध्रुवण, आइसोट्रोपिकरेडिएटर, शक्तिलाभ, प्रभावित क्षेत्र, अर्धतरंग द्विध्रुव, उर्ध्वाधर एन्टीना, फोल्डेडतत्व, लूप एवंफेराइटकोररिसीविंग एन्टीना, यागी एन्टीना, नॉनरेजोनेन्ट एन्टीना, ड्रिविन एरेस, पेरासिटिक एरेस, सूक्ष्म तरंग एन्टीना। टेलीवीजन यांत्रिकी : मानव क्षेत्र अभिलक्षण, दृष्टि एवंफिलकर का स्थायित्व, स्केनिंगप्रक्रिया, इन्टरलेज्डस्केनिंग, संयुक्तवीडियोंसिग्लन, वेसटीजियलसाइडबैण्डसिग्नल, स्टेण्डर्डचेनलअभिलक्षण, टी. वी.प्रेषित्र एवंअभिग्राही का ब्लाकडायग्राम।
Unit-5	Fiber Optic Communications : Introduction to Optical Fibers, Principles of Light Transmission in a Fiber: Propagation within a Fiber, Effect of Index Profile of Propagation, Modes of Propagation, Number of Modes supported by a fiber, Losses in Fiber, Dispersion, Light Sources for Optional Fibers, Photo Detectors, Connector and Slices. Wireless Communication System: Introduction to Cellular Telephony, Cells, Frequency Re-use Principle, Transmission, Reception, Handoff. Roaming Generations of Cellular Telephony; Global System for Mobile Communication (GSM): Introduction, Switching System, Base Station System, Operation and Support System, GSM Specifications, VSAT. फाइवरआप्टिककम्यूनिकेशन : फाइवरआप्टिक की प्रस्तावना, फाइवरमेंप्रकाशप्रेक्षण का सिद्धांत, फाइवरमेंसंचरण, संचरणपरइंडेक्सप्रोफाइल का प्रभाव, संचरण की विधाएं, फाइवरसहायकविधाओं के प्रकार, फाइवरमेंहानियों, विक्षेपणप्रकाशीय फाइवर के लिए प्रकाश स्त्रोत, फोटोडिटेक्टरकनेक्टर एवंस्लाइसेस। वायरलेसकम्यूनिकेशनसिस्टम : सेल्यूलरटेलीफोनी की भूमिका, सेल्सआवृत्तिपुनर्उपयोगीसिद्धांत, संप्रेक्षण, अभिग्रहण, हेण्डऑफ, रोमिंग, सेल्यूलरटेलीफोनी का उत्पादन, मोबाइलकम्यूनिकेशन के लिए वैश्विक तंत्र (GSM): प्रस्तावना, स्विचिंगसिस्टम, बेसस्टेशनसिस्टम, ऑपरेशन एवंसपोर्टसिस्टम, जी.एस.एम. के विनिर्देश(Specifications),व्ही.एस.ए.टी।

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SADHU VASWANI AUTONOMOUS COLLEGE
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Electronics
Session 2019-20 To 2020-21

Class	:	B.Sc.
Year	:	III
Subject	:	Electronics
Course Code	:	PR-SC-A42

CO1- Design basic digital communication systems to solve a given communications problem and they become conversant with the requirements and the protocols employed in the fundamental components in a communication network.
CO2- Describe the concept of "noise" in analog and digital communication systems.
CO3- Understand Analog and Digital Modulation.

PRACTICALS

Note : A students is required to do at least 10 experiments.

Any other experiments of similar Standerd may also be incorporated.

The Scheme of practical examination will be as follows:

Scheme of Examinatio:

One experiment of three hours duration

	Marks
Experiment	30
Sessional	10
Viva	10
Total Marks	50

List of Experiments

1. Study of SCR Characteristics.
2. Study of DIAC and TRIAC Characteristic.
3. Study of UJT Characteristies.
4. Study of UJT as relaxation oscillator
5. Assembly language programming to perform basic arithmetic operations using INTEL 8086 microprocessor.
6. Assembly language programmng for the summation of two data series using INTEL 8086 microprocessor.
7. Assembly language programming for finding the squares of the elements of a series using call procedure.
8. ALP using Macros.
9. Study of Amplitude Modulation and Demodulation.
10. Study of Frequency Modulation, and Demodulation.
11. Study of Time Division Multiplexing and frequency division multiplexing.
12. Study Pulse Code Modulation.
13. Study of Optiocal Fiber Communication.
14. Study of various sections of Television Receiver.

Note : Any other experiment of similar standard may also be incorporated

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Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2017-18 To 2020-21

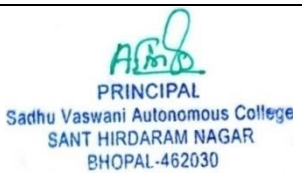
Class	:	BCA.
Year	:	I
Subject	:	Computer Science & Application
Title of Subject Group	:	FundamentalsofComputer
Max. Marks	:	40
Course Code	:	BC- A02

Course Outcome

CO1- Describe computer with its characteristics, usage, limitations and benefits
CO2 Use computer peripherals and memory efficiently.
CO3- Develop programming concepts.
CO4- Compare between various operating systems and their functions.
CO5- Identify network fundamentals and various communication network

Unit-1	Computer System: Definition, Characteristics, Capabilities and limitations, Types of Computers: Analog. Digital, Micro, Mini, Mainframe & Super Computers, Generations of Computers, Server. Smart Systems: definition, characteristics and applications. Definition of Embedded System, GIS, GPS. Cloud Computing, Concept of hardware, software and firmware. Use of computers in e-governance and various public domains and services.
Unit-2	Computer organization: block diagram of Computer and its functional units. Input devices- keyboard, scanner, mouse, light pen , bar code reader, OMR, OCR, MICR, track ball, joystick, touch screen camera, micetc. Output devices: monitors- classicification of monitors based on technology – CRT & flat panel, LCD, LED monitors, speakers, printers- dot matrix printer, ink jet printer, laser printer, 3D printers, wi-fi enabled printers, plotters and their types, LCD/LED projectors. Computer memory and its types, Storage devices: Magnetic tapes, Floppy Disks, Compact Disc- CD-ROM, CD-RW, VCD, DVD,DVD-RW, usb drives , blue Ray Disc, SD/MMC Memory cards.
Unit-3	Programming Concept and its Planning : Purpose of writing a program. Steps in program Development. Characteristics of a good Program, development of an Algorithm, flow Charts through examples. PROGRAMMING LANGUAGES: History, Classifications, Low Level, Assembly, High Level languages and 4GL, Advantages & Disadvantages of Programming languages. TYPES OF SOFTWARE: System Software. Translators, Compilers, Interpreters, Assemblers, Operating System Linkers, Libraries & utilities, Application Software, Packaged & Tailored Software's. Examples of word-processing, spreadsheets, presentation, multimedia, graphics, accounting, statistical analysis, MIS software and other utility software available.

Unit-4	OPERATING SYSTEMS: Introduction, Types of O.S: Single User, Multi Programming, Multi-Tasking, Real Time, Time Sharing Batch Processing, Parallel Processing, Distributed Processing. File Allocation Table (FLAT & FLAT 32), NTFS, Drives, files & directory structure and its naming rules, booting process details of DOS and Windows , system files. Examples of Operating Systems prevalent around the world, Windows, Linux, Ios Android and others. The concept of Open source, its advantages and limitations. Virus- working principles, Types of viruses, virus detection and prevention, viruses on network, Antivirus software.
Unit-5	WWW, Browser, search Engine, Uses of the Internet, Basic Services of Internet, Difference between website and portal. Use of computers in communication : Communication Process, Communication types- Simplex, Half Duplex, Full Duplex, Communication Protocol, Communication Channels- Twisted, Coaxial, fiber Optic, Serial and Parallel Communication, Modulation and Demodulation, Modern – Working and characteristics, Types of network Connections – Dialup, Leased Lines, ISDN, DSL , RF, Broadband , Types of Network – LAN, WAN, MAN, Internet, VPN etc., Topologies of LAN- Ring , Bus, star, Mesh and tree topologies , Components of LAN – Media, NIC, NOS, Bridges, Adapters, HUB , Routers, Router, Repeater and Gateways.



Sadhu Vaswani Autonomous College
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Session – 2017-18 To 2020-21

Class : BCA.
Year : I
Subject : Computer Science & Application
Title of Subject Group : Office Automation Package and Tools
Max. Marks : 40
Course Code: BC- A04

Course Outcome

CO1- Thecourseaimstoprovideknowledgeabout basic components of a computer andtheir significance.
CO2- Office tools course would enable thestudentsincraftingprofessionalworddocuments,excel spreadsheets,powerpointpresentations using the Microsoft suite ofofficetools.
CO3- Tofamiliarizethestudentsinpreparation of documents and presentationswithoffice automation tools.
CO4- By learning the course, the students willbeabletoperformdocumentation,to performaccountingoperations&toperform presentationskills.
CO5- Perfom database operation using MS-Access.

Unit-1	MS Windows: Introduction to MS-Windows; Features of Windows; Various versions ofWindows & its use; Working with Windows; My Computer ,Accessories & Recycle bin ;Desktop, Icons and Windows Explorer; Screen description & working styles of Windows;Dialog Boxes & Toolbars; Volume Control, Working with Files & Folders; simple operationslike copy, delete, moving of files and folders from one drive to another, Shortcuts &Auto start,Accessories,WindowsSettingsusingControlPanel-settingupcommondevicesusingcontrol panel, modem, printers, audio, network, fonts, creating users, internet settings, Startbutton & Program lists; Installing and Uninstalling new Hardware & Software program onyourcomputer, maintaining user accounts,setting up system dateand time. OfficePackages-Officeactivitiesandtheirsoftwarerequirements,Word-processing,Spreadsheet, Presentation graphics, Database, introduction and comparison of various officesuiteslikeMSOffice, Lotus Notes, StarOffice, Open Officeetc.
Unit-2	MS Word :Introduction , Features & area of use. Working with MS Word :Ribbon tabs-Home, Insert, Page Layout, References, Mailings, Review, View. Creating a New Document;Different Page Views and layouts; Applying various Text Enhancements; Working with –Styles, Text Attributes; Paragraph and Page Formatting; Text Editing using various features ;Bullets,Numbering, Auto correct,changecase, sorting, Printing& variousprintoptions. AdvancedFeaturesofMS-Word:SpellCheck,Thesaurus,Find&Replace;Headers&Footers;Inserting–PageNumbers,Pictures,Files,Autotext,Symbols,formulaetc.;WorkingwithColumns,Tabs&Indents;Creation&WorkingwithTablesincludingconversion to and from text; Margins & Space management in Document; Adding Referencesand Graphics;Mail Merge, printing Envelops & Mailing Labels. Importing and exporting toandfrom variousformats. Working with OPTIONS inMS-WORD.
Unit-3	MSExcel: Introduction ,features and area of use; Working with MS Excel.; concepts ofWorkbook &Worksheets; Using Wizards; Various Data Types; Using different features withData,CellandTexts;Inserting,Removing&ResizingofColumns&Rows;WorkingwithData & Ranges; Different Views of Worksheets; Column Freezing, Labels, Hiding, Splittingetc.; Using different features with Data and Text; Use of Formulas, Calculations & Functions;Cell Formatting including Borders & Shading; Working with Different Chart

	Types; PrintingofWorkbook & Worksheets with various options.
Unit-4	MS PowerPoint: Introduction & area of use; Working with MS PowerPoint: Creating a NewPresentation;WorkingwithPresentation;UsingWizards;Slides&itsdifferentviews;Inserting, Deleting and Copying of Slides; Design slides using themes, colors, and specialeffects. Adding special effects to slide transitions. Working with Notes, Handouts, Columns &Lists; Adding Graphics, Sounds and Movies to a Slide; Working with PowerPoint Objects;Designing&PresentationofaSlideShow;PrintingPresentations,Notes,Handoutswithprintoptions. Working with master slides.
Unit-5	MSAccess: Introductiontodatabase,Relational Database, DatabaseElements,Tables, Query ,Opening and Closing Access Interface Window, Different tabs and icons onribbon, creating a New database in Access, save and open database, Table creation, Databaseview and Design View. Data Types, Field Properties, Fields: names, types, properties, DataEntry,Addrecord,deleterecord,edittext,Sort,find/replace,filter/select,rearrangeColumns.

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Session – 2017-18 To 2020-21

Class	:	BCA.
Year	:	I
Subject	:	Computer Science & Application
Title of Subject Group	:	Problem Solving and Programming Through C
Max. Marks	:	40
Course Code	:	BC- A05

Course Outcome

CO1-Able to implement the algorithms and draw flowcharts for solving Mathematical problems.

CO2- Demonstrate an understanding ofcomputer programming language concepts.

CO3- Abletodefinedatatypesandusetheminsimpledataprocessingapplicationsalsohe/shemustbeablet ousetheconceptofarrayofstructures.

CO4- Developconfidenceforself-educationand ability for life-long learning needed for Computerlanguage.

CO5- Implement Pointers and file management in C

Unit-1	Use of Algorithm for problem solving. Flow Charts - Symbols, Rules for making flow chart.Program Concept and logic development,Algorithm and flowcharts as programming aids,Characteristics of Programs, Various stages in Program Development , ProgrammingTechniques – Top down, Bottom up, Modular, Structured - Features, Merits, Demerits, andtheircomparativestudy. Programming Logic- Simple, Branching, Looping, Recursion, Cohesion & Coupling,ProgramTesting & Debugging & theirTools .
Unit-2	IntroductiontoClanguage,standardfeaturesof C,StructureofaCprogram.IntroductiontoC compilers, Creating and compiling C Programs, IDE features of Turbo C compiler,Commandlineoptions tocompile C program in TC. Keywords, Identifiers, Variables, constants, Scope and life of variables - local and globalvariable. Data types, Expressions, Operators : Arithmetic, Logical, Relational, Conditionaland Bit wise Operators. Precedence and Associatively of Operators, Type conversion. Basicinput/output library functions: Single character input/output i.e. getch(), getchar(),putch(),putchar(). Formatted input/output - scanf() and printf() . Library functions : Mathematical &Characterfunctions, Storageclasses.
Unit-3	Declarationstatement,conditionalstatement:Ifstatement,If..... Elsestatement, Nestingof If.....ElseStatement,elseif ladder,The?: operator, Switchstatement.Iteration statements:for loop,whileloop,do-whileloop.Jumpstatements:break,continue,goto,exit(). ARRAYS : concept of Single and Multi Dimensional arrays, Array declaration andinitializationofarrays.Strings:declaration, initialization,stringfunctions.
Unit-4	The need forC functions, User defined and library functions, prototype of functions,prototype of main() function, Calling of functions, Function arguments, argument passing:call by value and call by reference, Return values. Nesting of functions, Recursion, Array asfunction argument, Command line arguments.

	Storage class specifies - auto, extern, static,register.
Unit-5	Defining structure, Declaration of structure variable, typeset, Accessing structure members,Nested structures, Array of structure, Structure assignment, Structure as function argument,Functionsthat return structure,uses ofstructure,Union. **Pointers-** Fundamentals, Pointer declarations, Passing pointers to the functions, pointers andone dimensional array, dynamic memory allocation, Operations on pointers, arrays ofpointers. Concept of debugging. Finding Errors in the programs, error codes and their meanings,Variousdebuggingoptionsin TurboCcompiler.(Debug andOptionsMenu oftheTCCIDE) **File Handling** - Defining, opening & closing a file, Functions for processing and creation offiles- Reading, Writing, Accessing(tell()) &Seeking(seek()). Access modes-read, write andappend.

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Class	:	BCA.
Year	:	I
Subject	:	Computer Science & Application
Title of Subject Group	:	Business Mathematics
Max. Marks	:	40
Course Code	:	BC- A06

Course Outcome

CO1- Implement trigonometric solutions for measurements in real world.
CO2- Implement Matrices and simultaneous equations to solve problems.
CO3- Use Statistical tools efficiently.
CO4- Apply differentiation and integration for solving complex Problems.
CO5- Analyze real world scenarios formulate problems about commission, brokerage and discount

Unit-1	Trigonometry:Angles&theirMeasurement,ValuesofTrigonometricRatiosandtheirGraphical Representations, Height and Distances.
Unit-2	TheoryofIndices,Definition&TypesofMatrices,ElementaryTransformationofMatrices,Determinantand Matrices,SpecialMatrices,Inverseof a Matrix.
Unit-3	Frequency Distribution, Histogram, Measure of Central Tendency, Mean, Mode, Median, StandardDeviation.
Unit-4	RatioAndProportion,Percentage, Commission&Brokerage,Discount,Profit&Loss.
Unit-5	Limits&Continuity,LimitsofFunctions,InfiniteLimits,LimitsatInfinity,ContinuousFunction, Differentiationof1st and2nd Order,Integration– finite,infinite,addition,subtraction&multiplication.

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Class	:	BCA.
Year	:	I
Subject	:	Computer Science & Application
Title of Subject Group	:	Digital Computer Organization
Max. Marks	:	40
Course Code	:	BC- A07

Course out Comes

CO1- Given an introduction to digital computer and their fundamental architectures & Data Representation.
CO2- Understand the concepts of BinaryLogics,Gates,andCombinational&Sequential Circuits.
CO3- Memory organization, hierarchy andorganization.AbletoawareofRAM,ROM, COST, SIZE, CACHE and virtual memory.Comprehend the need for improving cache perform.
CO4- UnderstandingtheprincipleofMicroprocessorandCPUorganization,DataTransfer modesandschemes.
CO5- Explain about Computer buses, input/ Output Peripherals and DMA

Unit-1	**Data Representation:** Number System: Binary, Octal, Hexadecimal, Conversions from onebase to another, Binary Arithmetic, Unsigned binary number, signed magnitude number,Fixed- point and Floating point representation of numbers, BCA Codes, ASCII code,EBCDIC,Unicode, excess– 3 codeand gray code,2's complementarithmetic.ard
Unit-2	**Binary Logic:** Boolean algebra, Boolean Theorems, Boolean Function and Truth Tables,Canonical and Standard forms of Boolean functions, Simplification of Boolean Functions,sopand POS form, Karnaugh Maps. Digital Logic gates: Basic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, OtherGates– XOR,XNOR, NAND, NOR,Multilevel NAND andNOR circuits. Combinational Circuits: Half-Adder, Subtract or, Encoders, Decoders, Multiplexers, De-Multiplexers, Sequential Circuits: Flip-flops- RS, D, JK, T & Master- Slave flip-flops,Registers,Counters.
Unit-3	**Memory :**Memory cells – SRAM and DRAM cells, primary memory- RAM, ROM, PROM,EPROM, PLA programmable logic array, Secondary memory and its types, InternalOrganization and levels of cache memory, Concept of virtual memory, memory accessingmethods:serial and random access. Hardwaresupportformemorymanagement.
Unit-4	Bus, word length, processing speed, microprocessor, General architecture of CPU, Instructionformat, Instruction set: datatransfer instructions, Data manipulation instructions, programcontrolinstructions. Von Neumann model. **Types of CPU organization:** Accumulator based, stack based and general based machine,Addressingmodes. Basicintroduction to CISC/ RISC

Unit-5	**Datatransfermodes:**Serial,Parallel,Ethernet, USB,Wi-Fi,Bluetooth; Data transfer scheme (1) programmed data transfer- Synchronous, Asynchronous andInterruptdrivendata transferscheme,(2)Directmemory accessdatatransfer.

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Class	:	BCA.
Year	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	Programming with C++ and Data Structures
Max. Marks	:	40
Course Code	:	BC- A12

Course out Comes

CO1- Understand importance of object oriented programming and difference between structured oriented and object oriented programming features. Develop an in-depth understanding of object oriented paradigm with principles of classes, object and functions.

CO2- Abletomakeuseofobjectsandclasses fordevelopingprograms.

CO3- Implementvariousobjectoriented conceptstosolvedifferentproblems.

CO4- Apply algorithms, flowcharts and applicationsofgraphsandtreestosimplify realtimeproblems.

CO5- Implementtheabstractdatatypes stack,queue,deuce,andlist.

Unit-1	Introduction Procedural Vs Object Oriented Programming, Classes, Object, Data, Abstraction, Encapsulation, Inheritance,Polymorphism,DynamicBinding,MessagePassing,ObjectOrientedLanguages,ObjectBasedlanguages. **BasicsofC++:**A Brief History ofC++, Application of C++, Compiling & Linking, Tokens, Keywords, Identifiers &Constants , BasicData Types, User-Defined Data Types, Symbolic Constant, Type Compatibility, Reference Variables, Operator in C++,Scope Resolution Operator, Member Dereferencing Operators, Memory Management Operators, Manipulators, Type CastOperator. **Functions In C++:** The Main Function, Function Prototyping, Call by Reference Call by Address, Call by Value,Return by Reference, Inline Function, Default Arguments, Constant Arguments, Function Overloading, Function withArray.
Unit-2	**Classes & Object:** A Sample C++ Program with class, Defining Member Functions, Making an Outside Function Inline,Nesting of Member Functions, Private Member Functions, Arrays within a Class, Memory Allocation for Objects, StaticData Members, Static Member, Functions, Array of Objects, Object as Function Arguments, Friend Functions, ReturningObjects,Constantmemberfunctions,PointertoMembers,LocalClasses.**Constructor& Destructor:**Constructor, Parameterized Constructor, Multiple Constructors in a Class, Constructors with Default Arguments, DynamicInitialization of Objects,CopyConstructor, Dynamic Constructor, Destructor.
Unit-3	**Inheritance:** Defining Derived Classes, Single Inheritance, Making a Private Member Inheritable, Multilevel Inheritance,Hierarchical Inheritance, Multiple Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructor inDerived Classes, Nesting of Classes. Operator Overloading & Type Conversion ,Polymorphism, Pointers, Pointers withArrays C++, Streams, C++ Stream Classes, Unformatted I/O Operation, Formatted I/O Operation, Managing Output withManipulators.

Unit-4	**Basic Idea of Data Structures:** Introduction to Data Structure, Classification, Operations on Data Structure, DynamicMemory Allocation. **Arrays**: Array Address Calculation, operations on array and its algorithms, Application of Arrays,Limitations, Sparse Matrix. **Stacks:** Introduction, Representation of Stack, Implementation, Applications of stack: Infix,Prefix, Postfix expressions, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of Postfix expression usingStack.**Recursion:**RecursiveDefinitionandProcesses,ExampleofRecursion,RecursionVs .Iteration.**Queues:**Introduction,Representationof Queue,Implementation, CircularQueue, Desuetude,andPriority Queue**.**
Unit-5	**LinkedLists**:LinearListConcept,LinkedListv/sArray,LinkedListTerminology,LinkedListDataStructure,Representation of Linked List in Memory, Types of Linked List: Simple, Circular, Doubly Linked List, Circular DoublyLinked List,Operations onLinkedList:Creation,Traversing,Searching,InsertNode (EmptyList, Beginning, Middle,End),Delete Node(First, GeneralCase)Count,SortList. **Introduction to Trees:** Tree Terminology, Binary Tree, Types of Binary Tree, Representation of Binary Tree, BinaryTreeTraversal (In order, Preorder, Post order), Binary Tree Creation, Expression Tree, Binary Search Tree ,Insertion and Deletionin BST, Graph Terminology. **Sorting & Searching Techniques:**Bubble Sort, Selection Sort, Binary search and SequentialSearch.

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Session – 2017-18 To 2020-21

Class	:	BCA.
Year	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	Computer based Numerical and Statistical Techniques
Max. Marks	:	40
Course Code	:	BC- A13

Course out Comes

CO1- Applynumericalmethodstofindour solution of algebraic equationsusingdifferent methods under different conditions, and numericalsolutionofsystemofalgebraic equations.

CO2- Applyvariousinterpolationmethods andfinitedifferenceconcepts.

CO3- Workoutnumericaldifferentiationand integrationwheneverandwhereverroutine methodsarenot applicable.

CO4- Worknumericallyontheordinary differentialequationsandpartialdifferential equationsusing differentmethodsthroughthe theoryof finitedifferences.

CO5- WorknumericallyontheCorrelation andRegressionusingdifferentmethods.

Unit-1	**Computer Arithmetic**: Floating Point representation of numbers and operations, normalization and their consequences,pitfallsincomputing,errorsin numbers. Solutionofalgebraicandtranscendentalequations:Introduction, Bisectionmethod,themethodoffalseposition (Regula Falsi),Newton-Rap sonmethod, secant method, theiralgorithms& comparative studyofallthemethods.
Unit-2	**Solutionofsimultaneouslinearalgebraicequations**: DirectMethod:Gausseliminationmethod,GaussJordanEliminationmethod.IterativeMethod: Gauss sidlemethod,pivoting,Ill-conditioned equations.NumericalIntegration:Generalquadrativeformulaforequidistantordinates,TrapezoidalRule,Simpson's1/3rule,Simpson's3/8 ruleandtheir algorithms.
Unit-3	Interpolation & Extrapolation: Introduction, Finite Differences: Forward differences, backward differences, Interpolation with evenly spaced points: Newton's forward difference interpolation formula, Newton's backward difference interpolation formula. Interpolation with unevenly spaced points: Lagrange's interpolation formula, Newton's divided difference interpolation formula.

Unit-4	**Numerical solution of ordinary differential equations**: Introduction, Euler's method and algorithm, Euler's modifiedmethod, Taylor's series, Picard's method, RungeKutta method of order 2 anditsalgorithm, Rungekutta method of order 4andits algorithm.
Unit-5	**Correlation &Regression** : Correlation, definition, Utility, Types of Correlation, Karl Pearson's coefficient of correlation,shortcut method, step deviation method, merits and limitations of Karl Pearson's coefficient of correlation, Rank correlationcoefficient, itsmerits and demerits. Regression: Definition, Utility, Linear Regression lines: Freehand curve method, method of least squares, line of regression,regressioncoefficientandits properties.

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Session – 2017-18 To 2020-21

Class	:	BCA.
Year	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	Operating system
Max. Marks	:	40
Course Code	:	BC- A14

Course out Comes

CO1- Describe & Discuss the basic concepts of operating systems.

CO2- Explain the mechanism of Process Management and Process Synchronization.

CO3- Explain Virtual memory concepts and file management methods.

CO4- Illustrate disk management and describe UNIX system organization and LINUX architecture.

CO5- Develop basic Shell scripts.

Unit-1	**Introduction:** Definitions, functions and types of operating system, System components, Operating system Structure,System Calls, SystemPrograms, Interrupts, Microkernel. **ProcessManagement:**ProcessConcepts,Processstates&ProcessControlBlock,ProcessScheduling:SchedulingCriteria, Scheduling Algorithms (Preemptive & Non- Preemptive) –FCFS, SJF, RR, Priority, Multiple-Processor, Real-Time,MultilevelFeedbackQueue Scheduling.
Unit-2	**ProcessSynchronization:**CriticalSectionProblem,Semaphores,ClassicalProblemsofSynchronizationandtheirSolutions,DeadlockCharacterizations,MethodforHandlingDeadlocks,DeadlockPrevention,DeadlockAvoidance,DeadlockDetection, Recovery fromDeadlock **Memory Management:** Introduction, Address Binding, Logical versus Physical Address Space, Swapping, Contiguous &Non-ContiguousAllocation,Fragmentation (Internal&External), Compaction,Paging, Segmentation
Unit-3	**VirtualMemory**:concept,DemandPaging,PerformanceofDemandPaging,PageReplacementAlgorithms. **File Management:** Concept of File System(File Attributes, Operations, Types), Functions of File System, Types of FileSystem,AccessMethods(Sequential,Direct&othermethods),DirectoryStructure(Single-Level,Two-Level,Tree-Structured,Acyclic-Graph,GeneralGraph),AllocationMethods(Contiguous, Linked,Indexed).
Unit-4	**Disk Management**: Disk Scheduling Algorithms (FCFS, SSTF, SCAN, C-SCAN, LOOK), Swap Space Management, DiskReliability,Recovery, Security: SecurityThreats, Protection,Trusted Systems,WindowsSecurity. **UNIX :**Introduction to UNIX, UNIX System Organization (the Kernel and the Shell), Files and Directories, LibraryFunctions and System Calls, Editors (vi and ed). Introduction to the Concept of Open Source Software, Linux, LinuxArchitecture, Linux File System (inode, Super block, Mounting and Un-mounting), Essential Linux Commands, Kernel,Process Managementin Linux,Signal Handling, System Call,SystemCall forFiles, ProcessesandSignals

Unit-5	**ShellProgramming:**TypesofShells,ShellMetaCharacters,ShellVariables,ShellScripts,ShellCommands,theEnvironment, Integer Arithmetic and String Manipulation, Special Command line Characters, Decision Making and LoopControl, Controlling Terminal Input, Trapping Signals, Arrays, I/O Redirection and Piping, Vi and Emacs Editors, ShellControl Statements, Find, Shell Meta- Characters, Shell Scripts, Shell Keywords, Shell Procedures and Reporting, HandlingDocuments,ChangingProcessPriority withNice,Scheduling ofProcessesatCommand,cron,Batch commands. **ProcessManagementandProcessSynchronization:**Commandlineargument,Backgroundprocesses,processsynchronization, Sharing of data, user-id, group-id, pipes, fifes, message queues, semaphores, shared variables, Coding,Compiling,Testing and Debugging.AWK programming–reportprinting withAWK. 1. Parata—AdvancedUnix–AProgrammer'sGuide,BPB. 2. MeetaGandhi, —TheCOdyssey Unix–The OpenBoundlessC, BPB.

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Class	:	BCA.
Year	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	Web technology and Application Development using .Net & C#
Max. Marks	:	40
Course Code	:	BC- A15

Course out Comes

CO1- Understand and know how to use descriptive languages likeHTMLand XML.Theywillalso know how to use web programming languages(JavaScript and C#) and be capable of construction lessdemandingwebapplication ontheirown.

CO2- Distinguishbetweenserver-sideand client-sidewebtechnologies.

CO3- Design and implement dynamic websites with good aesthetic sense of designingandlatest technicalknow-how's.

CO4- Apply the Concept of Stat Management in Creating Session and Cookies.

CO5- Develop Database Connection and Create Data Grid.

Unit-1	**HTML**-HTMLIntroduction, HTMLSyntax,Head&Body Sections,BasicHTMLTags,Inserting, formatting, &modifying text, Lists – ol, ul& dl. Inserting images, hyperlinks, internal links. Working with tables: table tags &attributes.Form Controls– textfield,text area,radiobutton, checkbox, dropdownlistbox, buttonetc.
Unit-2	**Cascading Style Sheet**– Introduction, merits, types, creating Divs with ID & Classes.CSS backgrounds, border, & boxmodel. **JavaScript**- Overview,JavaScript vs. Java, Comments, Variables, Alert box, Prompt & confirm. Expressions: Arithmeticoperators, Assignment operators, Logical operators, Expressions and precedence, Statements: If statement, For statement,Whilestatement, Break/Continue, Functions.
Unit-3	**ASP.Net**-Overview ofASP.NETframework, Installationof**VisualStudio**,ASP.NETStandardControls &**Codein C#**for – Labels,Textbox,Button,LinkButton,RadioButton,RadioButtonList,CheckBox,CheckBoxList,Calendarcontrol,Ad rotatorControl, Fileupload control.Runningawebapplication, creatingamulti-form web project.
Unit-4	**State management**: Client side- Cookies, query string, hidden fields. Server Side-View state, Session state, Applicationstate. **Form Validation**:Client side validation, server Side validation, Validation Controls: Required Field, Comparison, Range,RegularExpression validate, validationsummary andcustomvalidation.

Unit-5	**Database Connection**: SQL Server Database File, Configuring SQL Data Source Control, Connection Class,CommandClass,DataAdapterClass,Dataset Class. Displayingdataindatabound ControlsandData Grid.

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Class	:	BCA.
Year	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	RDBMS & ORACLE
Max. Marks	:	40
Course Code	:	BC- A16

Course out Comes

CO1- Understand,effectively&explainthe underlying concepts of database Technologies.

CO2- Designandimplementadatabase schemaforagivenproblem-domain.

CO3- Normalizeadatabaseandquerya database using SQL DML/DDL/DCL/TCL/DQL commands. Declare and enforce integrity constraintsonadatabase.

CO4- Formulate Solution of Data Management Problems using SQL.

CO5- Apply Joint on Tables and used TCL and DCL Commands.

Unit-1	**Introduction:** Evolution of DB and DBMS, need for Data Management, Introduction and Application of DBMS, FileSystem versus Database System. **Concepts of DBMS:** Data, Information, Database, Components of DBMS, Architecture ofa database system – Physical, Conceptual and User level, Data Independence – Logical and Physical, DBMS terminology,DataDictionary. Concepts of Multitier Architecture in databases, Brief idea about distributed databases, parallel databases, mobile databases,temporal databases, spatial databases, geographic databases, data warehousing, data mining, data visualization, OODB andXMLDatabases, Multimedia and Web Databases.
Unit-2	**DatabaseModels:**Network,HierarchicalandRelationalModels,FeaturesandComparisonofthe threemodels.. **RDBMS:** Introduction to Relational Database, Structure of Relational Database, Relational Model terminology- domains,Attributes, Tuples, Relations, Relational DB Schema, ER-Model, ER-Diagram, ER-concepts, and types of relationships.Cod's 12 rules. **Normalization**: Functional Dependency, definition, Trivial and Non-Trivial Functional Dependencies, Steps involved innormalization,1NF,2NF,3NF,DecompositionusingFunctionalDependencypreservation,BC NF,Multi-valuedDependency,4NF, Join Dependency, 5NF
Unit-3	IdeaaboutGeneralization,Aggregation,Specialization. **Indexing&Hashing:**BasicConcepts,Indexing:b+tree&B-treeindexfiles,Hashing:static&dynamichashing **.ElementaryConceptsof DatabaseSecurity:**Systemfailure, Backup and Recovery Techniques, Authorization andAuthentication. **Relational Algebra:** Formal Definition, Fundamental Operations – select, project, union, set, difference,Cartesianproduct&rename, additionaloperations& extended operations.

Unit-4	ConceptofSQLsublanguages–DDL, DML,DCL,TCL, SCLetc.,Embedded SQL. **Interactive SQL:** Oracle data types, table creation, modifying the structure of tables, dropping and renaming tables.**DMLcommands:**Insertion, updating, deletion operations, many faces of select command, data constraints, logical operators,rangesearching,patternmatching,oraclefunctions,useof Alias,groupingdatafromtables,manipulatingdatesinsql.
Unit-5	**Joins**: Equi Join, Self Join, Cross Join.Sub queries, Indexes, Views, Sequences, Roles, Synonyms.**TCL Commands:**use ofsavepoint,rollback,commitcommands.**DCLCommands**:creatinguseraccounts,grantingp ermissions,revokingpermissions.Conceptofimportingand exporting database files.

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Class	:	BCA.
Year	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	Software Engineering
Max. Marks	:	40
Course Code	:	BC- A17

Course out Comes

CO1- Describe theories, models, and techniques that provide a basis for the softwarelifecycle.

CO2- Use software metrics to estimate varioussoftwareprojectparameters.

CO3- Design,test,deployandmaintain Software.

CO4- Illustrate Software project management,Timemanagement,Costand Qualitymanagement.

CO5- Describe Project Human resource management,Configurationmanagementand useCASE tools.

Unit-1	**Introduction to Software Engineering:**Introduction to Software, Types of software, Software Components, SoftwareCharacteristics, Software Engineering , Scope and necessity of Software Engineering, Software Engineering Processes,Factors affecting Quality and Quantity of Software. Software Development Life Cycle (SDLC), **SoftwareModels:** WaterFallModel,PrototypeModel,RADModel,EvolutionaryDevelopmentModels(SpiralModel,IncrementalModelConcurrent DevelopmentModel) **Software Requirement Analysis:** Requirement Specifications: Need for SRS, Nature of SRS, Characteristics, Componentsof SRS. Requirements analysis: Review and Management of User Needs, Feasibility Study, Information Modeling, IEEEStandardsfor SRS, VariousSRS Templates, Validationof SRS.
Unit-2	**SoftwareMetricsandMeasurement:**SoftwareProcessandProjectMetrics,SoftwareMeasurement,CyclomaticComplexity Measures: Control Flow Graphs, Software Quality Matrices. **Software Project Planning:**Objectives, Scope,Software Cost Estimation: Decomposition Techniques: Software sizing , Problem Based Estimation, Line of Code(LOC) VsFunction Point (FP) Based Estimation, Process Based Estimation; Empirical Estimation Models: The COCOMO Model;Make/BuyDecision, Software RiskManagement. **SoftwareAnalysis:**AnalysisModel,ProcessandvariousDocuments.**ConventionalAnalysis:**DataModeling(ERDiagram), Functional Model & Information Flow (DFDs), Behavioral Modeling, Structured Analysis, Data Dictionary.**Object Oriented Analysis:**Domain Analysis, Object Oriented approach Process (Use Case), Object-Relational Model,Object-BehavioralModel.
Unit-3	**Software Design: Conventional Design:** Design Process, Principles & Concepts, and Design Model. **Object OrientedDesign:** Design Issues, Design Process: System Design, Object Design. **Software Design Document:**Software Design

	Document & its various example templates: Data Design, Architecture Design, and Interface Design & Procedural Design.**Coding:** Code Debugging**,**Verificationand Code Optimization. **Testing, Deployment & Maintenance:**Objectives, Types of Software Testing, Testing for Functionality and Performance,Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suite Preparation, Levels ofTesting:User,Integration,SystemAlphaandBetaTesting,UserAcceptanceofProducts,Rollout ofSoftware&Deployment Issues.Need for Maintenance, Categories of Maintenance: Corrective, Preventive, Adaptive and PerfectiveMaintenance,CostofMaintenance, SoftwareRe-Engineering, ReverseEngineering, Software Reuse.
Unit-4	**Introduction to Software Project Management (SPM):** Project stakeholders, Project management knowledge areas,Project management tools and techniques, Project success factors; The Role of the Project Manager: Job description, Skillsforprojectmanager,EthicsinProjectManagement,ProjectManagementSoftware.ProjectIntegrationManagement .ProjectExecution,MonitoringandControllingtheProject. **ProjectTimeManagement:**ImportanceofProjectSchedulesandTimeManagement,ActivityDefinition,ActivitySequencing, Activity Resource Estimation, Activity Duration Estimation, Schedule Development, Gantt Charts, CriticalPath Method (CPM), Program Evaluation and Review Technique (PERT) **Project Cost Management:** Importance andPrinciplesofProjectCostManagement,CostEstimation,Typesofcostestimates,Costestimationtoolsandtechniques,CostBudgeting,CostControl,**ProjectQualityManagement:**Importance ofProjectQualityManagement,Quality planning,Qualityassurance,Qualitycontrol,ToolsandTechniquesforQualityControl,Paretoanalysis,Statisticalsampling,Testing, ISOstandardsfor quality, CostofQuality.
Unit-5	**Project Human Resource Management:** Motivation theories, Maslow's hierarchy of needs, Improving effectiveness,Human Resource Planning, Project organizational charts, Responsibility assignment matrices, Management plans andresource histograms, Acquiring the Project Team, Resource assignment, Resource loading, Resource leveling, DevelopingtheProjectTeam,Managing the ProjectTeam. Software Configuration Management (SCM), Software Version Control. Software Quality Management**,** Software QualityAssurance (SQA), Software Reliability & Reliability Models, Clean Room Software Engineering Approach. **CASE Tools:**Overview of CASE Tools Framework, Features, Advantages and Limitations of CASE Tools, Awareness about SomeCommercial CASEToolsUse and Applications.

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Class	:	BCA.
Year	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	Organizational Behavior
Max. Marks	:	40
Course Code	:	BC- A18

Course out Comes

CO1- Toenablesstudentstolearnthebasics ofindividualbehaviorandgroupbehavior.

CO2- To make them understand the organizationaldynamicsandorganizational culture.
C03- To make them aware about Goal setting, Interpersonal Skills, Stress & Time Management, Leadership Qualities.
C04- To make them understand the concept and importance of Organizational Behavior in present scenario.
C05- Design and Organization Structure, Culture .

Unit-1	**FundamentalsofOB :**Definition, ScopeandimportanceofOB,Relationshipbetween OBwithotherdisciplines–Psychology, Sociology, Anthropology and Political science. Challenges and Opportunities for OB..Theoretical frameworkandmodels of OB (cognitive, behavioristand socialcognitive).
Unit-2	**IndividualDifferencesandBehavior:** Foundationsofindividualbehavior:BiographicalCharacteristics,Abilityandlearning. Attitudes, Values and Job Satisfaction. Attitude: Importance of attitude in an organization, Measuring Attitude,Componentsofattitude,Relationship between behavior andattitude. Importanceof ValuesandEthicalbehavior.Jobsatisfaction: Conceptandmeasurement.Concept of PersonalityandEmotions. TheBigFivepersonalitymodel,Significantpersonalitytraitssuitabletotheworkplace(personality&job–fittheory),Emotions,EmotionalIntelligence.DevelopingEmotionalIntelligenceattheworkplace. Perception:Meaningandconceptofperception,Factorsinfluencingperception,Motivation:Definition&Concept, Theories of Motivation (Maslow's Need Hierarchy & Herzberg's Two Factor model Theory). The ProcessTheories(Vroom'sexpectancyTheory&PorterLawlermodel).ContemporaryTheories-EquityTheoryofWorkMotivation.
Unit-3	**Group Behavior and Interpersonal Influence:** Foundation of Group Behavior: The Meaning of Group, Group behavior& Group Dynamics, Types of Groups, The Five –Stage Model of Group Development. Managing Teams: Work teams InOrganization,DevelopingWorkTeams,TeamEffectiveness&TeamBuilding,ManagingConflict and Negotiation-Conflicts in Organizations, A contemporary perspective on intergroup conflict,

	What causes intergroup conflict, The causesof dysfunctional intergroup conflict, Managing intergroup conflict through Resolution, Stimulating Constructive intergroupconflict,Negotiations-Negotiationtactics,Increasingnegotiation effectiveness.AssertiveBehavior-InterpersonalOrientations,Facilitatingsmooth relations, Stroking. **Job stress:** Concept of Stress, Stress model, Work stressors, Stress outcomes, Stress moderators, Stress prevention and management,Employeecounseling,Typesofcounseling.
Unit-4	**OrganizationSystemandProcesses:** **Communication** - The importance of communication, The communication process, Communicating within organizations,Information richness, How technology affects communication, Interpersonal communication, Multicultural communication,Barrierstoeffectivecommunication, ImprovingCommunicationinorganizations,Promotingethicalcommunications. **Decision Making** - Types of decisions, A Rational Decision-making Process, Alternatives to Rational Decision making,Behavioral influenceson decisionmaking,Groupdecisionmaking, Creativityingroupdecision making. **Leadership**-ConceptofLeadership,StylesofLeadership,TraitsApproach,ContingencyleadershipApproach,Contemporaryleadership,meaningandsignificanceofcontemporaryleadership,Contemporaryissuesinleadership,Contemporarytheoriesofleadership, Conceptof Transformationalleadership,Multiculturalleadership, Successstoriesoftoday'sGlobalandIndianleaders.
Unit-5	**Organizational Design, Change And Innovation:** Designing an organizational structure, Division of labor, Delegation ofauthority,Departmentalbiases, Spanofcontrol,Dimensionsofstructure,Organizationaldesignmodels, MultinationalStructureand Design, VirtualOrganizations. **Organizational Culture:** Meaning & Definition of Organizational Culture, Creating & Sustaining Organizational Culture.Types of Culture (Strong vs. Weak Culture, Soft vs. Hard Culture & formal vs. Informal Culture), Creating PositiveOrganizational Culture,ConceptofWorkplace Spirituality. Organizationalbehavioracrosscultures,Conditionsaffectingmultinationaloperations,ManagingInternationalWorkforce,Productivity and culturalcontingencies, Crosscultural communication. **Organizational Change:** Meaning, definition & Nature of Organizational Change, Types of organizational change, Forcesthat acts as stimulants of change, Implementing Organizational Change : How to overcome the Resistance to Change,Approaches to managing Organizational Change , Kurt Levin's- Three step model, Seven Stage model of Change &Kotter'sEightStepplanforImplementingChange, LeadingtheChangeProcess,FacilitatingChange,DealingwithIndividual & Group Resistance, Intervention Strategies for Facilitating Organization Change, Methods of ImplementingOrganizational Change, Developing a Learning organization, Organizational Development: Concept and Techniques of OD.Thefuture ofOrganizationalBehavior.

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Class	:	BCA.
Year	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	Computer Networking & Internet Security
Max. Marks	:	40
Course Code	:	BC- A22

Course out Comes

CO1- To make students well familiar withcomputerandnetworkingfundamentals.

CO2- To Build an understanding of thefundamentalconceptsofcomputernetworking.

CO3- Topreparestudentswithbasicnetworking concepts: datacommunication, protocols and standards, varioustopologies&applicationsof network.

CO4- Evaluate Deferent Cryptography technique such as RSA, MAC, SHA and HASH Functions.

C05- Illustrate Various level of Network Security.

Unit-1	Definition and concept of networking, transmission modes, transmission media, internetworking, connectingdevices Adapters, Routers, evolution of Network Technology, Standards and protocol, Introduction to Analogsignal, Digital signal, Modulation and Demodulation OSI Reference Model-Layered architecture, function of eachlayer,protocolused.
Unit-2	Switching-Message,PacketandCircuitSwitching,Multiplexing– FDM,TDM,WDM,SONET,Cellularnetwork, satellite network, IEEE 802 STANDARDS-CSMA/CD, TOKEN BUS, TOKEN RING, FDDI, Routingalgorithms – Distance Vector routing, Link state routing, TCP/IP – Overview, Architecture, function of each layerandprotocol, IP addressing,subnetand subnetmask, IP addressing-classes,IPV4,IPV6.
Unit-3	Bootstrapprotocol,DHCP,mobileIP,DNS,Telnet,SMTP,HTTP,SNMP,TFTP,ATMnetwork,ATMArchitecture, BISDN reference model, ATM applications, Data link control- Line discipline, Flow control, Errorcontrol, Conventional Encryption – Convention Encryption, Conventional Encryption Model, Steganography,Classical Encryption Techniques, Simplified DES, Block Cipher Design Principles, Block Cipher Modes ofOperation.
Unit-4	Cryptography, Public key encryption and hash functions- public key cryptography, principles of public keycryptosystems. The RSA algorithm, Message Authentication and Hash Functions Authentication Requirements,Authentication Function, Message Authentication

	Codes, MAC Algorithm, Hash Function algorithms, SecureHashAlgorithm(SHA-1, SHA-256, SHA-512), IPSecurity.
Unit-5	Network Security at various layers, Secure – HTTP, SSL, PSP, authentication Header, key distribution protocols,Digital Signature, Digital Certificates, Security protocol, Levels of security, Virus and Worms related threats,Maliciousprograms, Firewalldesign principles.Wi-Fi, Bluetooth, infrared.

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Class	:	BCA.
Year	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	Core JAVA
Max. Marks	:	40
Course Code	:	BC- A23

Course out Comes

CO1- Useanintegrateddevelopmentenvironment to write, object-oriented Java programs.
CO2- Use object-oriented concepts in JavaProgramming.
CO3- ExecuteprogramsusingInheritanceandMulti-Threadedprogramming.
CO4- Create Package for Reusability of code.
CO5- Design and develop basic Applets.

Unit-1	History and features of JAVA, C++Vs JAVA, how JAVA works, JAVA Program Structure, JavaVirtualMachineconcepts,JAVAplatformOverview,Primitivedatatypes,tokens.,variablesand constants, operators, precedence, expressions statements– branching, looping and jumping, labeledstatements.
Unit-2	Classes,objectsandmethods:definingaclass,addingvariablesandmethods,creatingobjects,constructors, Instances field and methods initialization by constructors, access methods Arrays, StringandString bufferclasses,Wrapper classes, using the JDKtools.
Unit-3	Inheritance, Super class, Subclass basic types using super keyword, abstract and final classes, Methodoverloading, Interface, Thread, Thread Life Cycle, Multithreading example, Synchronized threading,Prioritiesofthread.
Unit-4	Exceptionhanding:FundamentalExceptiontypes,uncaughtexceptions,throws,throw,try-catch,finally, built-inexceptions,creating your own exceptions.Packages,builtin Packages,creating yourownpackageInput /Output basicsstreams,byteand character streams.
Unit-5	Applet Programming:Local and Remote Applets, Applets Vs Application creating and executing JavaApplets, Inserting Applets in a web page, Java Security, Passing Parameters to Applets, Aligning theDisplay,HTML Tags &Applet Tag, GettingInput from theuser, Networking: Basics, Networking classes and interfaces, using Java.net package, TCP/IP and DatagramProgramming.

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Class	:	BCA.
Year	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	ManagementInformation Systems
Max. Marks	:	40
Course Code	:	BC- A24

Course out Comes

CO1- Developing and maintaining the information system.
CO2- An effective search of data from the system.
CO3- Implementation of data structures.
CO4- Understand the role of informationsystemsintoday'scompetitivebusinessenvironment.
CO5- Analyzetherelationshipbetweeninformationsystemsandorganizations.

Unit-1	**The System Concept:** Definition Characteristics of Systems, Elements of a System, Open and ClosedSystem, Formal and Informal Information Systems, Computer based Information Systems, Decisionsupportsystem, InterpersonalCommunication System, Physicalor Abstractsystems. System Analysis and Design Life Cycle: SDLC, Requirements Specifications, Feasibility Analysis FinalSpecification,Role ofSystem Analyst, Attributes of aSystemsAnalyst,
Unit-2	**Systems Analysis:** System Planning and Initial Investigation, Information gathering tools, Tools used inSystem Analysis, Data flow diagrams, case study for use of DFD, Leveling of DFDs, Logical andPhysicalDFDs,StructuredandUnstructuredDFDs,TypesofInterviewsandQuestionnaires,Data Dictionary,DecisionTrees andStructured English,Feasibility Study, Cost/BenefitAnalysis. **Systems Design:** Logical & Physical Design, Design methodologies, Structured Design, Input/ Outputand Forms Design: Input Design, Output Design Requirements of form Design, Screen design, graphicaluserinterfaces,interactiveI/Oonterminals,SpecificationorientedDesignvsProcedureorientedDesign,FileOrganization and DatabaseDesign.

Unit-3	**System Implementation:** System Testing and Validation, System Quality Assurance, Level of QualityAssurance,Implementationandsoftwaremaintenance,Hardwareandsoftwareselection,ProjectScheduling,SystemMaintenance,Maintenanceactivitiesandissues,Security,Disaster/RecoveryPlanning,Ethics codes and standards ofbehaviorin systemdevelopment. **Management InformationSystems:**NeedPurpose andObjectives- Contemporary, ApproachestoMIS, Information as strategic resource – Use of Information for competitive advantage- MIS as aninstrumentforthe organizational change.
Unit-4	**Management and decision making** – Models of Decision Making - Classical, Administrative andHerbert Simon's Models – Attributes of information and its relevance to Decision Making, Types ofinformation. **Information Technology** – Definition, IT Capabilities and their Organizational impact, IT enabledservices such as Call Centers, Geographical Information System etc., Data Base Management Systems-Data Warehousing and Data Mining, Information Security and Control – Quality Assurance- Ethical andSocial Dimensions – Intellectual Property Rights as related to IT Services / IT Products – ManagingGlobalInformation Systems.
Unit-5	**DecisionSupportSystem**– ImportanceofDecisionSupportSystem,CharacteristicsofDecisionSupportSystem,Computerized DecisionSupport-DecisionMaking,IntroductionandDefinitions,Models, Phases of the Decision Making Process: the Intelligence Phase, Design Phase, ImplementationPhase, Executive Information Systems - Executive Support Systems, Expert Systems and KnowledgeBasedExpert Systems– ArtificialIntelligence. Performance Evaluation and Monitoring, Model Building, Simulation, Quality Control and QualityAssurance.

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Class	:	BCA.
Year	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	E-Governance
Max. Marks	:	40
Course Code	:	BC- A26

Course out Comes

CO1- Need for change in current service delivery model and role of e-Governance.
CO2- Gain a familiarity with the basic concepts, terminology and technology of e-commerce/e-government.
CO3- Understand the various stages of e- governance and various models of e- governance.
CO4- Understand the major federal and state laws and regulations impacting the evolution of e-government.
CO5- Analyses the issuesandchallenges.

Unit-1	**Introduction to E-Governance:** Needs of E-Governance, Issue in E-Governance application and theDigital Divide: Evolution of E-Governance, Its scope and content, Present global trends of growth inE-Governance,Otherissues. **ModelsofE-Governance:**IntroductionModelofDigitalGovernance,Broadcasting/WilderDissemination Model, Critical Flow Model, Comparative Analysis Model, Mobilization and LobbyingModel, Interactive service Model/Government-to-Citizen-to-Government Model, (G2C2G), Evolution inE-Governance and Maturity Models : Five Maturity Levels, Characteristics of Maturity Levels , Keyareas,GoodGovernancethrough E-GovernanceModels.
Unit-2	**E-GovernanceInfrastructureandStrategies:**E-readiness:DigitalSystemInfrastructure,LegalInfrastructuralPreparedness,InstitutionalInfrastructural Preparedness,HumanInfrastructuralPreparedness,TechnologicalInfrastructuralPreparedness,andEvolutionaryStagesinE-Governance. **Data Warehousing and Data Mining in Government:** Introduction National Data Warehouse. CensusData,PricesofEssentialCommodities,OtherareasforDataWarehousingandDataMining,Agriculture,RuralDevelopment, HealthPlanning, Education,Commerce and Trade,Other Sectors.
Unit-3	**Center Security:** Information System Threats and attacks, Classification of Threats and

	AssessingDamages,SecurityinMobileandWirelessComputing–SecurityChallengesinMobileDevices,Authentication Service Security, Security Implication for organizations,Laptops Security FrameworkforInformationSecurity,ISO27001,SEE-CMM,SecurityMetrics,InformationSecurityVsPrivacy.Basic Principles of Information Security, Confidentiality, Integrity, Availability and other terms inInformationSecurity,Information Classification and their Roles, Security Threatsto E-Commerce,Virtual Organization, Business Transactions on Web, E-Governance and EDI, Concepts in Electronicspaymentsystem, E-Cash,Credit/Debit cards.
Unit-4	**Virtual Private Networks:** Need use to Tunneling with VPN, Authentication Mechanisms, Types ofVPN'sand theirUsage,Security Concerns in VPN. **IT Act & Cyber Laws:** Cyber Crime and Cyber Laws, Types of Cyber Crimes, Cyber Law Issues in E-Business Management, Overview of Indian IT act, Information Technology act 2000, InternationalScenario in Cyber Laws: Data Protection Laws in EU and USA, Ethical Issues in Intellectual propertyrights, Copy Right, Patents, Data privacy and protection, Domain name, Software privacy, Plagiarism,Issuesin ethical hacking.
Unit-5	**Case studies:** Indian Context: Cyber Laws, Implementation in the Land Reform, Human ResourceManagement Software: India, NICNET, Collectorate, Computer aided Administration of RegistrationDepartment (CARD), Smart Nagarpalika, National Reservoir Level and Capacity Monitoring System,ComputerizationinAndhraPradesh,EkalSevaKendra,SachivalayaVahini,Bhoomi,IT inJudiciary, E-Khazana,DFGT,PRAJA,E-Seva,E-Panchayat,GeneralInformationServicesofNationalInformatics Center, E-Governance initiative in USA, E-Governance in China, E-Governance in BrazilandSri Lanka.

PRINCIPAL
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SANT HIRDARAM NAGAR
BHOPAL-462030

Sadhu Vaswani Autonomous College
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2018-19 To 2020-21

Class	:	BCA.
Year	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	Principle and Practices of Management
Max. Marks	:	40
Course Code	:	BC- A27

Course out Comes

CO1- Learnerswouldbeabletodevelop"team–work"attitudeandidentifythekeycompetencies required to be an effectivemanager.
CO2- Assume the role and responsibilities associated with managerial function.
CO3- Compare various approaches in management for problem solving.
CO4- To help the students gain understanding of the functions and responsibilities of managers.
CO5- Discursive the process involved cadet ting and staffing.

Unit-1	**Introduction to Management Concept:** Definition and Characteristics, Management asanArt orSciences,ObjectiveofBusinessManagement,Manager,RolesandResponsibilities,ManagementTheoriesand Practices, Corefunctions of Management.
Unit-2	**Planning:** Introduction (Concept, Definition and Characteristics), Types of Planning, Significance ofplanning, Planning Vs forecasting, Planning Principles, Planning Process, Factors responsible for failureManagementby objectives.
Unit-3	**Organizing:**Introduction(Concept,DefinitionandCharacteristics),OrganizingProcess anditsimportance, Span of Management, Organizing Principles, Line and Staff relationship(s), Delegation ofAuthority,Departmentation, Centralization and Decentralization.
Unit-4	**Directing:** Introduction, Components of Directing, Principles of Directing, Directing styles: Tools forDirecting,Leadership style andImportance. **Controlling:** Introduction, Control process, Types of control, Controlling Principles and Techniques:Resistanceto control-effectsand ways toovercome resistance, Controlling byException.
Unit-5	**Coordinating:**Introduction,Elementsofcoordination,PrinciplesofcoordinationandApproachesofcoordination. **Staffing:**Introduction,Rolesandresponsibilityofstaffing,Staffingprocess,Factorsaffectingstaffingprocess.

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Sadhu Vaswani Autonomous College
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2018-19 To 2020-21

Class	:	BCA.
Year	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	Project : Application Development using PHP & MySQL
Max. Marks	:	40
Course Code	:	IN-BC- A30

Course out Comes

CO1- Design and develop websites usingfundamental web languages, technologies,andtools.
CO2- Understandvariouswebtechnologyandapplicationdevelopmentissuesandtrends.
CO3- Conduct independent research on asubjectrelatedtothecoursematerial.
CO4- C05.Understandthepracticesandproceduresbeingfollowedintheindustriesandprovidean opportunityto
workonsome live projects in the industry.
CO5- Applytheacquiredknowledgeand skillsinsolvingliveproblemsintheComputerand I.T.industry.

Recommendation:TheTechnologytobeusedfor ProjectDevelopmenttoberevisedevery2yearsasperthe prevailing trends andneed of theindustry/market.

GuidelinesforProject DevelopmentinBCAFinalYear.

- Internal Evaluation (CCE) will be based on Viva on Project synopsis (i) System Study andSystem Design, (ii) Presentation) submitted bythestudent– 10 marks.
- **External Evaluation will be based on, Viva and demonstration of the work done in theProject– 40 Marks.**

1. Project will consist of software development taken up in a group consisting of not more than 2students.
2. Reportwillbesubmitted jointlybythe groupinonecopy.
3. Projectcanbedoneeitheron-the-jobtraininginaSoftwareDevelopmentOrganization/Company or it can be a self-effort as a suitable solution to a real world problemidentifiedin consultation with guideteacher.

GUIDELINESFORPROJECTFORMULATION

***TYPEOFPROJECT**

It is suggested that theProject to be chosen should have some direct relevance to the realworld.Students are expected to work out a solution for real life problems in evolving diverse applicationdomainsinsomeIndustry/DevelopmentLaboratories/EducationalInstitutions/SoftwareCompanies;However, it is not mandatory for a student to work on a live Project. The student can formulate orinnovateProject problemwith thehelp of his/herGuide.

The Project work will give an opportunity to the students to develop quality software solution. ProjectdevelopmentshouldinvolveallthestagesoftheSoftwareDevelopmentLifeCycle(SDLC)likeRequirements Analysis, Systems Design, Software Development/Coding, Testing and documentationwith an overall emphasis on the development of reliable Software Systems. The primary emphasis of theProjectworkistounderstandandgaintheknowledgeofthePrinciplesofSoftwareengineeringpractices,and develop good understanding of SDLC.

Project Ethics to be adhered to: Plagiarism to be avoided: The Project should be genuine and original innatureandshouldnotbecopiedfromanywhere,StudentsshouldbeencouragedtoworkinthesuggestedareasS listed at theend ofthe guidelines.

*CalendarforTheProject

S.No.	Topic	Date
1.	Assigningof teacher Guide	Before25July
2.	Topicfinalized	Before20August
3.	SubmissionoftheProjectabstractandsynopsis(CCE 1)	Before20September
4.	PPTpresentation(CCE2)	Before20December
5.	FirstproofoftheProjectreporttobecheckedbyteacherGuide	Before20 February
6.	Final Submission and Viva / Demonstration byExternalexaminer	2nd WeekofMarch

PROJECTProposal (Synopsis)

The Project proposal should be prepared in consultation with the mentor in organization/ TeacherGuide. The Project proposal should clearly state the Project objectives and the environment of theproposedProjecttobeundertaken.TheProjectproposalshouldcontaincompletedetailsinthefollowingform.

1. TitleoftheProject
2. IntroductionandobjectiveoftheProject.
3. Relevanceof thetopicfor thebenefit of thesociety.
4. Analysis: (DFDs at least up to second level, ER Diagrams/ Class diagrams/ Database Design etc.asper theProjectrequirements.)
5. Design:Acompletestructurewhichincludes:Numberofmodulesandpurposeofeachmoduleto provide and estimation of the student's effort on the Project. Data structures as per the Projectrequirementsfor all themodules.
6. Testingprocesstobeused.
7. Reportsgeneration(Mentiontentativecontentofreport)
8. Tools/Platform,HardwareandSoftwareRequirementspecifications.
9. Are you doing this Project for any Industry/Client? Mention Yes/No. If Yes, Mention the nameandaddress of the Industry orClient.
10. Futurescopeandfurther enhancementofthe Project.

Incomplete Project proposals in any respect should be given another chance and resubmitted afterincorporating changes and suggestions given by the Guide. CCE marks to be given based onsynopsis viva.

***PROJECTREPORTFORMULATION:**

I. TheProjectreportmustcontainthefollowingin detail:

1. CertificatefromtheorganizationwhereProject hasbeenundertaken.
2. Certificateoforiginality(Formatgiven).
3. Declaration(Formatgiven).
4. Acknowledgement(Formatgiven).
5. Introduction
6. Objectives
7. Tools/Environmentused
8. Analysis Document (This should include SRS in proper structure based on SoftwareEngineering

concepts, E-R Diagrams/Class Diagrams/any related Diagrams (if the former arenot applicable), Data flow Diagrams/other similar Diagrams (if the former is not applicable),Datadictionary)

9. Designdocument(Modularizationdetails.Data Integrity&ConstraintsincludingDatabaseDesign,Procedural Design, UserInterfaceDesign)
10. ProgramDescription(Detailedspecificationinsteadofcode),Comments&Description)
11. Testing (Test case designs are to be included separately for Unit testing, Integration testing,System testing, Reports of the outcome of unit testing, integration testing, system testing areto be included separately, also details of debugging and code improvement are to beincluded.)
12. Inputand OutputScreens.
13. Implementation of Security for the Software developed (In case, you have set up a User Nameand Password for your software, you should ensure the security of User Name and Passwordduringtransmission to server)
14. Limitation,futurescopeforimprovement/enhancementoftheProject.
15. ApplicationoftheProjectmentioningbenefitto therealworld.
16. Bibliography/References
17. Synopsis

II. TheProjectReportmaynot bemorethan80 1.5mm spacedA-4sizetypedpages.

III. Executable file of the Project must be submitted in soft copy attached at the back of theProjectreport.

IV. The Project Report should be hard bound: should consist of a contents page; all pages ofreportshouldbenumbered:contentshouldbewellorganizedinameaningfulmanner:Printoutsoftext &screen layoutsshould beoriginaland should not beXeroxed)

ImportantpointsForPreparation&SubmissionoftheProjectReport

1. The Project Report should be submitted in A-4 size typed in 1.5mm line space, justified, (FonttimesNew Roman,size normal 12, Heading 16 and Subheading14)
2. The length of the Report should be between 50 to 80 pages including the cover page, summary,tableof contents,list of figures, list oftables, andacknowledgement.
3. Ensure that Project synopsis and the final report contain the signatures of both the Guide and

thestudentalong with date.

4. If any Project Report is received in absence of the items listed above, it will be rejected andreturned to students for compliance, Also, violation ofProjectGuidelines may lead to rejectionoftheProject.
5. Spiral bound photocopy of the Project Report is to be submitted to the College, Original copy ofthe same Project Report is to retained with the student and the student is supposed to carry hiscopywhile appearing forviva voce.
6. If the title and content of the Project differs from the title mentioned in the Project Proposal, theProjectReportshould be rejectedby theexternalexaminer andvaluationto bedoneaccordingly.

SUGGESTEDLISTOFTOPICSFORAPPLICATIONDEVELOPMENT

A sample list of topics for Project development is provided below. This is just a suggested list andstudents are free to choose any other innovative Project relevant to computer applications**which can bedevelopedusing PHP/MySQL.**

- CustomerTargetedE-Commerce
- AutomatedFacultyEvaluationSystem
- OnlineHealthShopping PortalWithProductRecommendation
- CollegeForums with AlumniWith Content Filtering
- SQLInjectionPrevention System
- CollegeSocialNetwork Project
- ERP System
- OnlineBookRecommendationUsingCollaborativeFiltering
- MonitoringSuspiciousDiscussions onOnlineForums
- FakeProductReviewMonitoring&Removal forGenuineRatings
- ACommoditySearch systemforOnlineShopping usingWeb Mining
- SecureOnline AuctionSystem
- Farmingassistancewebservice
- OnlineLoanApplication&VerificationSystem
- MatrimonialPortal
- OnlineHerbsShoppingProject
- OnlineBakery shop System
- CourseMaterial Distribution System
- OnlineFurnitureShop Project

- HotelRoomComparisonSystem Project
- SalonManagementProject
- SportsClubManagementProject
- OnlineBloodBankProject
- StationeryManagementSystem
- OnlineApplicationfor theTraining andPlacement
- OnlineLeaveManagementSystem
- Airlinereservationsystem
- RecipeManagementSystem
- ComplaintManagementSystem
- WebBasedMeetingScheduler
- StudentProjectAllocationandManagement
- TicketReservationSystem
- ContentManagementSystem
- CallCenterManagement
- OnlineOn-Request Courses Coordination System
- CivilRegistry
- OnlineCareerGuidance andPlacementUnit
- Adagency

Formatsofcertificatestobeincluded

A. Coverpage:

PROJECT

REPORTON

<ProjectTitle>

SUBMITTEDTO

Sadhu Vaswani (Autonomous), College,
BhopalAffiliatedbyBarkatullahUniversity
Bhopal

<Logoof College>

INPARTIALFULFILLMENTOFTHEDEGREEOF

Bachelor of Computer
ApplicationsSession< >

By

Name:……

RollNo.:……..

EnrollmentNo.:……

Under theGuidanceof

<NameofInternal Guide> <NameofExternalGuide>

<Designation> <Designation>

B. Certificatefromtheorganization:(tobeissuedbytheorganizationandthephotocopyofthecertificateis to beattached inthe report)

C. Formatforacknowledgement

ACKNOWLEDGEMENT

Iconveymysinceregratitudeto ..... forgivingmetheopportunityto preparemyProjectworkin……..Iexpressmysincerethankstoallthestaffmembers of……...

Iamthankfulto ..... forher/hisguidanceduringmyProjectworkandsparking her/hisvaluabletimeforthesame.

Iexpressmysincereobligationandthankstothe Principalandallfacultiesofthedepartmentof ……,forprovidingmewithguidance,help,motivationandvaluableadviceatev erystagefor completingtheProject work successfully.

Signature:

Name:

EnrollNo.:

D. FormatforDeclaration

DECLARATION

Idohereby declarethattheProjectworkentitled“.....”submittedbymefor

the partial fulfillment of the requirement for the award of Bachelor of Computer Application, is anauthentic work completed by me. The report being submitted has not been submitted earlier for theawardof any degreeor diploma to any oruniversity.

Date:

Signature:

Name:

EnrollNo.:

E. CertificateofOriginality

CertificateofOriginality

This is to certify that the Project report entitled ……..……..submitted toSadhu Vaswani Autonomous College, Bhopal, in partial fulfillment of the requirement for the award of thedegreeofBachelorofComputerApplication,isanoriginalworkcarriedoutbyMr./Ms. ……EnrollmentNo.:……...RollNo.:…….

The matter embodied in this Project is a genuine work done by the student and has notbeen submitted whether to this university or to any other University/ Institute for the fulfillment of therequirementofany courseof study.

Signatureof theGuide

Name,Designation &Address of theGuide

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SADHU VASWANI AUTONOMOUS COLLEGE

Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Hindi
Session 2016-17 To 2020-21

Class	:	M.A
Subject	:	हिन्दीसाहित्य
Semester	:	I
Paper	:	I
Title of Paper	:	प्राचीन एवं मध्यकालीनकाव्य तथाउसकाइतिहास
Max. Marks	:	85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code	:	HIN-2001

पाठ्यक्रम के परिणाम

CO1- भारत के प्राचीन एवं मध्यकालीनकाव्य की समृध्द साहित्यिकपंरम्परा का ज्ञानकरवाना।

CO2- विभिन्नकाव्य धाराओं एवंकवियों का अध्ययन।

CO3- सामाजिकउत्थानमें मध्यकालीनकाव्य की भूमिका का ज्ञान

CO4- हिन्दी की विभिन्नबोलियोंजैसे सधुक्कड़ी, अवधी, ब्रजआदि का अध्ययन

CO5- सहजसरलभाषामें अध्यात्म, दर्शन, नीति, सामाजिकव्यवहार एवंमानवीय प्रवृत्तीयों के अक्षय भण्डार का विंहगम अध्ययन।

Unit-1	व्याख्यांश 1. विद्यापति– 20 पद (विद्यापति, जयभारतीप्रकाशन, इलाहाबाद) पद क्रमांक–1,4,5,7,8,11,12,14,15,16,20,22,23,26,27,28,31,35,36,39 2. कबीर–कबीरग्रंथावली– डॉ0 श्यामसुंदरदास गुरूदेवको अंग (साखीक्रमांक 1 से 10), सुमिरणको अंग (साखी क्रमांक 1 से 10), विरहको अंग (साखीक्रमांक 1 से 10), ज्ञान– विरहको अंग (साखीक्रमांक 1 से 10), परचाको अंग (साखीक्रमांक 1 से 10) 3. जायसी–पदमावत, संपादक–आचार्यरामचंद्र शुक्ल पद क्रमांक :–1,11,16,21,24,50,60,65,69,70, (दस पद) (मानसरोदक खण्ड एवंनागमतीवियोग खण्ड)
Unit-2	विद्यापति, कबीरऔरजायासी से संबंधितआलोचनात्मकप्रश्न ।
Unit-3	प्राचीनकाल एवं मध्यकालीनकाव्य (निर्गुणधारा) का इतिहासप्रमुख प्रवृत्तियॉ एवंरचनाकारों से संबंधितप्रश्न ।
Unit-4	द्रुतपाठ के कवि–चन्दबरदाई, अमीर खुसरो, रैदास, नामदेव से संबंधित लघुउत्तरीय प्रश्न ।
Unit-5	वस्तुनिष्ठप्रश्न (संपूर्ण पाठ्यक्रम से)

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Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Hindi
Session 2016-17 To 2020-21

Class : M.A
Subject : हिन्दीसाहित्य
Semester : I
Paper : II
Title of Paper : आधुनिकहिन्दी गद्य औरउसकाइतिहास
Max. Marks : 85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code : HIN-2002

पाठ्यक्रम के परिणाम

CO1- गद्य की विभिन्नविधाओं का अध्ययन

CO2- सृजनात्मकभाषा, विचारात्मक एवंभावात्मकअभिव्यक्ति क्षमता का विकास

CO3- स्कंदगुप्त एवंआषाढ़ का एक दिननाटकों के अध्ययन के आधार से नाटक के तत्वों व रंगमंच के इतिहास का परिचय

CO4- प्रेमचंद की कालजयीरचनागोदान के अध्ययन के माध्यम से उपन्यास के तत्वों एवंग्रामीण जीवन का परिचय।

CO5- द्रुतपाठ द्वाराविभिन्नगद्यकारों के व्यक्तित्व एवंकृतिव का परचिय।

व्याख्यांश :

निम्नलिखितरचनाओं से व्याख्यांशपूछेजाऐंगें ।

स्कंदगुप्त– जयशंकरप्रसाद, आधे–अधूरे–मोहनराकेश, गोदान –प्रेमचन्द्र

Unit 1	हिन्दीनाटक की विकास यात्रा एवंउसकीविविध प्रवृत्तियॉ
Unit 2	स्कंदगुप्त एवंआधे–अधूरे से समीक्षात्मकप्रश्न
Unit 3	हिन्दीउपन्यास की विकास यात्रा एवंउपन्यास की विविध प्रवृत्तियॉ
Unit 4	गोदान से समीक्षात्मकप्रश्न
Unit 5	लधुउत्तरीय प्रश्न–द्रुतपाठमें निर्धारितगद्यकारों से सम्बध्य दो लधुउत्तरीय प्रश्नहोंगे । (1) नाटककार–भारतेन्दुहरीशचन्द्र, डॉ0 रामकुमारवर्मा, जगदीशचन्द्रमाथुर, धर्मवीरभारती, लक्ष्मीनारायण लाल (2) उपन्यासकार–जैनेन्द्र, अमृतलालनागर, निर्मलवर्मा, भीष्म शाहनीमुन्नूभण्डारी ।

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Session 2016-17 To 2020-21

Class	:	M.A
Subject	:	हिन्दीसाहित्य
Semester	:	I
Paper	:	III
Title of Paper	:	भारतीय एवंपाश्चात्य काव्यशास्त्र
Max. Marks	:	85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code	:	HIN-2003

पाठ्यक्रम के परिणाम

CO1- संस्कृत से हिन्दीतकनिरंतप्रवाहमानभाररीय काव्य शास्त्र की परंपरा से विद्यार्थियोंकोअवगतकराना।

CO2- काव्य रचना से रसअलंकार, रीतिवक्रोक्ति, ध्वनि, औचित्य, सिध्दांतों के महत्व से परिचितकरवाना।

CO3- ध्वनिसिद्धांतकी पंरपरा से विद्यार्थियोंकोअवगतकराना।

CO4- हिन्दीकवि–आचार्यो का काव्य शास्त्रीय चिंतनसे विद्यार्थियोंकोअवगतकराना।

CO5- आलोचनात्मकप्रवृत्ति का विकासजिसमेंविद्यार्थियोंमेंकिसीभीरचना के सर्वागींण अध्ययन की क्षमताविकसितहोसकें।

Unit-1	संस्कृतकाव्य शास्त्र : काव्य –लक्ष्मण, काव्य –हेतुकाव्य –प्रयोजनकाव्य के प्रकार । रस–सिद्धांत : रस का स्वरूप, रस–निष्पत्ति, रस के अंग, साधारणीकरण, सहृदय की अवधारणा। अंलकारसिद्धांत : मूलस्थापनाएं, अलंकारों का वर्गीकरण।
Unit-2	रीति–सिद्धांत : रीति की अवधारण, काव्य–गुण, रीति एवं शैली, रीतिसिद्धांत की प्रमुख थापनाएँ। वक्रोक्तिसिद्धांत : वक्रोक्ति की अवधारणा, वक्रोक्ति के भेद, वक्रोक्ति एवंअभिव्यंजनावाद।
Unit-3	ध्वनिसिद्धांत : ध्वनि का स्वरूप, ध्वनि–सिद्धांत की प्रमुख स्थापनाएँ, ध्वनिकाव्य के प्रमुख भेद, गुणीभूत–व्यंग्य, चित्रकाव्य। औचित्य सिद्धांत : प्रमुख स्थापनाएं, औचित्य के भेद।
Unit-4	हिन्दीकवि–आचार्यो का काव्य शास्त्रीय चिंतन : लक्षण–काव्य परंपरा एवंकवि–शिक्षा
Unit-5	हिन्दीआलोचना की प्रमुख प्रवृत्तियॉ : शास्त्रीय व्यक्तिवादी/सौष्ठववादी, ऐतिहासिक, तुलनात्मक, मनोविश्लेषणवादी, सौंदर्यशास्त्रीय शैलीवैज्ञानिकऔरसमाजशास्त्रीय

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Class	:	M.A
Subject	:	हिन्दीसाहित्य
Semester	:	I
Paper	:	IV
Title of Paper	:	प्रयोजनमूलकहिन्दी
Max. Marks	:	85मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code	:	HIN-2004

पाठ्यक्रम के परिणाम

CO1- कामकाजीहिन्दी के विभिन्न रूपों का ज्ञान

CO2- कार्यालयीनहिन्दी के प्रकार्यो का अभ्यास

CO3- परिभाषिक शब्दावली के महत्व एवंप्रयोग का ज्ञान

CO4- हिन्दीकम्प्यूटिंग का अध्ययन एवंअभ्यास

CO5- हिन्दीपत्रकारिता के विभिन्नस्वरूपों का अध्ययन एवंअभ्यास।

Unit1-	कामकाजीहिन्दी– 1 हिन्दी के विभिन्न रूप–सर्जनात्मकभाषा, संचारभाषा, राष्ट्र भाषा, राजभाषा, माध्यम भाषा, मातृभाषा । 2 कार्यालयीनहिन्दी, राज भाषा के प्रमुख प्रकार्य । प्रारूपण, पत्र–लेखन संक्षेपण, पल्लवन, टिप्पणी
Unit2-	पारिभाषिक शब्दावली–स्वरूप एवंमहत्व, पारिभाषिक शब्दावली के उदहरण एवंउनका व्यावहारिकप्रयोग ।
Unit3-	हिन्दीकम्प्यूटिंग– 1. कम्प्यूटर :परिचय, रूपरेखा, उपयोगतथावेबपब्लिशिंग का परिचय । 2. इंटरनेट, संपर्कउपकरणों का परिचय, प्राथमिक रख–रखाव एवंइंटरनेट समय मितव्ययिता के सूत्र । 3. वेबपब्लिकेशन । 4. इंटरनेट एक्सप्लोररअथवानेटस्केप । 5. लिंक, ब्राउजिंगपोर्टल, ई0 मेलभेजना / प्राप्तकरना, हिन्दी के प्रमुख इंटरनेटप्वाइंट, डाउनलोडिंग एवंअपलोडिंग के साफ्टवेयर, पैकेज ।
Unit4-	पत्रकारिताअवधारणा, स्वरूप एवंविभिन्नप्रकार । 2. हिन्दीपत्रकारिता का संक्षिप्तइतिहास । 3. समाचारलेखन–कला । 4. संपादन के आधारभूततत्व । 5. व्यावहारिकप्रूफ शोधन ।

Unit5-	पत्रकारिता : शीर्षक की संरचना, लीड, इण्ट्रो का शीर्षकसंपादन 2. संपादकीय लेखन 3. पृष्ठ सज्जा 4. साक्षात्कारपत्रकारवार्ता एवंप्रेसप्रबंधन 5. प्रमुख प्रेसकानून एवंआचार–संहिता

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Title of Paper	:	प्राचीन एवं मध्यकालीनकाव्य तथाउसकाइतिहास
Max. Marks	:	85मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code	:	HIN-2005

पाठ्यक्रम के परिणाम

CO1- प्राचीन एवं मध्यकालीनहिन्दीकवितामेंब्रजतथाअवधीभाषा के प्रमुख कवियों की कविताओं का आस्वादन।
CO2- कविता के भावात्मक एवंकलात्मकसौन्दर्य का ज्ञान।
CO3- भक्तिकाल एवंरीतिकालीन युग के विभिन्नकाव्य प्रवृत्तियों का ज्ञान।
CO**4-** मुख्य उपबोलियोंमेंरचितहिन्दीकविता के भावात्मक एवंकलात्मकसौन्दर्य का ज्ञानविद्यार्थियोंकोकराना।
CO5- हिन्दीभाषा के विकासक्रम के प्रतिविद्यार्थियोंकोसजगतथासचेतकरना।

इकाई–1	व्याख्यांश : सूरदास : भ्रमरगीतसार–संपादकरामचंद्र शुक्ल, पद क्रमांक 51 से 100। तुलसीदास : रामचरितमानस–अयोध्या काण्ड, दोहा, क्रमांक 51 से 100। बिहारी : बिहारीरत्नाकर–संपादकजगन्नाथदासरत्नाकर, दोहाक्रमांक 1 से 50।
इकाई–2	भक्तिकाल की संत काव्य परम्परा से प्रश्न।
इकाई–3	सूरदास, तुलसीदास से संबंधितनिबंधात्मकप्रश्न।
इकाई–4	रीतिकाल का इतिहास, प्रवृत्तियां, विशेषताएं एवंबिहारीपरनिबंधात्मकप्रश्न।
इकाई–5	दुतपाठ से कवि–नन्ददास, मीराबाई, घनानंदपाद्माकरऔरकेशव से संबंधितलघुउत्तरीय प्रश्न।

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Paper	:	II
Title of Paper	:	आधुनिकहिन्दी गद्य औरउसकाइतिहास
Max. Marks	:	85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code	:	HIN-2006

पाठ्यक्रम के परिणाम

CO1- गद्य की विभिन्नविधाओं का अध्ययन

CO2- सृजनात्मकभाषा, विचारात्मक एवंभावात्मकअभिव्यक्ति क्षमता का विकास

CO3- स्कंदगुप्त एवंआषाढ़ का एक दिननाटकों के अध्ययन के आधार से नाटक के तत्वों व रंगमंच के इतिहास का परिचय

CO-4 प्रेमचंद की कालजयीरचनागोदान के अध्ययन के माध्यम से उपन्यास के तत्वों एवंग्रामीण जीवन का परिचय।

CO5- द्रुतपाठ द्वाराविभिन्नगद्यकारों के व्यक्तित्व एवंकृतिव का परचिय।

Unit-1	व्याख्यांश 1–बाणभट्ट की आत्मकथा–हजारीप्रसाद द्विवेदी 2–निबंध–1. देशसेवा का महत्व–बालकृष्णभट्ट 2.म्युनिसीपलेटी के कारनामे–महावीरप्रसाद द्विवेदी 3.काब्य मेंलोकमंगल की साधानावस्था–आचार्यरामचन्द्र शुक्ल 4.अशोक के फूल–हजारीप्रसादद्विवेदी 5.मेरे राम का मुकुटभीमरहाहै–विद्यानिवासमिश्र 6.प्रियानीलकंठी–कुबेरनाथराय 7.पगडण्डियों का जमाना–हरिशंकरपरसाई 3– निर्धारितकहानियाँ – 1. उसनेकहाथा (चन्द्रधर शर्मा गुलेरी) 2. पूस की रात(प्रेमचंद) 3. गुण्डा (जयशंकरप्रसाद) 4. अपनाअपनाभाग्य (जैनेंद्र कुमार) 5. लंदनकी एकरात (निर्मल वर्मा) 6. राजानिरबंसिया (कमलेश्वर)

	7. सिक्काबदलगया (कृष्णा सोबती) 4—पथ के साथी—महादेवीवर्मा
Unit-2	बाणभट्ट की आत्मकथा, निर्धारितनिबंध, कहानी एवंपथ के साथी से समीक्षात्मकप्रश्न।
Unit-3	हिन्दी, कहानी, निबन्ध एवंअन्य गद्य विधओं (रेखाचित्र, संस्मरण, आत्मकथा, जीवनी यात्रावृत्तांत, व्यंग्य आदि) के इतिहासप्रवृत्तियाँ औरप्रमुख रचनाकारों से सम्बद्ध निबन्धात्मकप्रश्न।
Unit-4	हिन्दी, कहानी ,निबंध एवंअन्य गद्य विधाओं (रेखचित्र, संस्मरण, आत्मकथा, जीवनी, यात्रावृत्तांत, व्यंग आदि) के इतिहासप्रवृत्तियांऔरप्रमुख रचनाकारों से सम्बध्द निबन्धात्मक प्रश्न
Unit-5	लघुउत्तरीय प्रश्न द्रुतपाठहेतू निर्धारितनिम्नलिखितगद्यकारोंपरकेंद्रितदोलघुउत्तरीय प्रश्नपूछेजाऐंगे। निबन्धकार—भारतेंदुहरिश्चंद्र, प्रतापनारायण मिश्र, बालमुकुन्दगुप्त, सरदारपूर्णसिंह। कहानीकार—अज्ञेय, यशपाल, फणीश्वरनाथरेणु, भीष्मसाहनी, अमरकांत स्फुटग्रंथ— 1. अमृतराय (कलम का सिपाही) 2. शिवप्रसादसिंहउत्तर योगी 3. हरिवंशराय बच्चन, (क्याभूलूंक्या याद करू), 4. राहुलसांकृत्यायन (घुमक्कड़ शास्त्र), 5. माखनलालचतुर्वेदी, साहित्य देवता)

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Class : M.A
Subject : हिन्दीसाहित्य
Semester : II
Paper : II
Title of Paper : भारतीय एवंपाश्चात्य काव्य शास्त्र
Max. Marks : 85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code : HIN-2007

पाठ्यक्रम के परिणाम

CO1- संस्कृत से हिन्दीतकनिरंतप्रवाहमानभाररीय काव्य शास्त्र की परंपरा से विद्यार्थियोंकोअवगतकराना।

CO2- काव्य रचना से रसअलंकार, रीतिवक्रोक्ति, ध्वनि, औचित्य, सिध्दांतों के महत्व से परिचितकरवाना।

CO3- आलोचनात्मकप्रवृत्ति का विकासजिसमेंविद्यार्थियोंमेंकिसीभीरचना के सर्वांगींण अध्ययन की क्षमताविकसितहोसकें।

CO4- सहजसरलभाषामेंनीति, सामाजिकव्यवहार एवंमानवीय प्रवृत्तीयोंका अध्ययन।

CO5- आधुनिकसमीक्षा की विशिष्टप्रवृत्तिया का अध्ययन।

Unit-1	प्लेटो : काव्य –सिद्धांत अरस्तू : अनुकरण–सिद्धांत, त्रासदी–विवेचन, विरेचन, विरेचनसिद्धांत लोंजाइनस : उदात्त की अवधारणा
Unit-2	ड्राइडन के काव्य सिद्धांत वड्र्सवर्थ : काव्य –भाषा का सिद्धांत कालरिज : कल्पना–सिद्धांतऔरललित–कल्पना
Unit-3	मैथ्यूआर्नल्ड : आलोचना का स्वरूपऔरप्रकार्य टी.एस.इलियट : परंपरा की परिकल्पनाऔरवैयक्तिकप्रज्ञा, निवैर्यक्तिकता का सिद्धांत, वस्तुनिष्ठसमीकरण, संवेदनशीलता का असाहचर्य। आई.ए.रिच्र्डस : रागात्मकअर्थ।संवेगों का संतुलन, व्यावहारिकआलोचना।
Unit-4	मार्क्सवाद, मनोविश्लेषणतथाअस्तित्ववाद।
Unit-5	आधुनिकसमीक्षा की विशिष्टप्रवृत्तियाँ : संरचनावाद, शैलीविज्ञान, विखंडनवाद, उत्तर अधुनिकतावाद।

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Paper : IV
Title of Paper : प्रयोजनमूलकहिन्दी
Max. Marks : 85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code : HIN-2008

पाठ्यक्रम के परिणाम

CO1- **कामकाजीहिन्दी के विभिन्न रूपों का ज्ञान**

CO2- **कार्यालयीनहिन्दी के प्रकार्यो का अभ्यास**

CO3- **परिभाषिक शब्दावली के महत्व एवंप्रयोग का ज्ञान**

CO4- **हिन्दीकम्प्यूटिंग का अध्ययन एवंअभ्यास**

CO5- **हिन्दीपत्रकारिता के विभिन्नस्वरूपों का अध्ययन एवंअभ्यास।**

इकाई 1	मीडियालेखन 1. जनसंचार–प्रौद्योगिकी एवंचुनौतियाँ 2. विभिन्नजनसंचार माध्यामों का स्वरूप–मुद्रण, श्रव्य, दृश्य–श्रृव्य, इंटरनेट। 3. श्रृव्य माध्यम–रोडियो, 4. मैखिकभाषा की प्रकृति, समाचारलेखन एवंवाचन, रोडियोनाटक, उद्घोषणालेखन, विज्ञापनलेखन, फीचरतथारिपोर्ताज
इकाई 2	1. दृश्य–श्रृव्य माध्यम (फिल्म, टेलीविजन, विडियों,) दृश्य माध्यमोंमेंभाषा की प्रकृति, दृश्य एवं श्रव्य साम्रगी का सामंजस्य पार्श्ववाचन, (वायस ओवर) पटकथलेखन, टेलीड्रामा, डॉक्यूड्रामा, संवाद–लेखन, साहित्य की विधाओं का दृश्य–माध्यमों का रूपान्तंरण, विज्ञापन की भाषा। 2. इंटरनेटसाम्रगीसृजन– (Content creation)
इकाई 3	1. आनुवाद का स्वरूप, क्षेत्र, प्रक्रिया एवंप्रविधि। 2. हिन्दी की प्रयोजनीयतामेंअनुवाद की भूमिका। 3. कार्यलयीनहिन्दीऔरअनुवाद। 4. जनसंचार माध्यमों का अनुवाद। 5. विज्ञापनमेंअनुवाद। 6. वैचारिकसाहित्य का अनुवाद।
इकाई 4	1. वाणिज्यिकअनुवाद। 2. वैज्ञानिक, तकनीकीतथाप्रौद्योमिकी क्षेत्र मेंअनुवाद। 3. विधि–साहित्य की हिन्दीऔरअनुवाद। 4. व्यावहारिकाअनुवादअभ्यास। 5. कार्यलयीनअनुवाद :–कार्यालयीन एवंप्रशासनिक शब्दावली, प्रशासनिक, प्रयुन्तियॉ, पदनाम, विभाग, आदि।

	6. पत्रों के अनुवाद। 7. पदनामों, अनुभागों, दस्तावेजों, प्रतिवेदनो के अनुवाद
इकाई 5	1. बैंकसाहित्य के अनुवाद का अभ्यास 2. विधि साहत्य के अनुवाद का अभ्यास 3. साहित्यि अनुवाद के सिद्धांत एवंव्यवहार : कविता, कहानी, नाटक 4. सारानुवाद 5. दुभाषियाप्रविधि 6. अनुवादपुनरीक्षण एवंमूल्यांकन

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Subject	:	हिन्दीसाहित्य
Semester	:	III
Paper	:	I
Title of Paper	:	आधुनिकहिन्दीकाव्य ओरउसकाइतिहास
Max. Marks	:	85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code	:	HIN-2009

पाठ्यक्रम के परिणाम

CO1- साहित्य कृतियों के माध्यम से साहित्य के शिल्पऔरसौंदर्य से परिचित
CO2- समिक्षण क्षमता का विकास
CO3- छायावाद की प्रमुख प्रवृत्तियों से परिचय
CO4- विभिन्नरचनाकारों की रचनाओंआकलन एवंआस्वादन
CO5- द्रुतपाठ द्वाराविभिन्नगद्यकारों के व्यक्तित्व एवंकृतिव का परचिय।

इकाई–1	व्याख्यांश : (1) मैथिलीशरणगुप्त–साकेत का नवम् सर्ग, (2) जयशंकरप्रसाद–कामायनीचिंता, श्रद्धा, इडासर्ग
इकाई–2	मैथिलीशरणगुप्त से संबंधितसमीक्षात्मकप्रश्न
इकाई–3	जयशंकरप्रसाद से संबंधितसमीक्षात्मकप्रश्न
इकाई–4	आधुनिकहिन्दीकाव्य (छायावाद तक) की प्रमुख प्रवृत्तियां
इकाई–5	द्रुतपाठ के निर्धारितकविजगन्नाथदासरत्नाकार, अयोध्या सिंह उपाध्याय, हरिऔध, महादेवीवर्माओरबालकृष्ण शर्मानवीन

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Subject	:	हिन्दीसाहित्य
Semester	:	III
Paper	:	II
Title of Paper	:	भाषाविज्ञान एवंहिन्दीभाषा
Max. Marks	:	85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code	:	HIN-2010

पाठ्यक्रम के परिणाम

CO1-भाषाऔरभाषाविज्ञान से परिचय
CO2-स्वनप्रक्रियास्वरूपऔर शाखाओं से परिचय
CO3-भाषामेंव्याकरण के महत्व का परिचय
CO4-साहित्य के अध्ययन मेंभाषाविज्ञान के अंगो की उपयोगिता से परिचय।
CO5-भाषाऔरभाषाविज्ञान की शाखाओं से परिचय

इकाई–1	भाषाऔरभाषाविज्ञान–भाषा की परिभाषाऔरअभिलक्षण, भाषाव्यवस्थाऔरभाषाव्यवहार, भाषासंरचनाऔरभाषिकप्रकार्य, भाषाविज्ञानस्वरूप
इकाई–2	स्वन प्रक्रिया–स्वरूपऔर शाखाएं, वागयंत्र और उनके कार्यस्वनिम की अवधारणा–स्वनों का वर्गीकरण, स्वन गुणस्वनिक–परिवर्तन
इकाई–3	व्याकरण– रूपविज्ञान का स्वरूप, रूपिम की अवधारण। वाक्य की अवधारणा– वाक्य के भेद–वाक्य विश्लेषण–निकटस्थअव्यय विश्लेषणगहनसंरचनाऔरबाह्य संरचना
इकाई–4	अर्थविज्ञान–अर्थ की अवधारण। शब्दऔरअर्थ का संबंध। अर्थप्राप्ति के साधनऔरअर्थपरिवर्तन
इकाई–5	साहित्य औरभाषाविज्ञान–साहित्य में अध्ययन मेंभाषाविज्ञान के अंगो की उपयोगिता।

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Subject	:	हिन्दीसाहित्य
Semester	:	III
Paper	:	III
Title of Paper	:	हिन्दीसाहित्य का इतिहास
Max. Marks	:	85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code	:	HIN-2011

पाठ्यक्रम के परिणाम

CO1- हिन्दीसाहित्य के इतिहास के लेखनपरंपरानामकरण एवं युगीनपृष्ठभूमि से परिचय।
CO2- हिन्दीसाहित्य के आदिकाल की पृष्ठ भूमिसाहित्य प्रवृत्तियाँ एवंकाव्य धारा से परिचय।
CO3- पूर्व मध्यकालभक्तिकाल के ऐतिहासिकपृष्ठभूमिसांस्कृतिकचेतना एवंविभिन्नकाव्य धाराएँ उनके कवियों के काव्य सौन्दर्य का परिचय।
CO4- रामऔरकृष्णकाव्य के प्रमुख कवियों की कृतियों का आस्वादन एवंररचनागतवैशिष्ट् से परिचय।
CO5- उत्तर मध्यकाल के ऐतिहासिकपृष्णभूमि से परिचय।

इकाई–1	हिन्दीसाहित्य के इतिहासलेखन की परम्पराऔरसाहित्येतिहास के पुनर्लेखन की समस्याएं
इकाई–2	हिन्दीसाहित्य के आदिकाल की पृष्ठभूमि, साहित्यिकप्रवृत्तियां, काव्यधाराएं, गद्य साहित्य, प्रतिनिधि रचनाकारऔरइनकीरचनाएं
इकाई–3	पूर्व मध्यकाल, भक्तिकाल की ऐतिहासिकपृष्ठीभूमि, सांस्कृतिकचेतना एवंभक्तिआन्दोलन, विभिन्नकाव्य धाराएंतथाउनकाविश्लेषण, प्रमुख निर्गुणसन्तकविऔरप्रमुख सूफीकवियों का अवदान।
इकाई–4	रामऔर कृष्णकाव्य : प्रमुख कविऔरउनकारचनागतवैशिष्ट्य
इकाई–5	उत्तर मध्यकालरीतिकाल की ऐतिहासिकपृष्ठभूमि , कालसीमाऔरनामकरण, विविध धाराएंरितिबद्ध, रीतिसिद्ध, रीतिमुक्तप्रवृत्तियांऔरविशेषताएं

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Subject : हिन्दीसाहित्य
Semester : III
Paper : IV
Title of Paper : कथाकारप्रेमचन्द
Max. Marks : 85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code : HIN-2012

पाठ्यक्रम के परिणाम

CO1- मुंशीप्रेमचन्द का साहित्य यथार्थपरकऔरजीवंतहै।
CO2- प्रेमचन्द का साहित्य हमारे जीवन कोस्वाभाविकऔर स्वाधीनबनाताहै।जिससेमन का संस्कारबनताहै। यहीसाहित्य का उददे्श्य है ।
CO3- प्रेमचंद ने साहित्य संबंधीमूलसमस्याकोइंगितकिया एवं नए औरपुरानेजमाने की चेतना के फर्कको समझाया।
CO4- पुरानीऔरनईचेतनामेंफर्कबतानाआधुनिकयुग के साहित्य की प्रवृत्तियों से परिचय।
CO5- भाषासाधनहैसाध्य नही, जिसकारणहिन्दुस्तानीभाषा का निर्माणकिया ।

इकाई–1	गोदान, उपन्यास कहानीबुढ़ी काकी, बडेभाईसाहब, शंतरज के खिलाड़ी
इकाई–2	प्रेमचन्द्र युगीनपरिवेश
इकाई–3	हिन्दीउपन्यासपरम्पराऔरप्रेमचन्द
इकाई–4	हिन्दीकहानीउद्भव, विकासऔरप्रेमचंद
इकाई–5	द्रुतपाठ–विश्वम्भरनाथ शर्माकौशिकवेचन शर्माउग्र, भगवतीप्रसादबाजपेयी, वृंदावनलालावर्मा

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Class : M.A
Subject : हिन्दीसाहित्य
Semester : IV
Paper : I
Title of Paper : आधुनिकहिन्दीकाव्य औरउसकाइतिहास
Max. Marks : 85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code : HIN-2013

पाठ्यक्रम के परिणाम

CO1-साहित्य कृतियों के माध्यम से साहित्य के शिल्पऔरसौंदर्य से परिचित

CO2- समिक्षण क्षमता का विकास

CO3- छायावाद की प्रमुख प्रवृत्तियों से परिचय

CO4- सहजसरलभाषामें अध्यात्म, दर्शन, नीति, सामाजिकव्यवहार एवंमानवीय प्रवृत्तीयों के अक्षय भण्डार का विंहगम अध्ययन।

CO5-विभिन्नरचनाकारों की रचनाओंआकलन एवंआस्वादन

इकाई–1	पाठ्य विषयः 1. सुमित्रानंदनपन्त–परविर्तन, नौकाविहार, एकतारा 2. सूर्यकांत त्रिपाठीनिराला–राम की शक्तिपूजा, कुकुरमुत्ता 3. संच्चिदानंदहीरानंद–वात्स्यायनअज्ञेय –नदी के द्वीप, सरस्वतीपुत्र असाध्यवीणा 4. गजानन माधव मुक्तिबोध –ब्रह्मराक्षस, भूलगलती सुमित्रानंदनपन्त, सूर्यकांत त्रिपाठीनिराला, अज्ञेय एवंमुक्तिबोध की गविताओं से व्याख्यांश
इकाई–2	आधुनिकहिन्दीकाव्य (छायावाद तक) की प्रमुख प्रवृत्तियॉ, इतिहास एवंप्रमुख कवि
इकाई–3	छायावादोत्तरकाव्य की प्रमुख प्रवृत्तियां, इतिहासऔरप्रमुख कवि
इकाई–4	निर्धारितकवियोंपरसमीक्षात्मकप्रश्न
इकाई–5	द्रुतपाठ–रामधारी सिंह दिनकर, हरिवंशराय बच्चन, त्रिलोचन, भवानीप्रसादमिश्र, नरेशमेहता से लघुउत्तरीय प्रश्न

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Subject	:	हिन्दीसाहित्य
Semester	:	IV
Paper	:	II
Title of Paper	:	भाषाविज्ञान एवंहिन्दीभाषा
Max. Marks	:	85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code	:	HIN-2014

पाठ्यक्रम के परिणाम

CO1-भाषाऔरभाषाविज्ञान से परिचय

CO2- स्वन प्रक्रियास्वरूपऔर शाखाओं से परिचय
CO3- भाषामेंव्याकरण के महत्व का परिचय
CO4- साहित्य के अध्ययन मेंभाषाविज्ञान के अंगो की उपयोगिता से परिचय।

CO5- हिन्दीकम्प्यूटिंग का अध्ययन एवंअभ्यास

इकाई–1	हिन्दीकी ऐतिहासिकपृष्ठभूमि–प्राचीनभारतीय आर्यभाषाएं–वैदिकतथालौकिकसंस्कृतिऔरउनकीविशेषताएं । मध्यकालीनभारतीय आर्यभाषाएं–पालि, प्राकृत– शौरसेनी अर्ध माधधी, अपभ्रंशऔरउनकीविशेषताएं । आधुनिकभारतीय आर्यभाषाएंऔरउनकावर्गीकरण
इकाई–2	हिन्दी का भौगोलिकविस्तार : हिन्दी की उपभाषाएं, पश्चिमीहिन्दी, पूर्वीहिन्दी, राजस्थानीबिहारीतथापहाड़ीऔरउनकीबोलियां । खड़ीबोली, ब्रजऔरअवधी की विशेषताएं
इकाई–3	हिन्दी का भाषिकस्वरूप–हिन्दी की स्वनिमव्यवस्था– खंडय् खंडेतर । हिन्दी शब्द–रचना, उनसर्ग, प्रत्तय, समास । रूप् रचना–लिंग, वचनऔरकारक–व्यवस्था के संदर्भमें, हिन्दी के संज्ञा, सर्वनाम, विशेषणऔरक्रिया रूप । हिन्दीवाक्य रचनापदक्रमऔरअन्विति
इकाई–4	हिन्दी के विविध रूप : संपर्कभाषाराष्ट्र भाषा, रासभाषा के रूपमेंहिन्दी, माध्यम –भाषा, संचार–भाषा, हिन्दी की सवैधानिकस्थिति
इकाई–5	हिन्दीमेंकम्प्यूटरसुविधाएं : आंकड़ा–संसाधनऔर शब्दसंसाधन, वर्तनी– शोधकमशीनीअनुवाद, हिन्दीभाषा–शिक्षण, देवनागरी लिपि –विशेषताएंऔरमानकीकरण

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Class	:	M.A
Subject	:	हिन्दीसाहित्य
Semester	:	IV
Paper	:	III
Title of Paper	:	हिन्दीसाहित्य का इतिहास
Max. Marks	:	85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code	:	HIN-2015

पाठ्यक्रम के परिणाम

CO1-हिन्दीसाहित्य के इतिहास के लेखनपरंपरानामकरण एवं युगीनपृष्ठभूमि से परिचय।

CO2- हिन्दीसाहित्य के आदिकाल की पृष्ठ भूमिसाहित्य प्रवृत्तियाँ एवंकाव्य धारा से परिचय।

CO3- पूर्व मध्यकालभक्तिकाल के ऐतिहासिकपृष्ठभूमिसांस्कृतिकचेतना एवंविभिन्नकाव्य धाराएँ उनके कवियों के काव्य सौन्दर्य का परिचय।

CO4- रामऔरकृष्णकाव्य के प्रमुख कवियों की कृतियों का आस्वादन एवंररचनागतवैशिष्ट् से परिचय।

CO5- उत्तर मध्यकाल के ऐतिहासिकपृष्णभूमि से परिचय।

इकाई–1	आधुनिककाल : आधुनिककाल की सामाजिक, राजनीतिक, आर्थिक एवंसांस्कृतिकपृष्ठभूमि, सन् 1857 ई. का प्रथम स्वाधीनतासंग्रामऔरपुनर्जागरण, भारतेन्दु युग–प्रमुख साहित्यकार, रचनाएंऔरसाहित्यिकविशेषताएं
इकाई–2	द्विवेदी युग : प्रमुख साहित्यकार, रचनाएंऔरसाहित्यिकविशेषताएं । हिन्दीस्वच्छन्दतावादीचेतना का अक्रिमविकास, छायावादीकाव्य, प्रमुख साहित्यकार, रचनाएंऔरसाहित्यिकविशेषताएं
इकाई–3	उत्तरछायावाद की विविध प्रवृत्तियां : प्रगतिवाद, प्रयोगवाद, नयीकविता । प्रमुख साहित्यकार, रचनाएंऔरसाहित्यिकविशेषताएं
इकाई–4	हिन्दी गद्य की प्रमुख विधाएं, कहानी, उपन्यास, नाटकनिबंध
इकाई–5	संस्मरणरेखाचित्र जीवनी, आत्मकथा का विकास । हिन्दीआलोचना का उद्भव एवंविकास । स्त्री विमर्शऔरदलितविमर्श का परिचय

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Subject	:	हिन्दीसाहित्य
Semester	:	IV
Paper	:	IV
Title of Paper	:	कथाकारप्रेमचन्द
Max. Marks	:	85 मुख्य परीक्षा, 15 आंतरिकपरीक्षा
Course Code	:	HIN-2016

पाठ्यक्रम के परिणाम

CO1-मुंशीप्रेमचन्द का साहित्य यथार्थपरकऔरजीवंतहै।

CO2-प्रेमचन्द का साहित्य हमारे जीवन कोस्वाभाविकऔर स्वाधीनबनाताहै।जिससेमन का संस्कारबनताहै। यहीसाहित्य का उददे्श्य है ।

CO3- प्रेमचंद ने साहित्य संबंधीमूलसमस्याकोइंगितकिया एवं नए औरपुरानेजमाने की चेतना के फर्कको समझाया।

CO4- पुरानीऔरनईचेतनामेंफर्कबतानाआधुनिकयुग के साहित्य की प्रवृत्तियों से परिचय।

CO5- भाषासाधनहैसाध्य नही, जिसकारणहिन्दुस्तानीभाषा का निर्माणकिया ।

इकाई– 1	व्यांख्यांश गबन रंगभूमि कर्मभूमि कहानी–ठाकुर का कुआं–पचंपरमेश्वरमंत्र, कफन, ईदगाह, पूस की रात, दोबैलो की कथा नमक का दरोगा, कजाकी, सदगति ।
इकाई– 2	प्रेमचन्दजीवन एवंरचना यात्रा : उपन्यास, कहानी, पत्रकारिता ।
इकाई– 3	प्रेमचन्द के पाठ्य उपन्यासों की समीक्षा ।
इकाई– 4	प्रेमचन्द के पाठ्य कहानियों की समीक्षा ।
इकाई– 5	द्रुतपाठ–जेनेन्देकुमार, यशपाल, भगवतीचरणवर्मा, अमृतलालानागर ।

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Class	:	M.Com.
Semester	:	I
Title of Subject	:	Business Environment
Paper	:	II
Course Code	:	MCOM-902
Compulsory / Max. Marks	:	85

Course Outcomes

CO1- Identify different types of Business Environment.
CO2- Recognize tools for & Exacting the Environment
CO3- Explain the Role of Economic system Planning, Government Policies, Banks(Publics Development) Economic reforms, Liberalization Patent lows and its impact on business.
CO4- Realize the importance and impact of changing low and Regulation on a business firm.
CO5- Find out emerging dimension in socio – cultural Environment and its relevance for a business firm

Unit-I	**Theoretical Framework of Business Environment:**Concept, Significance and nature of business environment; Eloements of environment – internal and external Changing dimensions of business environment. Liberalisation, Privatisation and Globalisation. **व्यवसायिकपर्यावरण की सेद्धांतिकसंरचना** :व्यावसायिकपर्यावरण, अवधारणा, महत्व एवंप्रकृति । पर्यावरण के तत्व–आन्तरिक एवंबाह्य, व्यवसाय पर्यावरण के परिवर्तनशीलआयाम । उदारीकरण, निजीकरण एवंवैश्वीकरण ।
Unit-II	Economic Environment of Business : significance and elements of economic Environment, economic systems and business environment, Economic planning in India, Government policies – licensing policy fiscal policy, Industrial Policy monetary policy and EXIM policy **व्यवसायिक का आर्थिकपर्यावरण** : आर्थिकपर्यावरण का महत्व एवंतत्व, आर्थिकप्रणालियॉ एवंव्यवसाय पर्यावरण, भारतमेंआर्थिकनियोजन । सरकारीनीतियॉ–औद्योगिकनीति, अनुज्ञापत्र नीति, प्रशुल्कनीति, मौद्रिकनीति एवंआयात–निर्यात (एक्जिम) नीति ।
Unit-III	**Political and Legal Environment of Business :** Monopoly and Restrictive Trade Practices (MRTP) Act, Foreign Exchange Management Act (FEMA), Consumer Protection Act, Patent Laws. **व्यवसायिक का राजनैतिक एवंवेघानिकपर्यावरण** : एकाधिकार एवंप्रतिबंधात्मकव यापारव्यवहारअधिनियम (एम . आर . टी . पी .) विदेशीविनिमय प्रबंध अधिनियम (फेमा), उपभोक्तासंरक्षणअधिनियमपेटेंटकानून ।
Unit-IV	**Socio, Cultural & International Environment :** Social Responsibility of business, Characteristics, Components, Scope, relationship between society and business, Socio-cultural business Environment, Social Groups, World Trade Organistion (WTO), International Monetary Fund (IMF), Foreign Investment in India.

	सामाजिक, सांस्कृतिक एवंअन्तर्राष्ट्रीय पर्यावरण : व्यवसाय का सामाजिकदायित्वसमाज एवंव्यवसाय के लक्षण, तत्व क्षेत्र एवंदोनोमेंसम्बंध । सामाजिक–सांस्कृतिकव्यावसायिकपर्यावरण–सामाजिकसमूह, विश्वव्यापारसंगठन (डब्लू. टी. ओ.) एवंअन्तर्राष्ट्रीय मौद्रिककोष (आई. एम. एफ.) भारतमेंविदेशीविनिमय ।
Unit-V	**Technological Environment :** Concept, Online Channels, Online Srvices, Advantage of Online services, E-commerce, Indian conditions of E-commerce, Electronic Banking, Franchise Business. तकनीकीपर्यावरण–अवधारणा, ऑनलाईनचैनल्सऑनलाईनसेवाये, ऑानलाईनसेवाओं के लाभ । इलेक्ट्रानिककॉमर्स, भारतीय दशाओंमेंइलेक्ट्रानिककॉमर्स, इलेक्ट्रानिकबैकिंगफ्रेंचाइचीव्यवसाय ।

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Class	:	M.Com.
Semester	:	I
Title of Subject Group	:	Advanced Accounting
Paper	:	III
Course Code	:	MCOM-903
Max. Marks	:	85

Course Outcomes

CO1- Understand the method and Presentation of Financial statement.

CO2- Develop the Understanding and skill to prepare the Bank Reconciliation statement.

CO3- Prepare to present the financial statement of Non Profit Organization.

CO4- State accounting entries regarding the Investment Insolvency and rectification.

CO5- Solve Advance Problem related with dissolution of firms.

Unit-I	Advanced problems of Final Accounts अंतिमलेखे के उच्चतरप्रश्न ।
Unit-II	Advanced problems of Bank Reconcilation Statement, Rectification of Errors, Accounting for Non Profit Organization बैंकसमाधानविवरण के उन्नतप्रश्न, त्रुटियोंकासुधार, गैरलाभसंगठनोंकालेखांकन ।
Unit-III	Accounting from Incomplete Records, Accounting for Insurance Claim. अपूर्णअभिलेखोंसेलेखांकन, बीमादावोंकालेखांकन ।
Unit-IV	Investment A/c, Voyage A/c, Insolvency A/c. विनियोगलेखें, जहाजीलेखें, दिवालियालेखें ।
Unit-V	Dissolution of partnership firm including sales of Firm and Amalgamation. साझेदारीफर्मकाविघटन, फर्म के विक्रय एवं एकीकरणसहित ।

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Class	:	M.Com
Semester	:	I
Title of Subject Group	:	Cost Analysis and Control
Paper	:	IV
Course Code	:	MCOM-904
Max. Marks	:	85

Course Outcomes

CO1- Learn operational analyses – Determination of Cost, BEP.

CO2- Learn Improvement techniques for Business Cost Control Material.

CO3- Learn how to efficiency of business is Evaluativted parameters.

CO3- Study the impact of cost allocation and issue pricing – Right Technique.

CO5- Learn to make Critical but rational decision based on analysis.

Unit-I	Various cost concepts, Cost centre and cost unit, Methods and techniques of Costing. Installation of costing system, Methods of inventory control, Overheads Accounting. विभिन्नलागतअवधारणाएं, लागतकेन्द्र एवंइकाईलागत, लागत की पद्धतियां एवंतकनीक, लागतपद्धति की स्थापना, सामग्रीनियंत्रण की विधियां, उपरिव्यय लेखांकन ।
Unit-II	Process Accounting Joint product and Bye product, Equivalent Production and Inter Process Profit, Operating Cost. प्रक्रियालेखांकन, संयुक्तउत्पाद एवंउपोत्पाद, समोत्पादन एवंअन्तः प्रक्रियालाभ, परिचालनलागत ।
Unit-III	Marginal Costing : Concepts, Break Even Analysis, Uniform Costing and Inter firm comparison. Use of Managerial Costing in business Decision. सीमांतलागत : अवधारणा, समविच्छेदविश्लेषण, एकीकृतलागत, एवंअन्तः फर्मतुलना, व्यावसायिकनिर्णयकमेंप्रबंधकीय लागत का प्रयोग ।
Unit-IV	Budgetary Control : Basic Concepts, Preparation of functional budget: Cost Audit : Objectives and Advantages. बतटरीनियंत्रण : मूलअवधारणायें, क्रियांत्माकबजट की तैयारी, लागतअंकेक्षण : उद्देश्य एवंलाभ ।
Unit-V	Standard Costing and Variance Analysis. मनकलागत एवंविचरणविश्लेषण ।

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Class	:	M.Com.
Semester	:	II
Paper	:	I
Title of Subject	:	Corporate Legal Framework
Course Code	:	MCOM-905
Max. Marks	:	85

Course Outcomes

CO1- Students can work in organization like CCI office company & Secretary as they get knowledge of lows andProvisions.
CO2- Student can approach the authorities to demand action under consumer Protection Act.
CO3- They will be more cautious while handling cheques and other negotiable Instruments because they know the impact now.
CO4- Students get knowledge of Negotiable Instrument and its Act.
CO5- Student Learn about External offers of Business like the knowledge about wto custom valuation and dispute Settlement.

Unit-I	The Companies Act, 1956 (Relevant Provisions): Definition, types of companies, Memorandum of association, Articles of association, Prospectus, Share capital and Membership, Meetings and Resolutions, Company Management, Managerial Remuneration, Winding up and dissolution of companies. भारतीय कम्पनीअधिनियम (1956) (सम्बन्धितप्रावधान) : परिभाषा, कम्पनियों के प्रकार, पार्षदसीमानियम, पार्षदअर्न्तनियम, प्रविवरण, अंशपूंजी एवंसदस्यता, समाएं एव ंप्रस्ताव, कम्पनीप्रबंध, प्रबंधकीय पारिश्रमिक, कम्पनियों का परिसमापन एवंविघटन।
Unit-II	The Negotiable Instruments Act, 19881 : Definition, Types of Negotiable Instruments, Negotiation Holder and holder in due course, Payment in due course; Endorsement and Crossing of cheque; Presentation of negotiable instruments. पराक्राम्य विलेख अधीनियम, 1981 –परिभाषा, पराक्राम्य विलेखों के प्रकार, पराक्राम्य धारकऔर यथाविधि धारक, यथाविधि भुगतानः चेक का रेखांकन एवंपृष्ठांकन, परक्राम्य विलेखों का प्रस्तुतीकरण।
Unit-III	MRTP Act 1969: Monopolistic trade practices; Restrictive trade practices; Unfair trade practices. एकाधिकारप्रतिबंधात्मकव्यापारव्यवहार अधीनियम 1969ः एकाधिकारात्मकव्यापार व्यवहार, प्रतिबंधात्मकव्यापारव्यवहार, अनुचितव्यापारव्यवहार ।
Unit-IV	The consumer protection Act, 1986: salient features; Definition of Consumer. Right of consumer; Grievance Redressal Machinery. उपभोगतासंरक्षणअधिनियम, 1986ः विशिष्ट लक्षण, उपभोक्ता की परिभाषा, उपभोक्ता के अधिकार, शिकायतनिवारणतंत्र (मशीनरी)।

Unit-V	Regulatory Environment for International Business: FEMA, WTO: Regulatory framework of WTO basic principles and its character, WTO provisions relating to preferential treatment to developing countries; regional groupings, technical standard, anti-dumping duties and other Non Tariff Barriers. Custom valuation and dispute settlement, TRIP and TRIMS. अंतर्राष्ट्रीय व्यापार के लिए पर्यावरणनियामकः विदेशीविनियमप्रबंध अधिनियम (फेमा), विश्वव्यापारसंगठन(W.T.O.): विश्वव्यापारसंगठन की नियामकसंरचना, आधारभूतसिद्धांतऔरइसके लक्षण, विश्वव्यापारसंगठन मे ंविकासशीलदेशो ंके लिए अधिमान्यतासंबंधीव्यवहार के प्रावधान, क्षेत्रीय समूहीकरण, तकनीकीप्रमाप, भंडारणप्रतिरोधीप्रभारऔरअन्य गैरप्रशुल्कसंबंधीअवरोध। सीमा शुल्कमूल्यांकनऔरविवादोंकानिपटान, बौद्धिक संपदासंबंधीव्यापारअधिकार,(TRIPS) विनियोगसंबंधीव्यापारव्यवहार(TRIMS)।

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Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Commerce
Session 2020-21

Class	:	M.Com.
Semester	:	II
Paper	:	II
Title of Subject	:	Organizational Behaviour
Course Code	:	MCOM-906
Max. Marks	:	85

Course Outcomes

CO1- Understanding the theories, Principal and concepts applicable to the study of organizations andmanagement.

CO2- Knowledge of Personality and perception and Learning.

CO3- Understanding models and Theories of motivation.

CO4- Get Knowledge about Interpersonal Behavior.

CO5- Critically evaluate models and theories explored Throughout the module

Unit-I	Organization : Concept, Types and significance, Organization Goal and its determinants. Organization Behaviour : Concept, Nature and Significance, Organizational Behaviour models. Organizational Skil&Ramayan. संगठन : अवधारणा, प्रकार व महत्व, संगठनात्मक लक्षय एवंउसके निर्धारक।संगठनात्मकव्यवहारः अवधारणा, प्रकृतिऔरमहत्व, संगठनात्मकव्यवहारअभिकल्प।संगठात्मककला एवंरामायान।
Unit-II	Personality: Concept, Theories, Determinants and importance, Perception: Concept, Process and Theories, Learning: Concept, Components, affecting factors and theories. व्यक्तित्व : अवधारणाविभिन्नसिद्धांत, निर्धारक एवंमहत्व।दृष्टिकोणः अवधारणाप्रक्रिया एवंविभिन्नसिद्धांत।सीखनाः अवधारण, तत्व, प्रभावितकरनेवाले घठकऔरसिद्धांत।
Unit-III	Motivation: Meaning, types and important elements, Theories of Motivation, Attitudes and Values: Concept, factors, significance and Theories. अभिप्रेरणः अर्थ, प्रकार, औरमहत्वपूर्णतत्व, अभिप्रेरण के विभिन्नसिद्धांत।मूल्य एव ंव्यवहारः अवधारणा, घटक, महत्वऔरविभिन्नसिद्धांत।
Unit-IV	Interpersonal Behavious: Nature, Transactional Analysis. Concept of Group. Theories of group formation, Group cohesiveness. Power and Authority. अंर्तवैयक्तिकव्यवहारः प्रकृति, अंर्तक्रियांत्मकविश्लेषण, समूह की अवधारणा, समूहनिर्माण के सिद्धांत, समानसमूह शक्तिऔरअधिकार।
Unit-V	Organizational Conflicts : Cause and suggestions Developing sound Organizational Climate, Management of Change Concept and Process of Organizational Development. संगठनात्मकविरोधः कारणऔरसुझाव, स्वस्थसंगठनात्मकवातावरण का विकासपरवर्तन का प्रबंध संगठनात्मकविकास की अवधाणाऔरप्रक्रिया।

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Class	:	M.Com.
Semester	:	II
Paper	:	III
Title of Subject	:	Advanced Statistical Analysis
Course Code	:	MCOM-907
Max. Marks	:	85

Course Outcomes

CO1- Distinguish between discrete and continuous random variables.

CO2- Explain the assumptions of binomial distribution and apply it to calculate probabilities.

CO3- Explain why population are sampled and describe methods to sample a population

CO4- Learn about statistical tools to test hypothesis more knowledge of chi-square test and ANOVA test.

CO5- Knowledge to apply regression analysis to estimate the liner relationship between tow variables

Unit-I	Theory of Probability – Probability Distributions, Binomial, Poisson and Normal Distribution. प्रयिकता के सिद्धांत–प्रायिकतावितरण द्विपद, पायसन एवंसामान्य वितरण।
Unit-II	Theory of Sampling and Test of Significance न्यादर्श के सिद्धांतऔरसार्थकता की जांच।
Unit-III	Analysis of Variance (including one way and two way classification), Chin-square Test. विचरणविश्लेण (एकांगी और द्विमांर्गीवर्गीकरण के साथ,) काईवर्गपरीक्षण ।
Unit-IV	Interpolation and Extrapolation. Association of Attributes. अन्तरगणन एवम! बह्यगणन, गुणसम्बन्ध।
Unit-V	Regression Analysis, Statistical Decision Theory :- Decision under Risk and Uncertainty, Decision Tree Analysis. प्रतीपगमनविश्लेण, सांख्यिकी निर्णय सिद्धांत–जोखिमऔरअनिश्चितता की स्थिति मे ंनिर्णय, निर्णयवृक्ष विश्लेषण।

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Class	:	M.Com.
Semester	:	III
Paper	:	II
Title of Subject	:	Tax Planning and Management
Course Code	:	MCOM-910
Max. Marks	:	85

Course Outcomes

CO1- Study to identify the difference between tax evasion, tax avoidance and tax planning.

CO2- Study about types of incomes and their taxability and provision in respect of free Trade Zone.

CO3- Study about out line the corporate tax lows and their Provision.

CO4- Student will able to Plan tax in relation to siftings up new business.

CO5- Knowledge about to file the returns and assessment independently

Unit-I	**Concept of Tax Planning** : Meaning, Scope, Inportance, Objectives of Tax Planning. क्रनियोजन की अवधारणा : अर्थ, क्षेत्र, महत्व, करनियोजन के उद्देश्य, एवंउद्देश्य ।
Unit-II	**Areas of Tax Planning :** Ownership Aspect, Activity Aspects & Locational Aspects, Nature of the Business & Tax Planning. क्रनियोजन के क्षेत्र : स्वामित्वपहलूक्रियाशीलतापहलूस्थानीयकरणपहलू, व्यवसाय की प्रकृति एवंकरनियोजन ।
Unit-III	**Tax Planning and Setting up New Business**: Deductions Available to new Industrial Undertakings, Amalgamation, Merger and Tax Planning. Special Tax Provisions – Tax Provisions Relating to Free Trade Zones, Infrastructure Sector & Backward Areas. नयेव्यवसाय की स्थापना एवंकरनियोजन : नईऔद्योगिकइकाईयोंकोप्राप्तछूटे, एकीकरण, सविलयन एवंकरनियोजनविशेषकरप्रावधानमुक्तव्यापार क्षेत्र संरचनात्मक क्षेत्र एवंपिछड़े क्षेत्र संबंधीकरप्रावधान ।
Unit-IV	**Tax Planning and Financial Decisions :** Capital Structure Decision, Dividend, Inter Corporate Dividend, Bonus Shares. करनियोजन एवंवित्तीय निर्णयन : पूँजीसंरचनानिर्णय, लाभांश, अर्न्तकम्पनीलाभांश, बोनसअंश ।
Unit-V	**Tax Assessment :** Introduction, Difference between Tax Planning and Tax Management, Areas of Tax Management, Return of Income and Assessment, Penalties and Prosecutions, Appeals and Revisions. कर निर्धारण : परिचय, करनियोजन एवंकरप्रबंध मे अन्तर, करप्रबंध के क्षेत्र, आय का विवरण एवंकर निर्धारण, अर्थदण्ड एवंअभियोग, अपील एवंपुनर्विचार ।

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Class	:	M.Com.
Semester	:	III
Paper	:	III
Title of Subject	:	Entrepreneurship Skill Development
Course Code	:	MCOM-911
Max. Marks	:	85

Course Outcomes

CO1- Students get knowledge about entrepreneurship and cant set up their out entrepreneurship.

CO2- Understand the different methods to assess the attractiveness of business opportunities.

CO3- Study Entrepreneurship theories and their implications.

CO4- Detect weakness and strength with in business opportunity and give suggestion for improvement.

CO5- Design, Organize and lead with the goal of bringing new Product and service to market.

Unit-I	**Entrepreneur:** Definition, emergence of Entrepreneurial class; Theories of Entrepreneurship, Socio-economic Environment and Entrepreneur. उद्यमी–परिभाषा, उद्यमवर्ग का उद्‌भव, उद्यमिता के सिद्वांतसामाजिक–आर्थिकपरिवेश एवंउद्यमी ।
Unit-II	**Promotion of a venture:**Opportunity analysis, External Environmental forces, economic, Social, Technological and Competitive factors, Establishment of a new unit. साहसी (उद्यमी) के लियेप्रवर्तन : अवसरविश्लेषण, बाहय पर्यावरणीय शक्तियां, आर्थिक, सामाजिक, तकनीकी एवंप्रतियोगियात्मककारक, एक नईइकाईकीस्थापना ।
Unit-III	**Entrepreneurial Behaviour:** Innovation and Entrepreneurship, entrepreneurial Behaviour, Social Responsibility. उद्यमीव्यवहार : नवाचार एवंउद्यमिता, उद्यमीव्यवहार, सामाजिकउत्तरदायित्व ।
Unit-IV	**Entrepreneurial Development Programme:** Entrepreneurial Development Programme relevance and achievements, role of Government in organizing such programmes. उद्यमितावि‌कासकार्यक्रम : उद्यमितावि‌कासकार्यक्रम की प्रासंगिसता एवंउपलब्धियॉ, इनकार्यक्रमों के आयोजनमेसरकारकीभूमिका ।
Unit-V	**Entrepreneurship and Industrial Development:** Planning and growth of industrial activities through industrial Policy of the Government, Role of Industrial Estates, Role of Central and State level Promotional Services. कियाओंकानियोजन एवंविकास, औद्योगिकपरिक्षेत्रों की भूमिकाकेन्द्र एवंराज्य स्तरीय प्रोत्साहनसेवाये ।

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Class	:	M.Com.
Semester	:	III
Paper	:	IV
Title of Subject	:	Accounting for Managerial Decisions
Course Code	:	MCOM-912
Max. Marks	:	85

Course Outcomes

CO1- Study financial, Cost and management accounting and understand Role and duties of management Accountant.

CO2- Learn Limitation of Financial Statement and study to use Ratio analysis Profitability, Activity andFinancialRatio.

CO3- Get knowledge about Case flow accord tiny to A.S.B.

CO4- Study to method of capital budgeting Terms of investment and Ranking Investment Proposal.

CO5- Comprehend difference Contemporary issues in management accounting and reports & reporting needs and levels in organization.

Unit-I	Management Accounting : Its meaning, nature and importance. Difference of Management accounting with Cost Accounting and Financial accounting. प्रबंधकीय लेखांकन : अर्थ, प्रकृति एवंमहत्व, प्रबंधकीय लेखांकन, लागतलेखांकन एवंवित्तीय लेखांकनमेंअन्तर ।
Unit-II	Nature and Limitations of Financial Statements: Needs and objectives of financial Analysis. वित्तीय विवरणों की प्रकृति एवंसीमाऐं : वित्तीय विश्लेषण की आवश्यकता एवंउद्देश्य ।
Unit-III	Fund Flow analysis and Cash Flow analysis (Application of A.S.-3) कोषप्रवाहविश्लेषण एवंरोकप्रवाहविश्लेषण (।ैण् दृ 3 का प्रयोग) ।
Unit-IV	Capital Budgeting : Nature and Characteristics of Long Terms Investment Decision, Methods of Ranking Investment Proposals. पूँजीबजटन : दीर्घकालीननिवेशनिर्णयों की प्रकृति एवंविशेषताएं, निवेशप्रस्तावों की श्रेणीयन की विधि ।
Unit-V	Management Reporting System: Types of Reports, Responsibility Accounting. प्रबंध प्रतिवेदनपद्वति : प्रतिवेदन के प्रकारउत्तरदायित्वलेखांकन ।

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Class	:	M.Com.
Semester	:	IV
Paper	:	I
Title of Subject	:	Advertising and Sales Management
Course Code	:	MCOM-913
Compulsory /Optional	:	Optional
Max. Marks	:	85

Course Outcomes

CO1- Whole study of Advertisement and this benefits, if – Marketing mix, legal ethical and social aspect of advertising.
CO2- Learn about customers than made a advertisement that fulfill cons tomes layout and our business purpose.
CO3- Devaluation of Advertising effectiveness and Contorting Advertising Budget.
CO4- Able to access personal selling advertising and methods of sales promotion.
CO5- Study about sales force recruitment selection training, Compensation and evaluation.

Unit-I	Introduction : Concept, Scope, Objectives and Functions of advertising. Role of advertising in marketing mix and the advertising process. Legal, ethical and social aspect of advertising. परिचय –विज्ञापन की अवधारणा, क्षेत्र, उद्देश्य एवंकार्य, विज्ञापनमेंविपणनमिश्रण एवंविज्ञापनप्रक्रिया की भूमिका, विज्ञापन के नैतिक, विधिक एवंसामाजिकपहलू ।
Unit-II	Pre-launch Advertising Decision : Determination of target audience, Advertising, media and their choice. Advertising measures, Layout of advertisement and advertising appeal, Advertising copy. विज्ञापननिर्णयनपूर्वप्रदर्शन : लक्षितश्रोता, ग्राहको का निर्धारण, विज्ञापन माध्यम (मीडिया) एवंउनकाचयन, विज्ञापनउपाय विज्ञापनअपील एवंविज्ञापनविन्यास, विज्ञापनप्रति ।
Unit-III	Promotional Management : Advertising department, Role of advertising agencies and their selection, Advertising budget, Evaluation of Advertising effectiveness. प्रवर्तनीय प्रबंध : विज्ञापनविभाग, विज्ञापन एजेन्सी का योगदान एवंउसकाचयन, विज्ञापनबजट, विज्ञापन की प्रभावशीलता का मूल्यांकन ।
Unit-IV	Personal selling : Meaning and Importance of personal selling, Difference between personal selling, Advertising and sales promotion. Methods and procedure of personal selling. वैयक्तिकविक्रय : वैयक्तिकविक्रय का अर्थ एवंमहत्व, वैयक्तिकविक्रय, विज्ञापन एवंविक्रय प्रवर्तनमेंअन्तर, वैयक्तिकविक्रय की विधियांऔरप्रक्रिया ।
Unit-V	Sales Management : Concept of sales management, Objectives and Functions of sales managements. Sales organization, Management of sales force and Sales force objectives, Sales force recruitment, selection, training compensation and evaluation. विक्रय प्रबंध : विक्रय प्रबंध की अवधारणाउद्देश्य एवंकार्य, विक्रय संगठन, विक्रय शक्यिों का प्रबंध एवंविक्रय शक्ति के उद्देश्य, विक्रय शक्तियों की भर्ती, चयन, प्रशिक्षण, क्षतिपूर्ति एवंमूल्यांकन ।

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Class	:	M.Com.
Semester	:	IV
Paper	:	II
Title of Subject	:	International Marketing
Course Code	:	MCOM-914
Compulsory /Optional	:	Optional
Max. Marks	:	85

Course Outcomes

CO1- Developed as understanding of major issues related to Export in international marketing.
CO2- Get Knowledge Concept of International marketing its Environment and its selection.
CO3- Get knowledge about terms of payment in International Marketing.
CO4- Study about financing facility in export marketing and knowledge about difference organization.
CO5- Able to assess on organizations ability to enter and compete in International Markets.

Unit-I	International Marketing: Meaning, Scope, Nature and Significance, International Marketing Environment- Internal and External Environment, International Market, Orientation, Identification and Selection of foreign market, Functions and qualities of an Export Manager. अंतर्राष्ट्रीय विपणन : अर्थ क्षेत्र, प्रकृति, महत्वअंतर्राष्ट्रीय बाजारवातावरण–आंतरिक एवंबाहय वातावरण।अंतर्राष्ट्रीय बाजार, विदेशीबाजार के चयनऔरपरिचय, अभिमुखीकरण। एक निर्यातप्रबंधक के गुणऔरकार्य।
Unit-II	Export Organization : Meaning, affecting factors and types, Overseas Product Development; It's concept and methods, Pricing and its factors, Methods, of Pricing, Price quotation. निर्यातसंगठन : अर्थ, प्रभावितकरनेवाले घटकऔरप्रकार, समुद्रपारीय उत्पादविकासः इसकीअवधारणा एवं वधियॉ।मूल्य निर्धारणऔरइसके घटक।मुल्य निर्धारण की वधियां, मॅलय निविदा।
Unit-III	Direct Trading and Indirect Trading : Meaning and Methods, Methods of Payment in international Marketing. प्रत्यक्ष व्यापारऔरअप्रत्यक्ष व्यापार : अर्थऔरविधियां, अंर्त्राष्ट्रीय बाजारमेंभुगतान की पद्धतिया।
Unit-IV	Export Credit : Meaning, Nature, Influencing factors and significance, Methods of Export Credit, Export Credit and Finance in India, Risk in Export Trade, Role of the Export Credit Guarantee Corporation of India Limited, The Export-Import Bank of India. निर्यातसाख : अर्थप्रकृतिमहत्वऔरप्रभावित, करनेवाले घट निर्यातसाख की विधियां।भारतमेंनिर्यातसाख औरवित्त।निर्यातव्यापारमेंजोखिम।निर्यातसाख गारन्टीकारपोरेशन की भूमिकाभारत का आयातनिर्यातबैंक।

Unit-V	Export and Import Procedure : Documentation in foreign trade, Bilateral and Multilateral Trade Agreements, Its meaning, objective, types and significance, SAARC, Role of WTO in Foreign Trade. निर्यातआयातप्रविधः विदेशीव्यापारमेंप्रपत्रीकरणा, द्विपक्षीय एवंबहुपक्षीय व्यापार समझोते–अर्थ, उद्देश्य, प्रकार, औरमहत्व।साउथ एशिया एसोशिएशनऑफरीजनलकोआपोरेशन (सार्क) विदेशीव्यापारमेंविश्वव्यापारमेंविश्वव्यापारसंगठन की भूमिका ।

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Class	:	M.Com.
Semester	:	IV
Title of Subject	:	Rural & Agricultural Marketing
Paper	:	III
Course Code	:	MCOM-915
Compulsory /Optional	:	Optional
Max. Marks	:	85

Course Outcomes

CO1- Explain about Indian Rural Marketing its demand and dimension and segmentation Fro Approach of Product from rural Areas.

CO2- Students will understand the structure of agricultural marketing's structure and study Agricultural Goods and how its different from manufactured Goods.

CO3- Learn challenges and apport unition of rural marketing.

CO4- Knowledge about regulations of market its Advantage, Limitations and future of Regulated market in India.

CO5- Students will get Insight into difference process and sales method.

Unit-I	Rural Marketing: Position of Indian rural marketing and Approach to rural markets of India, Rural consumer and demand dimensions and Market segmentations,Channels of distribution and physical distribution Product management, Marketing communication and sales force tasks. ग्रामीणविवपणन (बाजार): भारतीय ग्रामीणविपणन की स्थिति एवंभारत के ग्रामीणबाजारों के प्रतिदृष्टिकोण, ग्रामीणउपभोक्ताऔरमांग के आयाम एवंबाजारविभक्तिकरण, वितरणवाहिकाएँऔरभौतिकवितरणउत्पादप्रबंध, विपणनसंचारऔरविक्रय शक्ति घटक।
Unit-II	Agricultural Marketing: Concept, Nature, Scope and Subject matter, Classification of agricultural products and their difference with manufactured goods. Agriculture market: Meaning, Components, Dimensions and Classification. Market structure; Dynamics of Market structure, Components of market, structure and Market forces. कृषिविपगणन–अवधारणा, प्रकृति, क्षेत्र औरविषय सामग्री, कृषिउन्यादो का वर्गीकरणऔरउनकानिर्मितमाल से अन्तर, कृषिबाजार–अर्थ घटकआयामऔरवर्गीकरण । बाजारसंरचना–बाजारसंरचना की क्रियाशीलताबाजार के घटक, बाजारसंरचना की शक्तियॉ।
Unit-III	Market Management and Channel Strategy: Modern marketing management and agricultural products, Structured organized markets-commodity exchange and produce exchange, Cash market, Forward dealing, Exchange market, Speculative market, Channels of distribution for consumer goods, Agricultural consumer goods and Agricultural raw materials. बाजारप्रबंध एवंवाहिकाव्यूहरचना: आधुनिकविपणनप्रबंध औरकृषिउत्पाद, संरचनात्मकसंगठितबाजारवस्तुविनिमय औरउत्पादविनिमय नकदबाजारअग्रेषितव्यवहारविनिमय बाजार, सट्टाबाजारउपभोक्तामाल के लिए वितरणवहिकाए कृषिकीय उपभोक्तामालकृषिकीय कच्चामाल।

Unit-IV	Rural Market in India: Regulated market, Genesis of regulated market in India, Limitations in present marketing regulation, Advantages and Limitations of regulated market, Organization of regulated market, Future of regulated and regulated markets in India. भारतमेंग्रामीणबाजारः बाजारों का नियमन–नियमितबाजारभारतमेंनियमितबाजारों की संरचना, वर्तमानविपणननियमनसीमाएं, नियमितबाजार के लाभऔरसीमाएंनियमितबाजारों का संगठनभारतमेंनियमितबाजारों का भविष्य ।
Unit-V	Marketing of Farm Products : Packaging – Packing and Packaging, Packing material. Transportation Advantages, Means of transport and Transportation cost. Grading and Standardization-Meaning, Type, Criteria, Labeling and specification, storage, Warehousing, Processing and Selling. कृषिउत्पादो का विपणन : संवेष्ठन–संवेष्ठनऔरपैकिंग, सेवेष्ठन, सामग्री, कृषिउत्पादनविपणन यातायातलाभ, यातायात के माध्यम और यातायातलागत।श्रेणीयॉ/ग्रेडिंग एवंप्रमापीकरण–अर्थ, प्रकार, कसौटी, लेबलिग एवंविशिष्टीकरण, संग्रहणप्रक्रियण औरबिक्रय।

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Session 2016-17 To 2020-21

Class	:	M.Sc.
Semester	:	I
Title of Subject	:	Mathematics for Chemists
Paper	:	V(A)
Course Code	:	CHE-705
Compulsory /Optional	:	Compulsory
Max. Marks	:	85+15CCE

Course Outcomes

CO1– Basics of vectors, vector calculus and matrix algebra
CO2– Differential calculus
CO3– Integral calculus
CO4- Elementary first order and second order differential equations and its application to chemical kinetics, quantum chemistry etc.
CO5- Permutations, combinations and probability

Unit I	**Vectors** Vectors, dot, cross and triple products etc. gradient, divergence and curl, Vector Calculus. **Matrix Algebra** Addition and multiplication; inverse, adjoint and transpose of matrices.
Unit II	**Differential Calculus** Functions, continuity and differentiability, rules for differentiation, applications of differential calculus including maxima and minima (examples related to maximally populated rotational energy levels, Bohr's radius and most probable velocity from Maxwell's distribution etc.).
Unit III	**Integral calculus** Basic rules for integration, integration by parts, partial fractions and substitution. Reduction formulae, applications of integral calculus.Functions of several variables, pa differentiation, co-ordinate transformations (e.g. Cartesian to spherical polar).
Unit IV	**Elementary Differential equations** First-order and first degree differential equations, homogenous, exact and linear equations. Applications to chemical kinetics, secular equilibria, quantum chemistry etc. second order differential equation and their solutions.
Unit V	**Permutation and Probability** Permutations and combinations, probability and probability theorems average, variance root means square deviation examples from the kinetic theory of gases etc., fitting (including least squares fit etc with a general polynomial fit.

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Class	:	M.Sc.
Semester	:	I
Subject	:	Chemistry
Paper	:	Pratical
Title of paper	:	Inorganic Chemistry
Course Code	:	PR-CHE-701
Compulsory / Optional	:	Compulsory
Max. Marks	:	33

(Duration: 6-8 hrs in each branch)
Practical examination shall be conducted separately for each branch.

Course Outcomes

After pursuing this course, the students can:

CO1- analyse inorganic mixture containing eight radicals including insoluble and rare earths,
CO2- perform chromatographic techniques like column chromatography, paper chromatography
CO3- prepare various inorganic compounds and perform spectral analysis and magnetic susceptibility measurement of these compounds

Examination Scheme

Quantitative Analysis	:	08 Marks
Chromatography	:	08 Marks
Preparation	:	08 Marks
Record	:	04 Marks
Viva Voce	:	05 Marks
Total	**:**	**33 Marks**

Experiments

1. Qualitative Analysis of Inorganic Mixture containing eight radicals (including insoluble and rare earth)
   a. Less common metal ions :Ti, Mo, W, Ti, Zr, Th, V, U (two metal ions in cationic/anionic forms).
   b. Insoluble- Oxides, sulphates and halides.

2. Chromatography Separation of cations and anions by Paper Chromatography and column chromatography : ion exchange

3. Preparations

Preparation of selected inorganic compounds and their studies by I.R. electronic spectra, Mossbauer, E.S.R. and magnetic susceptibility measurements. Handling of air and moisture sensitive compounds.

1. $VO(acac)_2$
2. $TiO(C_9H_8NO)_2H_2O$
3. cis-$K[Cr(C_2O_4)_2(H_2O)_2]$
4. $Na[Cr(NH_3)_2(SCN)_4]$
5. $Ni(acac)_2$
6. $K_3[Fe(C_2O_4)_3]$
7. Prussian Blue, Turnbull's Blue.

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Class	:	M.Sc.
Semester	:	I
Subject	:	Chemistry
Paper	:	Pratical
Title of paper	:	Organic Chemistry
Course Code	:	PR-CHE-702
Compulsory / Optional	:	Compulsory
Max. Marks	:	33

(**Duration: 6-8 hrs in each branch)**
Practical examination shall be conducted separately for each branch.

Course Outcomes

After completion of this course, the students can:

CO1- separate, purify and perform identification of simple organic compounds of binary mixture and ternary mixture

CO2- synthesize simple organic compounds by different reactions and characterize the products by spectral techniques

Examination Scheme	
Qualitative Analysis	:12 Marks
Organic Synthesis	:12 Marks
Record	:04 Marks
Viva Voce	:05 Marks
Total	**:33 Marks**

Experiments

1. Qualitative Analysis

Separation, purification and identification of compounds of binary mixture (one liquid and one solid) using TLC and columns chromatography, chemical tests. IR spectra to be used for functional group identification.

2.Organic Synthesis

Synthesis of organic compounds by applying following methods

(i)Acetylation
(ii)Oxidation
(iii)Halogenation
(iv) benzoylation
(v)Reduction

The products may be characterized by spectral techniques.

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Class	:	M.Sc.
Semester	:	I
Subject	:	Chemistry
Paper	:	Pratical
Title of paper	:	Physical Chemistry
Course Code	:	PR-CHE-703
Compulsory / Optional	:	Compulsory
Max. Marks	:	34

(**Duration: 6-8 hrs in each branch)**
Practical examination shall be conducted separately for each branch.

Course Outcomes

After completion of this course, the students can:

CO1- Do calibration of volumetric apparatus like burette, pipette etc.
CO2- Determine velocity constant, order of the reaction and energy of activation for saponification, solubility and solubility product of sparingly soluble salts and strength of strong and weak acid;
CO3- Determine molecular weight by cryoscopic method, activity coefficient of an electrolyte, degree of dissociation of weak electrolyte;
CO4- Study surface tension concentration relationship,
CO5- Determine congruent composition and temperature of a binary system and also learn to construct phase diagram for three component system

Examination Scheme

Error Analysis and Statistical Data Analysis	:	08 Marks
Conductometry	:	09 Marks
Solution	:	08 Marks
Record	:	04 Marks
Viva Voce	:	05 Marks
Total	**:**	**34 Marks**

Experiments

1. Error Analysis and Statistical Data Analysis

Errors, types of errors, minimization of errors distribution curves precision, accuracy and combination; statistical treatment for error analysis, 't test, null hypothesis, rejection criteria. F & Q test; linear regression analysis, curve fitting.
Calibration of volumetric apparatus, burette, piette and standard flask.

2.Conductometry

i. Determination of the velocity constant, order of the reaction and energy of activation for saponification of ethyl acetate by sodium hydroxide conductometrically.
ii. Determination of solubility and solubility product of sparingly soluble salts (e.g. $PbSO_4$, $BaSO_4$) conductometrically.

iii. Determination of the strength of strong and weak acid in a given mixture conductometrically.

iv. to study the effect of solvent on the conductance of AgNO3/acetic acid and to determine the degree of dissociation and equilibirum constant in different solvents and in their mixtures (DMSO, DMF, dioxane, acetone, water) and to test the validity of Debye-Huckel-Onsager theory.

v. Determination of the activity coefficient of zinc ions in the solution of 0.002 M zinc sulphate using Debye Huckel's limiting law.

Solution

i. Determination of molecular weight of non-volatile and volatile electrolyte/ electrolyte by cryoscopic method and to determine the activity coefficient of an electrolyte.

ii. Determination of the degree of dissociation of weak electrolyte and to study the deviation from ideal behaviour that occurs with a strong electrolyte.

Adsorption To study surface tension-concentration relationship for solutions (Gibbs equation). Phase Equilibria

i. Determination of congruent composition and temperature of a binary system (e.g. diphenylamine-benzophenone system).

ii. To construct the phase diagram for three component system (e.g. chloroform-acetic acid-water).

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Class	:	M.Sc.
Semester	:	II
Subject	:	Chemistry
Paper	:	IV
Title of paper	:	Spectroscopy II and Diffraction Methods
Course Code	:	CHE-710
Compulsory / Optional	:	Compulsory
Max. Marks	:	85 + CCE 15

Course Outcomes

After completion of this course, the students understand:

CO1- Nuclear Magnetic Resonance spectroscopy, chemical shift, spin- spin interaction, spindecoupling and FT NMR
CO2– **V**arious concepts and applications of Nuclear Quadrupole Resonance Spectroscopy
CO3- Basic principles of Electron Spin Resonance Spectroscopy, its various concepts andapplications
CO4- X-ray diffraction, Bragg's condition, various methods of X-ray Structure, analysis of crystals, identification of unit cell
CO5- Concept of electron diffraction and neutron diffraction.

Unit I	**Nuclear Magnetic Resonance Spectroscopy** Nuclear spin, nuclear resonance, saturation, shielding of magnetic nuclei, chemical shift and its measurements, factors, influencing chemical shift, deshielding, spin -spin interactions, factors influencing coupling constant "j" Classification (AXB, AMX, ABC, A2B2 etc.). spin decoupling; basic ideas about instrument, NMR studies of nuclei other than protin-13C, 19F and 31P. FT NMR, advantages of FT NMR.
Unit II	**Nuclear Quadrupole Resonance Spectroscopy** Quadrupole nuclei, quadrupole moments, electric field gradient, coupling constant, splitting. Applications.
Unit III	**Electron Spin Resonance Spectroscopy** Basic principles, zero field splitting and Kramer's degeneracy, factors affecting the 'g' value. Isotropic and anisotropic hyperfine coupling constants, spin Hamiltonian, spin densities and Mc Connell relationship, measurement techniques, applications.
Unit IV	**X-ray Diffraction** Bragg condition, Miller indices, Laue Method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals, index reflections, identification of unit cells from systematic absences in diffraction pattern, Structure of simple lattices and X-ray intensities, structure factor and its relation to intensity and electron density, phase problem. Description of the procedure for an X-ray structure analysis, absolute configuration of molecules.

Unit V	**Electron Diffraction** Scattering intensity vs. scattering angle, Wierl equation, measurement technique, elucidation of structure of simple gas phase molecules. Low energy electron diffraction and structure of surfaces. **Neutron Diffraction** Scattering of neutrons by solids measurement techniques,Elucidation of structure of magnetically ordered unit cells.

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Class	:	M.Sc.
Semester	:	II
Subject	:	Chemistry
Paper	:	V
Title of paper	:	Computers for Chemists
Course Code	:	CHE-711
Compulsory / Optional	:	Compulsory
Max. Marks	:	85 + CCE 15

This is a theory cum-laboratory course with more emphasis on laboratory work

Course Outcomes

After pursuing this course, the students understand:
CO1-Basic structure and functioning of computer
CO2–Computer language and programming in FORTRAN/C/BASIC
CO3–Programming in chemistry
CO4-Use of computer programs
CO5-Applications of internet for chemistry with search engines

Particulars

Unit I	**Introduction to computers and Computing** Basic structure and functioning of computer with a PC as illustrative example. Memory I/O devices. Secondary storage Computer languages. Operating systems with DOS as an example Introduction to UNIX and WINDOWS. Principles of programming Alogrithms and flow-charts.
Unit II	**Computer Programming in FORTRAN/C/BASIC** (The language features are listed here with reference to FORTRAN. The instructor may choose another language such as BASIC or C the features may be replaced appropriately). Elements of the computer language. Constants and variables. Operations and symbols Expressions. Arithmetic assignment statement. Input and output Format statement. Termination statements. Branching statements as IF or GO TO statement. LOGICAL variables. Double precession variables. Subscripted variables and DIMENSION. DO statement FUNCTION AND SUBROUTINE. COMMON and DATA statement (Student learn the programming logic and these language feature by hands on experience on a personal computer from the beginning of this topic.)
Unit III	**Programming in Chemistry** Developing of small computer codes using any one of the languages ORTRAN/C/BASIC involving simple formulae in Chemistry, such as Van der Waals equation. Chemical kinetics (determination of Rate constant) Radioactive decay (Half Life and Average Life). Determination Normality, Molarity and Molality of solutions. Evaluation Electronegativity of atom and Lattice Energy from experimental determination of molecular weight and percentage of element organic compounds using data from experimental metal representation of molecules in terms of elementary structural features such as bond lengths, bond angles.
Unit IV	**Use of Computer programmes** Operation of PC. Data Processing. Running of standard Programs and Packages such as MS WORD, MS EXCEL -special emphasis on calculations and chart formations. X-Y plot. Simpson's Numerical Integration method. Programmes with data preferably from physical chemistry laboratory.
Unit V	**Internet** Application of Internet for Chemistry with search engines, various types of files like PDF, JPG, RTF and Bitmap. Scanning, OMR, Web camera.

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Class	:	M.Sc.
Semester	:	II
Subject	:	Chemistry
Paper	:	Pratical
Title of paper	:	Inorganic Chemistry
Course Code	:	PR-CHE-707
Compulsory / Optional	:	Compulsory
Max. Marks	:	33

(**Duration: 6-8 hrs in each branch)**
Practical examination shall be conducted separately for each branch.

Course Outcomes

After completion of this course, the students can:

CO1- separate and determine two metal ions using volumetric and gravimetric methods
CO2- separate cations and anions by column chromatography and ion exchange chromatography.
CO3- prepare selected inorganic compounds and also learn their structural spectral studies

Examination Scheme

Quantitative Analysis	:	08 Marks
Chromatography	:	08 Marks
Preparation	:	08 Marks
Record	:	04 Marks
Viva Voce	:	05 Marks
Total	**:**	**33 Marks**

Experiments

1. Quantitative Analysis
Separation and determination of two metal ions Cu-Ni, Ni-Zn, Cu-Fe etc. involving volumetric and gravimetric methods.

2. Chromatography
Separation of cations and anions by Column Chromatography : Ion exchange.

3. Preparations

Preparation of selected inorganic compounds and their studies by I.R., electronic spectra, Mossbauer, E.S.R. and magnetic susceptibility measurements. Handling of air and moisture sensitive compounds.

1. $[Co(NH_3)_6]$ $[Co(NO_2)_6]$

2. cis-$[Co(trien)\ (NO_2)_2]Cl.H_2O$
3. $Hg[Co(SCN)_4]$
4. $[Co(Py)_2Cl_2]$
5. $[Ni(NH_3)_6]Cl_2$
6. $Ni(dmg)_2$
7. $[Cu(NH_3)_4]SO_4.H_2O$

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Class	:	M.Sc.
Semester	:	II
Subject	:	Chemistry
Paper	:	Pratical
Title of paper	:	Organic Chemistry
Course Code	:	PR-CHE-708
Compulsory / Optional	:	Compulsory
Max. Marks	:	33

(**Duration: 6-8 hrs in each branch)**
Practical examination shall be conducted separately for each branch.

Course Outcomes

After completion of this course, the students can:

CO1- synthesize organic compounds with name reactions
CO2- perform quantitative analysis alongwith determination of some parameters of oil and water samples

Examination Scheme

Organic Synthesis	: 12 Marks
Qualitative Analysis	: 12 Marks
Record	: 04 Marks
Viva Voce	: 05 Marks
Total	**: 33 Marks**

Experiments

1. Organic Synthesis

(i) Synthesis of p-nitroaniline and p-bromoaniline. The Products may be Characterized by Spectral Techniques.
(ii) Synthesis involving following reactions
a. Aromatic electrophilic sustitutions :
b. Condensation reaction
c. Rearrangement reaction
d. Diazotisation reaction

2. Quantitative Analysis

Determination of the percentage or number of hydroxyl groups in an organic compound by acetylation method. Estimation of amines/phenols using bromate bromide solution/or acetylation method. Determination of iodine and Saponification values of an oil sample. Determination of DO, COD and BOD of water sample.

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Class	:	M.Sc.
Semester	:	II
Subject	:	Chemistry
Paper	:	Pratical
Title of paper	:	Physical Chemistry
Course Code	:	PR-CHE-709
Compulsory / Optional	:	Compulsory
Max. Marks	:	34

(**Duration: 6-8 hrs in each branch)**
Practical examination shall be conducted separately for each branch.

Course Outcomes

After completion of this course, the students can:

CO1- Determine the velocity constants of hydrolysis of an ester, oxidation of iodide ions by hydrogen peroxide etc. with the help of chemical kinetics experiments

CO2- determine the strengths of halides in a mixture, valency of mercurous ions, formation constant, stoichiometry of the complex potentiometrically

CO3- determine dissociation constant, thermodynamic constants

CO4- experiments using pH meter and polarimeter

Examination Scheme

Chemical Kinetics
Potentiometry/pH metry : 09 Marks
Polarimetry : 08 Marks
Record : 04 Marks
Viva Voce : 05 Marks
Total : 34 Marks

1. Chemical Kinetics

i. Determination of the effect of (a) Change of temperature (b) Change of concentration of reactant and catalyst and (c) Ionic strength of the media on the velocity constant of hydrolysis of an ester/ionic reaction.
ii. Determination of the velocity constant of hydrolysis of an ester/ionic reaction in micellar media.
iii. Determination of the velocity constant for the oxidation of iodide ions by hydrogen peroxide study the kinetics as an iodine clock reactions.
iv. Flowing clock reactions (Ref : Experiments in Physical Chemistry by Showmaker)
v. Determination of the primary salt effect on the kinetics of ionic reaction and testing of the Bronsted relationship (iodide ion is oxidised by persulphate ion).
vi. Oscillatory reaction.

2. Potentiometry/pH metry

i. Determination of strengths of halides in a mixture potentiometrically.
ii. Determination of the valency of mercurous ions potentiometrically.
iii. Determination of the strength of strong and weak acids in a given mixture using a potentiometer/pH meter.
iv. Determination of temperature dependence of EMF of a cell.
v. Determination of the formation constant of silver-ammonia complex and stoichiometry of the complex potentiometrically.
vi. Acid-base titration in a non-aqueous media using a pH meter.
vii. Determination of activity and activity coefficient of electrolytes.
viii. Determination of the dissociation constant of acetic acid in DMSO. DMF, acetone and dioxane by titrating it with KOH.
ix. Determination of the dissociation constant of monobasic/dibasic acid by Albert- Sderjeant method.
x. Determination of thermodynamic constants, DG, DS, and DH for the reaction by e.m.f. method. Zn + $H_2SO_4 \rightarrow ZnSO_4$ + 2 H

3. Polarimetry

i. Determination of rate constant for hydrolysis/inversion of sugar using a polarimeter.
ii. Enzyme kinetics-inversion of sucrose.

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Class	:	M.Sc.
Semester	:	III
Subject	:	Chemistry
Paper	:	I
Title of paper	:	Application of Spectroscopy-**I**
Course Code	:	CHE-712
Compulsory / Optional	:	Compulsory
Max. Marks	:	85 + 15 CCE

Course Outcomes

CO1-D - D transitions taking place in octahedral, tetrahedral and square planar metal complexes
CO2-Mode of bonding of ambidentate ligands and applications of Resonance Raman spectroscopy
CO3- NMR spectroscopy., chemical shift, shielding, deshielding, spin - spin interaction and an idea of chemical shift values of different types of organic compounds
CO4-Chemical exchange effect of deuteration, complex spin- spin interaction and NOE
CO5- Mossbauer Spectroscopy, basic principles, technique and spectral parameters

Unit-1	**Electronic Spectroscopy** **Electronic Spectral Studies for d^1 – d^9systems in octahedral, tetrahedral and square planer complexes**
Unit-2	**Vibrational Spectroscopy** Symmetry and shapes of AB_2, AB_3, AB_4, AB_5 and AB_6, mode of bonding of ambidentate ligands, nitrosyl, ethylenediamine and diketonato complexes, application of resonance Raman spectroscopy and its applications.
Unit-3	**Nuclear Magnetic Resonance Spectroscopy-I** General introduction and definition, chemical shift, spin-spin interaction, shielding and deshielding mechanism, mechanism of measurement of chemical shift values and correlation for protons bonded to carbon (aliphatic, olefinic, aldehydic and aromatic) and other nuclei (alcohols, phenols, enols, carboxylic acids, amines, amides &mercapto).
Unit-4	**Nuclear Magnetic Resonance Spectroscopy-II** Chemical exchange, effect of deuteration, Complex spin spin interaction between two, three, four and five nuclei (I order spectra) Stereochemistry, hindered rotation, Karplus curve-variation of coupling constant with disordered angle. NMR shift reagents, solvent effects. nuclear overhauser effect (NOE).
Unit-5	**Mössbauer Spectroscopy** Basic principles, spectral parameters and spectrum display. Application of the technique to the studies of (1) bonding and structures of Fe^{+2} and Fe^{+3} compounds including those of intermediate spin, (2) Sn^{+2} and Sn^{+4} compounds nature of M-L bond, coordination number, structure and (3) detection of oxidation state and inequivalent MB atoms.

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Class	:	M.Sc.
Semester	:	III
Subject	:	Chemistry
Paper	:	II
Title of paper	:	Photochemistry
Course Code	:	CHE-713
Compulsory / Optional	:	Compulsory
Max. Marks	:	85 + CCE 15

Course Outcomes

CO1- photochemical reactions, excitations, fate of excited molecule, transfer of excitation energy
CO2- determination of reaction mechanism
CO3- photochemistry of alkenes and aromatic compounds
CO4- photochemistry of carbonyl compounds
CO5- miscellaneous photochemical reactions like formation of smog, photochemistry of vision

Unit-1	**Photochemical Reactions** Interaction of electromagnetic radiation with matter, types of excitations, fate of excited molecule, quantum yield, transfer of excitation energy, actinometry.
Unit-2	**Determination of Reaction Mechanism** Classification, rate constants and life times of reactive energy state, determination of rate constants of reactions. Effect of light intensity on the rate of photochemical reactions. Types of photochemical reactions-photo dissociation, gas-phase photolysis.
Unit-3	**Photochemistry of Alkenes** Intramolecular reactions of the olefinic bond-geometrical isomerism, cyclisation reactions, rearrangement of 1,4- and 1,5-dienes. **Photochemistry of Aromatic Compounds** Isomerisations, additions and substitutions.
Unit-4	**Photochemistry of Carbonyl Compounds** Intramolecular reactions of carbonyl compounds-saturated, cyclic and acyclic, β,γ unsaturated and α, β unsaturated compounds, cyclohexadienones. Intermolecular cyloaddition reactions-dimerisations and oxetane formation.
Unit-5	**Miscellaneous Photochemical Reactions** Photo-Fries reactions of annelides, Photo-Fries rearrangement. Barton reaction. Singlet molecular oxygen and its reactions. Photochemical formation of smog. Photodegradation of polymers. Photochemistry of vision.

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Class	:	M.Sc.
Semester	:	III
Subject	:	Chemistry
Paper	:	**III**
Title of paper	:	Environmental Chemistry
Course Code	:	CHE-714
Compulsory / Optional	:	Compulsory
Max. Marks	:	85 + CCE 15

Course Outcomes

CO1-Atmosphere, atmospheric chemistry, tropospheric chemistry, biogeochemical cycles
CO2-Air pollution, greenhouse effect, acid rain and stratospheric ozone depletion
CO3-Aquatic chemistry, water pollution
CO4-Environmental toxicology, toxic heavy metals, toxic organic compounds, polychlorinated biphenyls, polynuclear aromatic hydrocarbons
CO5-Composition of soil, soil pollution and some environmental disasters

Unit-1	**Atmosphere** Atmospheric layers, Vertical temperature profile, heat/radiation budget of the earth atmosphere systems. Properties of troposphere, thermodynamic derivation of lapse rate. Temperature inversion. Calculation of Global mean temperature of the atmosphere. Pressure variation in atmosphere and scale height. Biogeochemical cycles of carbon, nitrogen, sulphur, phosphorus, oxygen. Residence times. **Atmospheric Chemistry** Sources of trace atmospheric constituents : nitrogen oxides, sulphurdioxide and other sulphur compounds, carbon oxides, chlorofluorocarbons and other halogen compounds, methane and other hydrocarbons. **Tropospheric Photochemistry** Mechanism of Photochemical decomposition of NO_2 and formation of ozone. Formation of oxygen atoms, hydroxyl, hydroperoxy and organic radicals and hydrogen peroxide. Reactions of hydroxyl radicals with methane and other organic compounds. Reaction of OH radicals with SO_2 and NO_2. Formation of Nitrate radical and its reactions. Photochemical smog meteorological conditions and chemistry of its formation.
Unit-2	**Air Pollution** Air pollutants and their classifications. Aerosols-sources, size distribution and effect on visibility, climate and health. **Acid Rain** Definition, Acid rain precursors and their aqueous and gas phase atmospheric oxidation reactions. Damaging effects on aquatic life, plants, buildings and health. Monitoring of SO_2 and NO_2. Acid rain control strategies. **Stratospheric Ozone Depletion** Mechanism of Ozone formation, Mechanism of catalytic ozone depletion, Discovery of

	Antarctic Ozone hole and Role of chemistry and meteorology. Control Strategies. **Green House Effect** Terrestrial and solar radiation spectra, Major green house gases and their sources and Global warming potentials. Climate change and consequences. **Urban Air Pollution** Exhaust emissions, damaging effects of carbon monoxide. Monitoring of CO. Control strategies.
Unit-3	**Aquatic Chemistry and Water Pollution** Redox chemistry in natural waters. Dissolved oxygen, biological oxygen demand, chemical oxygen demand, determination of DO, BOD and COD. Aerobic and anaerobic reactions of organic sulphur and nitrogen compounds in water, acid-base chemistry of fresh water and sea water. Aluminum, nitrate and fluoride in water. Petrification. Sources of water pollution. Treatment of waste and sewage. Purification of drinking water, techniques of purification and disinfection.
Unit-4	**Environmental Toxicology** **Toxic heavy metals :**Mercury, lead, arsenic and cadmium. Causes of toxicity. Bioaccumulation, sources of heavy metals. Chemical speciation of Hg, Pb, As, and Cd. Biochemical and damaging effects. **Toxic Organic Compound :** Pesticides, classification, properties and uses of organochlorine and ionospheres pesticides detection and damaging effects. **Polychlorinated biphenyls :** Properties, use and environmental continuation and effects. **Polynuclear Aromatic Hydrocarbons :** Source, structures and as pollutants.
Unit-5	**Soil and Environmental Disaster** Soil composition, micro and macronutrients, soil pollution by fertilizers, plastic andmetals. Methods of re-mediation of soil. Bhopal gas tragedy, Chernobyl, three mile island, Minimtata Disease, Sevoso (Italy), London Smog.

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Class	:	M.Sc.
Semester	:	III
Subject	:	Chemistry
Paper	:	OP-I
Title of paper	:	Polymers
Course Code	:	CHE-715OPI
Compulsory / Optional	:	Optional
Max. Marks	:	85 +15 CCE

Course Outcomes

CO1- Basic concepts of polymers**,** polymerization conditions, polymer reactions

CO2- Polymer characterization**,** polymerization in homogeneous and heterogeneous systems

CO3- Analysis and testing of polymers

CO4- Concepts of inorganic polymers

CO5- Structure, properties, and applications of different types of polymers

Unit-1	**Basics** Importance of polymers. Basic concepts: Monomers, repeat units, degree of polymerization Linear, branched and network polymers. Classification of polymers. Polymerization: condensation, addition/radical chain-ionic and co-ordination and copolymerization. Polymerization conditions and polymer reactions. Polymerization in homogeneous and heterogeneous systems.
Unit-2	**Polymer Characterization** Polydispersion-average molecular weight concept. Number, weight and viscosity average molecular weights. Polydispersity and molecular weight distribution. The practical significance of molecular weight. Measurement of molecular-weights. End-group, viscosity, light scattering, osmotic and ultracentrifugation methods.
Unit-3	**Analysis and testing of polymers** Chemical analysis of polymers, spectroscopic methods, X-ray diffraction study. Microscopy. Thermal analysis and physical testing-tensile strength, fatigue, impact, tear resistance, Hardness and abrasion resistance.

Unit-4	**Inorganic Polymers** A general survey and scope of Inorganic Polymers, special characteristics, classification, homo and hetero atomic polymers. Structure, Properties and Applications of a. Polymers based on boron-borazines, boranes and carboranes. b. Polymers based on Silicon, silicone's polymetalloxanes and polymetallosiloxanes, silazanes.
Unit-5	**Structure, Properties and Applications of Polymers** a. Polymers based on Phosphorous-Phosphazenes, Polyphosphates b. Polymers based on Sulphur-Tetrasulphur tetranitride and related compounds. **c.** Co-ordination and metal chelate polymers.

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Class	:	M.Sc.
Semester	:	III
Subject	:	Chemistry
Paper	:	OPT-II
Title of paper	:	Industrial Chemistry-Heavy Chemicals & Petroleum
Course Code	:	CHE-716 OP2
Compulsory / Optional	:	Optional
Max. Marks	:	85 + 15 CCE

Course Outcomes

After pursuing this course, the students understand:

CO1- water pollutants, thermal pollution, various methods of water purification
CO2- large scale production of different gases and heavy chemicals
CO3-coal, its origin, composition etc. and economic importance
CO4-petroleum, its origin, refining, composition etc. and its economic importance
CO5-fats and oils, hydrogenation of unsaturated oils, manufacture of vanaspati and margarine

Unit-1	**Water,Gases and Heavy Chemicals** **Water :**Waterpollutants,their classes with examples .Biochemical Oxygen Demand,thermalpollution,pollution by fertilizers,detergents,pesticides and industrial wastes. **Water Purification :**Classical and modern Methods – Ion exchange , electrodialysis, Reverse osmosis, Softening of Hard water.Chlorination and Fluoridation.
Unit-2	**Gases :** Chemistry large –scale production ,storage, hazards and use of the following industrial gases: Hydrogen, oxygen, nitrogen, carbon dioxide, chlorine, fluorine, sulphur dioxide, phosgene, acetylene, argon, neon and helium. **Heavy Chemicals :**Manufacture, Physical properties, Analysis, Hazards and application of the following chemicals : HCI,H_2SO_4, HNO_3,H_3FO_4, polyphosphoric acid,$NaHCO_3$, Na_2CO_3,NaOH,NaCl,$Na_2S_2O_3$,Bleaching Powder,Bromine.
Unit-3	**Coal & Petroleum** Coal : Origin and economic importance of coal. Coal composition, coal carbonization, coal gasification, Coal Gas, Water Gas, Producer Gas ,coal tar industry and manufacture of coal tar based chemicals and their importance. Role of carcinogens, Non–fuel uses of coal and CI Chemistry based on MeOH, CO, CO_2,CH_4 and CH_2O.

Unit-4	**Petroleum:** Origin and composition, Refining, Reforming Fractionation;Cracking;knocking and Octane number, kerosene and Napthe; Liquified petroleum gas (L.P.G.)Synthetic Gas,SyntheticPetrol,Petrochemicals, manufacture of ethylene, propylene , Butadiene, xylenes, etc. Economic importance with particular reference to India.
Unit-5	**Fats & Oils** Fats & Oil Natural Fats, Edible and Industrial Oils of vegetable origin, common fatty acids and glycerides, hydrogenation of unsaturated oils, manufacture of Vanaspati and margarine.

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Class	:	M.Sc.
Semester	:	III
Subject	:	Chemistry
Paper	:	Pratical
Title of paper	:	A Inorganic Chemistry
Course Code	:	PR-CHE-717
Compulsory / Optional	:	Compulsory
Max. Marks	:	33

(**Duration: 6-8 hrs in each branch)**
Practical examination shall be conducted separately for each branch.

Course Outcomes

CO1- determine quantitatively three component mixtures volumetrically and gravimetrically
CO2- perform chromatographic techniques like paper chromatography and thin layer chromatography for the separation of metal ions.

Examination scheme

1.	Quantitative determinations of a three component mixture	: 12 Marks
2.	Chromatographic separations	: 12 Marks
	Record	:04 Marks
	Viva Voce	:05 Marks
	Total	**:33 Marks**

Experiments

1 . Quantitative determinations of a three component mixture:
One volumetrically and two gravimetrically

a . Cu^{+2}, Ni^{+2}, Zn^{+2}
b . Cu^{+2}, Ni^{+2}, Ag^{+1}

2 . Chromatographic separations
a . Cadmium and Zinc.
b . Zinc and Magnesium.
c . Thin-Layer/ paper chromatogtaphy-separation of nickel, manganese, cobalt and zinc.
Determination of R_f values.

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Class	:	M.Sc.
Semester	:	III
Subject	:	Chemistry
Paper	:	Pratical
Title of paper	:	B Organic Chemistry
Course Code	:	PR-CHE-718
Compulsory / Optional	:	Compulsory
Max. Marks	:	33

(**Duration: 6-8 hrs in each branch)**
Practical examination shall be conducted separately for each branch.

Course Outcomes

CO1- Do the estimation of elements and functional groups in organic compounds
CO2-perform the technique of paper chromatography

Examination scheme

1. Estimations	: 12Marks
2. Paper Chromatography	: 12 Marks
Record	:04 Marks
Viva Voce	:05 Marks
Total	**:33 Marks**

Experiments

1 . Estimations
1 . Estimation of element: Estimation of Sulphur, Nitrogen, and Halogens.
2 . Estimation of Functional group and simple organic compound -estimation of Carboxylic group, Aldehyde group, Ketonic group, Carbohydrate group etc.

2**. Paper Chromatography**
Separation and identification of the sugars present in the given sample of glucose,fructose and sucrose by paper chromatography and determination of $R_f$values.

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Class	:	M.Sc.
Semester	:	III
Subject	:	Chemistry
Paper	:	Pratical
Title of paper	:	C Physical Chemistry
Course Code	:	PR-CHE-719
Compulsory / Optional	:	Compulsory
Max. Marks	:	34

(**Duration: 6-8 hrs in each branch)**
Practical examination shall be conducted separately for each branch.

Course Outcomes

CO1-perform various chemical kinetics practical's

CO2- Determine pKa of an indicator (methyl red), study of stoichiometry and stability constant of complex ion in solution, perform oxidation of alcohol by Ce(IV) etc. spectroscopically

Examination scheme

1.	Spectroscopy	: 13 Marks
2.	Chemical Kinetics	: 12 Marks
	Record	:04 Marks
	Viva Voce	:05 Marks
	Total	**:34 Marks**

Spectroscopy& Chemical Kinetics

i. Determination of pKa of an indicator (e.g. methyl red) in (a) aqueous and (b) micellar Media.
ii. Determination of stoichiometry and stability constant of Ferricisthiocoyanation complex in solution.
iii. Determination of rate constant of alkaline bleaching powder of malachite green and effect of ionic strength on the rate of reaction.
iv. Determination of energy and enthalpy of activation in the reaction of $KMnO_4$and Benzyl alcohol in the acidic medium.
v. Determination of energy of activation and entropy of activation from a single kinetic run.
vi. Kinetics of an enzyme micellar catalyzed reactions.
vii. Kinetics of reaction between acetone and iodine spectrophotometrically.
viii. Spectrometric study of oxidation of alcohol by Ce(IV)
ix. Oxidation of alcohols by chromic acid – a kinetic study.
x. Determination of CMC spectrophotometrically.

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Class	:	M.Sc.
Semester	:	IV
Subject	:	Chemistry
Paper	:	I
Title of paper	:	**Application of Spectroscopy-II**
Course Code	:	CHE-720
Compulsory / Optional	:	Compulsory
Max. Marks	:	85 +15 CCE

Course Outcomes

CO1- Various electronic transitions Beer Lambert law, Fieser Woodward rule, students develop the skill to interpret the spectra

CO2-Infrared Spectroscopy, characteristic frequencies of different organic compounds, effect of hydrogen bonding and solvent effect, students develop the skill to interpret the spectra

CO3- contact and Pseudo contact shifts in NMR and applications of NMR

CO4- C-13 NMR spectroscopy, its various concepts and two-dimensional NMR spectroscopy

CO5-Mass spectrometry, introduction, various methods of ion production, mass spectra of common functional groups, McLafferty rearrangement, Nitrogen rule, students develop the skill of structure elucidation with the knowledge of various spectra

Unit-1	**Ultraviolet and Visible spectroscopy** Various electronic transitions (185-800 nm) Beer-Lambert law, Effect of solvent on electronic transitions, ultraviolet bands for carbonyl compounds, unsaturated carbonyl compounds, dienes, conjugated polyenes, Fieser Woodward rules for conjugated dienes and carbonyl compounds, ultraviolet spectra of aromatic compounds. Steric effect in biphenyls.
Unit-2	**Infrared Spectroscopy** Characteristic vibrational frequencies of alkanes, alkenes, alkynes, aromatic compounds, alcohols, ethers, phenols and amines. Detailed study of vibrational frequencies of carbonyl compounds (ketones, aldehydes, esters, amides, acids, anhydrides, lactones, lactams and conjugated carbonyl compounds). Effect of hydrogen bonding and solvent effect on vibrational frequencies, overtones, combination bands and fermi resonance.
Unit - 3	**Nuclear Magnetic Resonance of Paramagnetic Substances in Solution** The contact and Pseudo contact shifts, factors affecting nuclear relaxation, some applications including biochemical systems, an overview of NMR of metal nuclide with emphasis on ^{195}Pt and ^{119}Sn NMR.
Unit-4	**Carbon-13 NMR Spectroscopy** General considerations, chemical shift (aliphatic olefinic, alkyne, aromatic, heteroaromatic and carboynl carbon), coupling constants. Two dimension NMR spectroscopy-COSY, NOESY, DEPT, HMBC and HMQC techniques.

Unit-5	**Mass Spectrometry** Introduction, ion production E1, C1 FD, ESI and FAB, factors affecting fragmentation, ion analysis, ion abundance Mass spectral fragmentation of organic compounds, common functional groups, m etastable peak. Me Lafferty rearrangement. Nitrogen rule. Higl trometry. Structure elucidation of simple molecules using UV nd mass spectral techniques.

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Class : M.Sc.

Semester	:	IV
Subject	:	Chemistry
Paper	:	III
Title of paper	:	Biochemistry
Course Code	:	CHE-722
Compulsory / Optional	:	Compulsory
Max. Marks	:	85 + CCE 15

Course Outcomes

CO1- Role of metal ions in biological systems; bulk and trace metals, DNA polymerisation, glucose storage, metal complexes in transmission of energy; transport and storage of dioxygen

CO2- Electron transfer processes, biological and chemical nitrogen fixation

CO3- Enzymes, mechanism of enzyme action and kinetics of enzyme-catalysed reactions

CO4- Co-enzyme chemistry, enzyme models, biotechnological applications of enzymes. This helps students in setting their own units or career as a chemist.

CO5- Biological cell and its constituents, bioenergetics, biopolymer interactions, cell membrane and transport of ions

Unit-1	**Metal Ions in Biological Systems** Bulk and trace metals with special reference to Na, K, Mg, Ca, Fe, Cu, Zn, Co, and K^+/Na^+ pump. **Bioenergetics and ATP Cycle** DNA polymerisation, glucose storage, metal complexes in transmission of energy; chlorophyll's, photosystem I and photosystem II in cleavage of water. **Transport and Storage of Dioxygen** Haem proteins and oxygen uptake structure and function of haemoglobin's, mygolobin, haemocyaninsand hemerythrin, model synthetic complexes of iron, cobalt and copper.
Unit-2	**Electron Transfer in Biology** Structure and function of metal of proteins in electron transport processes cytochrome's and iron-sulphur proteins, synthetic models. **Nitrogen fixation** Biological nitrogen fixation, and its mechanism, nitrogenase, Chemical nitrogen fixation.
Unit-3	**Enzymes** Introduction and historical perspective, chemical and biological catalysis, remarkable properties of enzymes like catalytic power, specificity and regulation. Nomenclature and classification, extraction and purification. Fischer's lock and key and Koshalnd's induced fit hypothesis, concept and identification of active site by the use of inhibitors, affinity labeling and enzyme modification by site-directed mutagenesis. Enzyme kinetics, Michael's-Menten and Lineweaver Burk plots, reversible and irreversible inhibition. **Mechanism of Enzyme Action** Transition-state theory, orientation and Steric effect, acid-base catalysis, covalent catalysis, strain or distortion. Examples of some typical enzyme mechanisms for chemotrypsin, ribonuclease, lysozyme and carboxypeptidase. **Kinds of Reactions Catalysed by Enzymes**

	Nucleophilic displacement on a phosphorus atom, multiple displacement reactions and the coupling of ATP cleavage to endergonic processes. Transfer of sulphate, addition and elimination reactions, enolic intermediates in isomerisation reactions, b-Cleavage and condensation, some isomerization and rearrangement reactions. Enzyme catalyzed carboxylation and decarboxylation.
Unit-4	**Co-Enzyme Chemistry** Cofactors as derived from vitamins, coenzymes, prosthetic groups, apoenzymes. Structure and biological functions of coenzyme A, thiamine pyrophosphate, pyridoxal phosphate, NAD+, NADP+, FMN, FAD, lipoic acid, vitamin B12. Mechanisms of reactions catalyzed by the above cofactors. **Enzyme Models** Host-guest chemistry, chiral recognition and catalysis, molecular recognition, molecular asymmetry and prochirality Biometric chemistry, crown ether, cryptates. Cyclodextrins, cyclodextrion-based enzyme models, clixarenes, ionospheres, micelles synthetic enzymes or synzymes. **Biotechnological Applications of Enzymes** large-scale prodcution and purification of enzymes, techniques and methods of immobilization of enzymes, effect of immobilization on enzyme activity, application ofimmobilized enzymes, use of enzymes in food and drink industry-brewing and cheese-making, syrups from cron starch, enzymes as targets for drug design. Clinical uses of enzymes, enzyme therapy, enzymes and recombinant DNA Technology.
Unit-5	**Biological Cell and its Constituents** Biological cell, structure and functions of proteins, enzymes, DNA and RNA in living systems. Helix coils transition. **Bioenergetics** Standard free energy change in biochemical reactions, exergonic, endergonic. Hydrolysis of ATP, synthesis of ATP from ADP. **Biopolymer Interactions** Forces involved in biopolymer interactions. Electrostatic charges and molecular expansion, hydrophobic forces, dispersion force interactions. Multiple equilibrium and various types of binding processes in biological systems. Hydrogen ion titration curves. **Cell Membrane and Transport of Ions** Structure and functions of cell membrane, ion transport through cell membrane, irreversible thermodynamic treatment of membrane transport. Nerve conduction.

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Class	:	M.Sc.
Semester	:	IV
Subject	:	Chemistry
Paper	:	OPT-1
Title of paper	:	Analytical Chemistry
Course Code	:	CHE-723(OP1)
Compulsory / Optional	:	Optional
Max. Marks	:	85 + 15 CCE

Course Outcomes

CO1- concept of analytical chemistry, cleaning, calibration of glassware, errors, and evaluation, types of errors in experimental data and uses of statistics
CO2- analysis of adulterants present in food
CO3- water pollution and methods for the analysis of different types of water pollutants
CO4- analytical methods employed in the analysis of soil, fuel, body fluids and drugs
CO5- clinical chemistry and drug analysis

Particulars

Unit-1	**Introduction** Role of analytical chemistry Classification of analytical methods classical and instrumental. Types of instrumental analysis. Selecting an analytical method. Neatness and cleanliness. laboratory operations and practices. Analytical balance. Techniques of weighing, errors. Volumetric glassware cleaning and calibration of glassware. Sample Volumetric glassware cleaning and Calibration of glassware. Sample preparation-dissolution and decompositions. Gravimetric techniques. Selecting and handling or reagents. Laboratory notebooks. Safety in the analytical laboratory. **Errors and Evaluation** Definition of terms in mean and median. Precision-standard deviation, relative standard deviation. Accuracy-absolute error, relative error. Types of error in experimental data determinate (systematic), indeterminate (or random) and gross. Sources of error and the effects upon the analytical results. Methods for reporting analytical data. Statistical evaluation of data-indeterminate errors. The uses of statistics.
Unit-2	**Food analysis** Moisture, ash, crude protein, fat crude fiber, carbohydrates, calcium, potassium, sodium and phosphate. Food adulteration-common adulterants in food, contamination of foods stuffs. Microscopic examination of foods for adulterants. Pesticide analysis in food prodcuts. Extraction and purification of sample. HPLC. Gas chromatography for organophosphates. Thin-layer chromatography for identification of chlorinated pesticides in food products.
Unit-3	**Analysis of Water Pollution** Origin of Waste water, types, water pollutants and their effects. Sources of water pollution-domestic, industrial, agricultural soil and radioactive wastes as sources of pollution. Objectives of analysis-parameter for analysis-colour, turbidity, total solids, conductivity, acidity, alakalinity, hardness, chloride, sulphate, fluoride, silica, phosphates adn different forms of nitrogen, Heavy metal pollution-public health significance of cadmium, chromium, copper, lead, zinc, managanese, mercurry and arsenic. General survey of instrumental technique for the analysis of heavy metals in aqueous systems. Measurements of DO, BOD, and COD. Pesticides as water pollutants and analysis. Water pollution laws and standards.

Unit-4	**Analysis of soil, Fuel, Body Fluids and Drugs** (a) Analysis of Soil, moisture pH total nitrogen, phosphorus, silica, lime, magnesia, manganese, sulphur and alkali salts. Fuel analysis : liquid and gas. Ultimate and proximate analysis-heating values-grading of coal. Liquid fuels-flash point, aniline point, octane number and carbon residue. Gaseous fuels-produced gas and water gas-calorific value.
Unit-5	(a) **Clinical Chemistry** : Composition of blood-collection and preservation of samples. Clinical analysis. Serum electrolytes, blood glucose, blood urea nitrogen, uric acid, albumin, globulins, barbiturates, acid and alkaline phosphates. Immunoassay : principles of radio immunoassay (RIA) and applications. The blood gas analysis trace elements n the body (b) **Drug analysis** : Narcotics and dangerous drug. Classification of drugs. Screening by gas and thin-layer chromatography and spectrophotometeric measurements.

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Class	:	M.Sc.
Semester	:	IV
Subject	:	Chemistry
Paper	:	OPT-2
Title of paper	:	Industrial Chemistry- Pesticides &Glass industries
Course Code	:	CHE-723 (OP2)
Compulsory / Optional	:	Optional
Max. Marks	:	85 + CCE 15

Course Outcomes

CO1- Preparation and uses of toilet and washing soaps, synthetic detergents
CO2- manufacture of fertilizers, types, composition, properties, testing and manufacture of glass and also understand ceramics and their types
CO3- different types of cements, manufacture of cement, ferrous industry and silicones
CO4- pesticides and food additives
CO5- Chemistry and synthesis of common pesticides

Unit-1	**Cleansing Agents** Cleansing agents: Toilet and washing soaps; preparation and uses, Synthetic detergents; alkyl aryl sulfonates, fatty alcohol surfaces, ethanolamines, nonionic detergents.
Unit-2	**Fertilizers and inorganic materials** **Fertilizers:** Fertilizers Industries in India, Manufacture of Ammonium salts, Urea, Nitrates, Phosphates and Superphosphates, Nitrogen fixation **Glass:** Types, their composition and properties testing glass. Manufacture of Glass Fibres. Optical Glass, Coloured Glasses, Lead Glass and Neutron Absorbing Glass **Ceramics:** Important clays and feldspar. Glazing and vitrification, Glass ceremics
Unit-3	**Cement:** Types and their manufacture, setting process **Ferrous Industry:** Manufacture of steel and other important alloys **Silicon:** Pre silicon, Electronics Industry
Unit-4	**Pesticides and Food additivies** **Pesticides and Food additivies:**Classification,importantcatogories of insecticides, fungicides, herbicides and rodenticides: Mode of action
Unit-5	**Chemistry and synthesis of common pesticides** : Such and Tabun, sarin, Daygon, DDYP, paraquat.

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Class	:	M.Sc.
Semester	:	IV
Subject	:	Chemistry
Paper	:	Pratical
Title of paper	:	A. Inorganic Chemistry
Course Code	:	PR-CHE-725
Compulsory / Optional	:	Compulsory
Max. Marks	:	33

(**Duration: 6-8 hrs in each branch)**
Practical examination shall be conducted separately for each branch.

Course Outcomes

CO1- prepare inorganic compounds and do their spectral studies
CO2- do spectrophotometric determinations
CO3- flame photometric determinations of sodium potassium lithium, calcium, strontium etc.

Examination Scheme

Preparation	:12 Marks
Spectrophotometric Determinations	:
Flame Photometric Determinations	: 12 Marks
Record	:04 Marks
Viva Voce	:05 Marks
Total	**:33 Marks**

Preparation

Preparation of selected inorganic compounds and their study by IR, electronic spectra, and magnetic susceptibility measurements. Handling of air and moisture sensitive compounds involving vacuum lines. Selection can be made from the following :

1. Sodium amide. Inorg. Synth., 1946, 2, 128.
2. Atomic absorption analysis of Mg and Ca.
3. Synthesis of trichlorodiphenylantimony (V) hydrate. Inorg. Synths., 1985, 23, 194
4. Sodium tetrathionate $Na_2S_4O_6$.
5. Metal complex of dimethyl sulfoxide : $CuCl_2$.2DMSO J.Chem. Educ., 1982, 59, 57.
6. Synthesis of metal acethylacetonate :Inorg. Synths, 1957, 5, 130, 1963, 1, 183.
7. Cis and Trns $[Co(en)_2CI_2]^+$.
8. Determination of Cr (III) complex. $[Cr(H_2O)_6]NO_3$.3HO,. Inorg. synths., 1972, 13, 184.
9. Preparation and use of Ferrocene. J. Chem. Edu. 1966, 43, 73; 1976, 53, 730.
10. Preparation of [Co(phenathroline-5,6 quinone)].

Spectrophotometric Determinations/ Spectroscopic identification of recorded spectra like IR, NMR, ESR and Mass

a. Manganese/Chromium in steel sample.
b. Nickel by extractive spectrophotometric method.
c. Fluoride/nitrite/phosphate.
d. Copper-Ethylene diamine complex : Slope-ratio method.

Flame Photometric Determinations

a. Sodium and potassium when present together.
b. Lithium/calcium/barium/strontium.
c. Cadmium and magnesium in tap water.

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Class	:	M.Sc.
Semester	:	IV
Subject	:	Chemistry
Paper	:	Pratical
Title of paper	:	B Organic Chemistry
Course Code	:	PR-CHE-726
Compulsory / Optional	:	Compulsory
Max. Marks	:	33

(**Duration: 6-8 hrs in each branch)**
Practical examination shall be conducted separately for each branch.

Course Outcomes

CO1- Prepare organic compounds by multi-step synthesis and purification of products by chromatographic techniques
CO2- Identify organic compounds by analyzing spectral data
CO3- Isolate some natural products and estimate some compounds spectrophometrically

Examination Scheme

Multi-step Synthesis of Organic Compounds	:12 Marks
Spectroscopy/Spectrophotometric Determinations	: 12 Marks
Record	:04 Marks
Viva Voce	:05 Marks
Total	**:33 Marks**

Multi-step Synthesis of Organic Compounds
The exercise should illustrate the use of organic reagents and may involve purification of the products by chromatographic techniques.

1. Photochemical reaction Benzophenone →Benzpinacol→Benzpinacolone
2. Beckmann rearrangement : Benzanilide from benzene Benzene→ Benzophenone →Benzphenone oxime →Benzanilide
3. Benzilic acid rearrangement :Benzilic acid from benzoin Benzoin→Benzil→Benzilic acid
4. Synthesis of heterocyclic compounds
5. Skraupsynthesis : Preparation of quinoline from aniline
6. Fisher Indole synthesis : Preparation of 2-phenylindole from phenylhydrazine.
7. Enzymatic synthesis
8. Enzymatic reduction : reduction of ethyl acetoacetate using Baker's yeast to yield enantiomeric excess of S (+) ehtyl-3-hydroxybutanoate and determine its optical purity.
9. Biosynthesis of ethanol from sucrose.

10. Synthesis using microwave Alkylation of diethyl malonate with benzyl chloride.
11. Synthesis using phase transfer catalyst. Alkylation of diethyl malonate or ethyl acetoacetate with an alkylhalide.

Spectroscopy

Identification of organic compounds by the analysis of their spectral data (UV, IR, PMR, CMR & MS)

Spectrophotometric (UV/VIS) Estimations/isolation of the following (any one compound)

Spectroscopic estimation

1. Amino acids
2. Proteins
3. Carbohydrates
4. Ascorbic acid
5. Aspirin
6. Caffeine

Isolation

1. Casein from milk
2. Lycopine from tomato
3. Piperine from black pepper
4. Caffeine from tea leaves
5. Lactose from milk

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Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of studies of Industrial Chemistry
Session 2017-18 To 2020-21

Class	:	M.Sc.
Semester	:	IV
Subject	:	Chemistry
Paper	:	Pratical
Title of paper	:	C Physical Chemistry
Course Code	:	PR-CHE-727
Compulsory / Optional	:	Compulsory
Max. Marks	:	34

(**Duration: 6-8 hrs in each branch)**
Practical examination shall be conducted separately for each branch.

Course Outcomes

After completion of this course, the students can:

CO1- perform experiments of spectroscopy, chemical kinetics, thermodynamics and polarography

Examination Scheme

Experiment No. 1	:13 Marks
Experiment No. 2	: 12 Marks
Record	:04 Marks
Viva Voce	:05 Marks
Total	**:34 Marks**

Experiments

Spectroscopy

Determination of PKa of an indicator (e.g. methyl red) in (a) aqueous and (b) micellar media.

i. Determination of stoichiometry and stability constant of Ferricisothicoyanation complex ion in solution.
ii. Determination of rate constant of alkaline bleaching of Malachite green and effect of ionic strength on the rate of reaction.

Chemical Kinetics

i. Determination of rate constant and formation constant of an intermediate complex in the reaction of Ce(IV) and Hypophosphorous acid at ambient temperature.
ii. Determination of energy and enthalpy of activation in the reaction of KMnO4 and benzyl alcohol in acid medium.
iii. Determination of energy of activation of and entropy of activation from a single kinetic run.
iv. Kinetics of an enzyme catalyzed reaction.

Thermodynamics

i. Determination of partial molar volume of solute (e.g.KCl) and solvent in a binary mixture.

ii. Determination of the temperature dependence of the solubility of a compound in two solvents having similar intromolecular in tetractions (benzoic acid in water and in DMSO water mixture and calculate the partial molar heat of solution.

iii. **Polarography**

Identification and estimation of metal ions such as Cd^{+2}, Pb^{+2}, Zn^{+2}, and i^{+2} etc. polarographically.

i. Study of a metal ligand complex polarographically (using Lingane's Method).

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Syllabus recommended by Board of Studies of Biotechnology
Session – 2016-17,2017-18,2018-19,2019-20,2020-21

Class : M.Sc
Semester : I
Paper : II
Subject : Biotechnology
Title of Subject Group : Structure, Function & Metabolism of Biomolecules
Max. Marks : 85+15 CCE
Course Code : BT-4002

Course Outcome

CO1- Students will be able to explain the structure-function relationships of biomolecules.
CO2- Student will be able to interpretate molecular structure, their properties and interactions present in carbohydrate
CO3- To learn the structure properties of amino acids and proteins
CO4- To learn the structure function and metabolism of nucleic acids.
CO5- To study the classification nomenclature and metabolism of fatty acids.

Unit-1	**Some important properties of water:** The law of Mass action;Dissociation of water and its ion product. pH, Bronsted Acids, ionization of weak acids and bases; Henderson-Hasselbalch equation, Titration curves and buffering action, physiological buffers. Principle of Thermodynamics.
Unit-2	**Carbohydrates:** Classification, structure, function and properties of sugars, storage polysaccharides and cell walls. Glycolysis, gluconeogenesis, HMP shunt and glycogen metabolism. Synthesis of cellulose and starch. Oxidative phosphorylation, compartmentation of respiratory metabolism. Regulation of carbohydrate metabolism.
Unit-3	**Proteins-Amino Acids:** essential and non-essential amino acids; common, rare and non-protein amino acids; acid base properties and chemical reactions of amino acids; stereochemistry and absorption spectra of amino acids. Biosynthesis and degradation of following amino acids: alanine, serine, lysine cysteine, arginine, methionine, tryptophan, phenylalanine glutamine. Proteins: Primary, secondary, tertiary and quaternary structure of proteins. Optical and chemical properties of peptides and small proteins. Hydrolysis of proteins: Action of different proteases. Regulation of amino acid metabolism.
Unit-4	**Nucleic acids:** general structure and functions of purines, pyrimidines, nucleosides, nucleotides; hydrolysis of nucleic acids. Biosynthesis of purines and pyrimidines, nucleosides and nucleotides. Degradation of purines and pyrimidines. Salvage pathway.
Unit-5	**Lipids:** Classification, nomenclature and structure of fatty acids, triacylglycerols, sphingolipids and phospholipids, waxes, glycolipids and sterols. Beta-oxidation of fatty acids, biosynthesis of fatty acids and triacylglycerols. Lipid proteins system and transport of lipoproteins of blood plasma. Regulation of lipid metabolism.

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Session – 2016-17,2017-18,2018-19,2019-20,2020-21

Class	:	M.Sc
Semester	:	I
Paper	:	III
Subject	:	Biotechnology
Title of Subject Group	:	General & Applied Microbiology
Max. Marks	:	85+15 CCE

Course Code: BT-4003

Course Outcome

CO1- Students will be able to understand the classification and nomenclature of Microorganism.

CO2- They will be able to learn Bacterial classification and study morphology and physiological characteristics of Bacteria

CO3- They will be able to study morphology and physiological characteristics of Virus

CO4- To study the microbial growth and study the culture collection and maintenance of culture

CO5- To study the control of microbial contamination.

Unit-1	**Introduction to Microbiology:** Historical background & scope, Difference between prokaryotic and eukaryotic organisms, structure of cell wall and peptidoglycan, Methods of Microbiology: Pure culture techniques, sterilization techniques, principle of microbial nutrition, preparation of culture media, enrichment culture techniques for isolation of microbes.
Unit-2	**Classification of Bacteria:** Basic principle and techniques used in bacterial classification. Phylogenetic polyphasic taxonomy and numerical taxonomy. New approaches of bacterial taxonomic classification including genetic methods, Ribotyping, Ribosomal RNA sequencing, characteristic of primary domains.
Unit-3	**Viruses:** General characteristics, Morphology, Classification andstructure of plant, animal and bacterial viruses, Cultivation of viruses, a brief account of Adenoviruses, Herpes, Retrovirus, Viroid's and prions.
Unit-4	**Microbial Growth:** The definition of growth, bacterial generation and doubling time, specific growth rate and yield measurement, Monoauxic, Diauxic and synchronized growth curve. Factors affecting microbial growth. Culture collection & maintenance of culture. Sporulation in bacteria.
Unit-5	Control of Microorganism by Physical & chemical agents: Antimicrobial agents, Sulfa drugs, Antibiotics (penicillin and cephalosporin) Broad Spectrum antibiotics, antibiotics from prokaryotes, Anti-fungal antibiotics, Mode of action (a brief account), resistance of antibiotics (a brief account).

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Session – 2016-17,2017-18,2018-19,2019-20,2020-21

Class	:	M.Sc
Semester	:	I
Paper	:	Practical
Subject	:	Biotechnology
Title of Subject Group	:	Laboratory – I
Max. Marks	:	85+15 CCE
Course Code	:	PR-BT-4005

Course Outcome

CO1- Students will be able to understand the classification and nomenclature of Microorganism.
CO2- They will be able to learn Bacterial classification and study morphology and physiological characteristics of Bacteria
CO3- They will be able to study morphology and physiological characteristics of Virus
CO4- To study the microbial growth and study the culture collection and maintenance of culture
CO5- To study the control of microbial contamination.

Laboratory-I

1. Chromosome preparation: mitosis-onion root tip, rat/mouse cornea/ human lymphocyte.
2. Chromosome preparation meiosis- rat / mouse testis, grasshopper testis.
3. Polytene chromosome preparation from Drosophila salivary gland.
4. Histochemical localization of DNA and RNA in onion peel.
5. Demostration of microbiological technique-sterilization, autoclaving and incubation etc.
6. Preparation of liquid and solid media for growth of microorganism.
7. Preparation of different stain –simple stain, gram stain and differential stain.
8. Isolation and maintenance of microorganism by plating, streaking and serial dilution method. slants and sub culture for storage of microorganism.
9. Isolation of pure culture from air, soil, water and study of colony characteristic.
10. Staining of bacterial culture –endospores and capsule.
11. Measurement of growth by colony forming unit and turbidometry.
12. Biochemical characterization of selected microbes.
13. Analysis of water for potability and determination of MPN.
14. One step growth curve of coliphage.
15. Determination of lambda max, verification of Beer's law.
16. Titration of amino acid.
17. Colorimetric determination of pk.
18. Quantitive assay of protein by Lowry, Biuret and Bradford method.
19. Quantitive assay of sugar by DNSA and Benedict reagent.
20. Separation of amino acid and sugar by paper and thin layer chromatography.
21. Electrophoresis of protein, native and under denaturing condition.
22. Separation of sub-cellular organelles by diffential centrifugation.
23. Analysis of oil, iodine number, saponification & acid number.
24. Quantitative analysis of amino acids.
25. Quantitative analysis of carbohydrates.
26. Quantitative estimation of lecithins.
27. Calculation of ratio of ionized & unionized dye with known pK value after the pH of the solution is altered.

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Session – 2016-17,2017-18,2018-19,2019-20,2020-21

Class	:	M.Sc.
Semester	:	II
Paper	:	II
Subject	:	Biotechnology
Title of Subject Group	:	Basic Enzymology and Enzyme Technology
Max. Marks	:	85+15 CCE
Course Code	:	BT-4007

Course Outcome

CO1- Students will be able to describe structure and functions and mechanism of action of enzymes
CO2- The student will learn kinetics of enzyme catalyzed reactions
CO3- The student will learn factor affecting enzyme activity. They can understand the enzyme inhibitory and regulatory process.
CO4- They will be able to learn the different enzymes like lyzozymes chymotrypsin and allosteric enzymes
CO5- They will get the learning of application of enzyme and various fields and their future potential.

Unit-1	**Introduction to Enzymes:** Enzyme nomenclature, enzyme commissionnumbers, and classification of enzymes. Isolation and purification of enzymes, preparation of purification chart, Enzyme activity, Specific activity and turn over number, Marker enzymes.
Unit-2	**Enzyme Kinetics:** Steady state, pre-steady state, equilibrium kinetics, Michaelis and Menten Equation and its derivation, Different methods to calculate the K_m and V_{max} and their significance.
Unit-3	**Factor affecting enzyme activity and catalysis:** pH, substrate and enzyme concentration, temperature, coenzyme and cofactors, Mechanism of action of enzymes involving two/more substrates. Role of metal ions in enzyme catalysis. Enzyme inhibition, different types of inhibitors and activators.
Unit-4	**Structure and function of enzymes:** Lysozyme, chymotrypsin, DNApolymerase, RNase, proteases. Enzyme regulation and control of their activity. Introduction to allosteric enzymes and isozymes.

Unit-5	**Enzyme Technology:** Immobilization of enzymes and their application, commercial production of enzymes, RNA-catalysis, Catalytic antibodies -abzymes, Protein and Enzyme engineering: Design and construction of novel enzymes. Structure and Application of protease, lipases, papain.

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Session – 2016-17,2017-18,2018-19,2019-20,2020-21

Class	:	M.Sc
Semester	:	II
Paper	:	IV
Subject	:	Biotechnology
Title of Subject Group	:	Immunology and Animal Cell Culture
Max. Marks	:	85+15 CCE
Course Code	:	BT-4009

Course Outcome

CO1- Students will be able to understand the basic concepts of immunity and types of immunity
CO2- Students will be aware of the structure and diversity of the antibodies and they are able to understand th neutrophils, macrophages and their association with the MHC molecule will be studied
CO3- The various immunological techniques and concept of vaccine can be studied.
CO4- The students will be able to study the animal cell culture and the concept of bioreactors for mammalian cell. .
CO5- The students will be able to study the specialized techniques and and its applications.

Unit-1	**Immunoglobulins:** Structure of IgG (b), various classes of antibodies, Antibodies diversity-theories and molecular mechanism, class-switching, monoclonal antibodies (hybridoma technology) , recombinant antibodies, antigen- antibody interaction.
Unit-2	**Complement System:** Classical, alternative and lactin pathways and their regulations. **Immunological Responses:** Cell mediated immune response, Major Histo-compatibility Complex, Cellular interactions in the immune response–antigen processing and presentation. recognition of antigens by T & B cells, T – cell receptor complex, B–cells receptor complex. Dendritic cells and N cells. cytokines, immunological tolerance, hypersensitivity, anti-immune diseases & AIDS.
Unit-3	**Autoimmunity**: Mechanism and therapeutic approaches, immunodeficiency syndrome and their diagnosis, vaccines-active and passive immunization, whole organism vaccines, macromolecules as vaccines, recombinant vector vaccines, synthetic peptide vaccines and subunit vaccines, DNA vaccines, Immunodiagnostic: precipitation techniques, agglutination, fluorescence techniques.

Unit-4	**Animal cell culture:** An introduction, concept of aseptic techniques, animal tissue culture media, cell propagation, preservation and storage of cells, detection of contamination, safety consideration in laboratory cell culture. **General cell culture techniques:** Dispersion and disruption of tissue, monolayer culture technique, measurement of growth and viability of cell, determination of 50% end point titer, Bulk culturing of animal cells, Concept of bioreactors for mass culture of mammalian cell, Micro carrier culture, harvesting and purification methods for end products recovery.
Unit-5	**Specialized Techniques:** Cell immobilization techniques, cell transmission, Amniocentesis, CEA production and its clinical application, Interferons derived from human cells, 3-D animal cell culture and tissue engineering, FISH and application of animal cell culture.

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Session – 2016-17,2017-18,2018-19,2019-20,2020-21

Class	:	M.Sc
Semester	:	II
Paper	:	Practical
Subject	:	Biotechnology
Title of Subject Group	:	Laboratory – I
Max. Marks	:	85+15 CCE
Course Code	:	PR-BT-4010

Course Outcome

CO1- Students will be able to understand the basic concepts of immunity and types of immunity

CO2- Students will be aware of the structure and diversity of the antibodies and they are able to understand th neutrophils, macrophages and their association with the MHC molecule will be studied

CO3- The various immunological techniques and concept of vaccine can be studied.

CO4- The students will be able to study the animal cell culture and the concept of bioreactors for mammalian cell. .

CO5- The students will be able to study the specialized techniques and and its applications.

Laboratory-II

1. Assay of antibiotics and demonstration of antibiotic resistance.
2. Study of mutation by Amu test.
3. Isolation of antibiotic resistant bacterial population by gradient plate method.
4. UV induced auxotrophic mutant production and isolation of mutant by replica plating technique.
5. Effect of UV radiation on bacteria.
6. Demonstration of UV repair mechanisms.
7. Immobilization of microorganisms and enzyme.
8. Amylase and urease production in the microorganisms.
9. Assay of acid phosphatase in plant seeds.
10. Assay of alkaline phosphatase in kidney and liver.
11. Determination of Km value of alkaline phosphatase. st.
13. Preparation of standard curve of DNA by DPA method.
12. Measurement of relative enzyme activity of cellulose by reducing sugar assay te
14. Preparation of standard curve of DNA by orcinol method and qualification of RNA from yeast.
15. Isolation of DNA from prokaryotic cell.
16. Isolation of DNA from eukaryotic cell.
17. Determination of Tm of nucleic acid.
18. Electrophoresis of DNA-linear, circular and super coiled.
19. Protein-DNA interaction.
20. Isolation of plasmid DNA.
21. Preparation of competent cells from *E.coli.*
22. Demonstration of Blotting techniques.
23. Blood film preparation and identification of cells.
24. Double diffusion and Immuno-electrophoresis.
25. Radial Immunodiffusion.
26. Detection of antigen through ELISA.
27. Preparation of antibody-enzyme conjugates.
28. Purification of IgG from serum.
29. Cell counting and cell viability.
30. Preparation of serum free media.
31. Culturing continuous cell lines.
32. Extraction/estimation of DNA/RNA/protein from animal tissues.
33. Preparation of single cell suspension from spleen and thymus.

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Class	:	M.Sc
Semester	:	III
Paper	:	I
Subject	:	Biotechnology
Title of Subject Group	:	Genetic Engineering
Max. Marks	:	85+15 CCE
Course Code	:	BT-4011

Course Outcome

CO1- Student will be able to comprehend the importance of various DNA modifying enzymes in developing various molecular techniques used in rDNA technology

CO2- They will be able to understand the selection of suitable hosts for the individual vectors for different purposes and to know the uses of restriction and other enzymes in molecular cloning, PCR and genetic manipulations.

CO3- Students will be able to carry out construction and screening of the genomic and cDNA libraries and to design experiments for expression of the cloned gene (s) for useful products.

CO3- students will be able to understand the Types of PCR and its various applications in the field of biotechnology.

CO5- They will able to understand the DNA Chip technology, genomics proteiomix and their applications with special reference to Arabidopsis and Rice.

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Unit-1	**Introduction:** Historical background, Restriction enzymes and modifying enzymes, Restriction mapping, Construction of chimaeric DNA- staggered cleavage, Addition of poly dA and dT tails, Blunt end ligation, Gene cloning.
Unit-2	**Cloning and Expression Vectors:** Vehicles for gene cloning, Plasmids, Bacteriophages, Cosmids and Phagemids as vectors, P1 vectors, F-factor based vectors, Plant and animal viruses as vector, Artificial chromosomes as vectors (YAC, BAC, PAC and MAC vectors), Expression vactors- use of promoters and expression cassettes, Baculoviruses as expression vectors, Virus expression vectors, Binary and shuttle vectors.
Unit-3	**Isolation Sequencing and Synthesis of Genes:** Methods of gene isolation, Construction and screening of genomic and cDNA libraries, Chromosome walking, Chromosome jumping, Transposone tagging, Map based cloning, DNA sequencing Techniques (Maxam Gilbert's chemical degradation methods, Sanger's dideoxy chain

	termination method, High throughput sequencing and pyrosequencing), Automated DNA sequencing, and Organ chemical gene synthesis.
Unit-4	**Molecular Probes and PCR:** Molecular probes, Labeling of probes, Radioactive vs. Non-radioactive labeling, Uses of molecular probes. Polymerase Chain Reaction- basic principle, Modified PCR (Inverse PCR, Anchored PCR, PCR for mutagenesis, asymmetric PCR, Real time and reverse Transcriptase PCR, Primer walking), Gene cloning Vs. Polymerase chain reaction; Applications of PCR in biotechnology, Ligase chain reaction.
Unit-5	**Molecular Markers and DNA Chip Technology:** Molecular-Markers-types and applications, Construction of molecular maps (genetic and physical maps), DNA chip Technology & Microarrays (a Brief account). **Genomics and Proteomics:** Whole genome sequencing and functional genomics (a brief account), Applications of genomics and Proteomics with special reference to Arabidopsis and Rice.

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Class	:	M.Sc
Semester	:	III
Paper	:	V
Subject	:	Biotechnology
Title of Subject Group	:	Applied Biotechnology
Max. Marks	:	85
	:	15 CCE
Course Code	:	BT-4015

Course Outcome

CO1- Students will be able to apply basic knowledge of pharmaceutical manufacturing in the production of biopharmaceuticals like antibiotics, vaccines, proteins and hormones

CO2- They are able to study aspects related to agriculture biotechnology.

CO3- Students will be able to explain the industrial aspects of Biotechnology for the production of various of industrial products of food industry.

CO4- The student will be able to evaluate the potential of biodegradation of organic pollutants taking microbial and physical chemical environments as well as the chemical structure of the compound itself into consideration

CO5- It helps to understand the recent advanced techniques like stem cell technology, nanotechnology, biosensors

Unit-1	**Industrial Biotechnology:** Microbial strain of industrial importance,microbial production of antibiotics (penicillin , streptomycin & tetracycline), Vitamins (Vit B12), amino acids (glutamic acid) & enzymes (amylase, protease, invertase & pectinase), microbial production of alcoholic beverages (whisky & brandy), vinegar, citric acid, acetic acid, glycerol, acetone, foods–SCP, Biotransformation of steroids and pesticides.
Unit-2	**Agricultural Biotechnology:** Role of biofertilizers and biopesticides insustainable development, petrocrops, aquaculture, Improvement of nutritional value of seed storage protein, starch, oil. Transgenic plants for increased shelf life molecular mapping of genes of agricultural importance, sericulture, transgenic fish Plant Variety Protection Act, Plant breeders rights, International Convention on biological diversity.
Unit-3	**Food Biotechnology:** Prokaryotic & Eukaryotic based products(fermented meats, milk products, yoghurt, cheese, cereal, wine, beer), Impact of biotechnology on microbial testing of food, current/traditional methodology and new approaches (use of gene probes, RDT, Bioluminescence), Safety evaluation of genetically engineered enzyme/novel food products, Natural Control of Micro Organism and preservation, Biogums, Bio-colours Fumaric acid, sweetener, fat substitutes, natural & modified starch, fats & oils food.
Unit-4	**Environmental Biotechnology:** Environmental pollution and theirmanagement, concept of Global Warming and Ozone depletion (Ecofarming, Green house effect & acid rain), Waste water treatment, solid waste management, conventional & modern fuels & their environmental impact, Bioremediation, Biodegradation of xenobiotic compounds, Biomineralization, Biotechnological approaches for preserving biodiversity (Gene banks ,Germ Plasm Banks & their management).

Unit-5	**Frontiers in Biotechnology:**Stem Cell Technology, Human Cloning Ethical issues & risks associated with it, Nano biotechnology:– Introduction to nanoscience, size matter, tools for measuring nanostructure Biosencer development and application, Nanofabrication, Nanotech impact on types of DNA chips & their production, SNP and genome mismatch signals, functional proteomics – RT PCR Human Genome Project , Bioterrorism.

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Class	:	M.Sc
Semester	:	III
Paper	:	Practical
Subject	:	Biotechnology
Title of Subject Group	:	LAB
Max. Marks	:	85+15 CCE
Course Code	:	PR-BT-4015

Laboratory-III

1. Bacterial culture and antibiotic selection media. Preparation of competent cells.
2. Isolation of phage DNA.
3. Restriction mapping of plasmid DNA.
4. Preparation of single stranded DNA template.
5. Gene expression of *E.coli* and analysis of gene product.
6. Preparation of helper phage and its titration.
7. PCR.
8. Calculation of the mean, median, mode and standard deviation using MS –Excel.
9. Graphical representation of various types of biological data using MS – Excel.
10. Biological data resources and data retrieval.
11. Sequence analysis using BioEdit software tools and other online tools.
12. Structural bioinformatics.
13. Protein structure prediction.
14. Isolation of industrially important microbes from environment.
15. Determination of TDP and TDT of microorganisms for design of a sterilizer.
16. Determination of growth curve of industrial organism and substrate degradation profile, also compute specific growth rate and growth yield.
17. Comparative study of ethanol production using different substrates.
18. Microbial production of citric acid using *Aspergillus niger*.
19. Preparation of media for plant tissue culture.
20. Sterilization of plant tissue.
21. Study of the effect of different tissue sterilizing agents.
22. Study of antifungal properties of plant extracts.
23. Callus induction from different explants: - seed, root & shoot.
24. Determination of organogenesis in mulberry.
25. Isolation of protoplast and culture.
26. Agrobacterium culture, selection of transformants, receptor genes (GUS) assays
27. Genomic DNA isolation from seed and plant tissue and their electrophoretic analysis
28. Restriction digestion of plant genomic DNA
29. Viability testing of seeds under different environmental conditions
30. Isolation of nitrogen fixing organisms like Cyanobacteria and Rhizobium and their characterization.
31. Measurement of nitrate reductase from *Nostoc muscorum*.
32. Analysis of total protein content of seeds by TCA precipitations method.
33. Isolation of VAM from soil by wet sieving and decanting method.
34. Isolation and cultivation of mushroom.
35. Determination of pesticide /metal detoxification by microbial species
36. Isolation of bacteriophage from sewage water.
37. Isolation and study of fungus responsible for food spoilage.
38. Detection of coliforms from determination of purity of potable water.
39. Determination of BOD of a sewage sample.
40. Determination of COD of a sewage sample.
41. Survey of degradative plasmid in microbes growing in polluted environment
42. Bioinsecticide isolation, purification and assay.

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Session – 2016-17,2017-18,2018-19,2019-20,2020-21

Class : M.Sc
Semester : IV
Paper : III
Subject : Biotechnology
Title of Subject Group : Applied Immunology and Immunodiagnostics
Max. Marks : 85+15 CCE
Course Code : BT-4019

Course Outcome

CO1- Students will be able to organize and make the constructionstrategies for the biochemical and molecular level screening system The knowledge of clinical trial and patenting of drugs is also impart by this unit.
CO2- Students will be able to understand the Classification of QSAR, Statistical concept of QSAR and its application in drug designing.
CO3- Students will be able to understand the molecular mechanics and Molecular Modeling methods.
CO4- Student will be able to understand the algorithms, modelingmultimolecular system. drug designing and . 3D database search methods
CO5- Student will be able to understand the Modeling drug receptor interaction

Unit-1	Organized drug discovery & development: Pharmacological ,microbial, recombinant, biochemical and molecular level screening system and their construction strategies. Alternative strategies in lead identification and lead optimization. Preclinical development: clinical trials, patenting & clearance for application.
Unit-2	**Quantitative Structure Activity Relationships (QSAR):** Types of QSAR models, Classification of parameters utilized in QSAR studies, Statistical concept of QSAR, Hansch model of QSAR, De Novo model of QSAR, Hammett and Taft model of QSAR equations, Applications of QSAR in drug design. Receptor verses enzyme mediated drug action. Principles in Agonist and antagonist action.
Unit-3	**Thermodynamic and structural principles**: Objective & approaches in the native ligand modification; Molecular graphic and modeling tools: hardware and software component of molecular graphics. Molecular modeling methods:MO theory, empirical methods, geometry optimization, force field, Conformational search, Perturbation free Energy. Molecular Mechanics: electrostatic models, point changes, Solvents, modeling reactivity.

Unit-4	Simulated annealing: Conformational space search algorithms, dynamic monte carlo simulation, modeling multimolecular system. Calculation and analysis of molecular field :electrostatic potential, electrostatic field, steric field, other fields and comparison. drug design by receptor site fit, active site confirmation, docking problems and methods. 3D database search methods. Automated structure construction methods.
Unit-5	Modeling drug receptor interaction: Receptor- introduction and soruce of informations. Receptor fitting. Receptor mapping-pharmacophore concept. Pseudoreceptor. Role of solvent. Peptidomimetic design- goal and achievement. Enzyme catalytic principle - recapitulation, affinity labels, principles of suicide inactivation, design strategies scope and limitations. Illustrative examples of hydrolases, PLP based enzyme, isomerases & redox enzymes inhibitors.Synthetic peptide libraries, peptide libraries through phage display: application in epitope a agretope mapping & in synthetic vaccine designing.

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Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of Biotechnology
Session – 2016-17,2017-18,2018-19,2019-20,2020-21

Class	:	M.Sc
Semester	:	IV
Paper	:	IV
Subject	:	Biotechnology
Title of Subject Group	:	Disstration
Max. Marks	:	85
	:	15 CCE
Course Code	:	BT-4020

Course Outcome

CO1- Student will be able to gain the practical knowledge on the implementation of the biotechnological techniques on various fields like Pharma industry,

CO2- The research area choosen by student help to Interpret, discuss and communicate scientific results in written form;

CO3- It help to Gain experience in writing a scientific proposal and Learn how to present and explain their research findings to the audience effectively.

Training/Survey/Visit in a private industry/ treatment plant or lab at national

or regional level for one month

50 marks for report

50 marks for presentation before external examiner

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Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of Biotechnology
Session – 2016-17,2017-18,2018-19,2019-20,2020-21

Class	:	M.Sc
Semester	:	IV
Paper	:	Practical
Subject	:	Biotechnology
Title of Subject Group	:	LAB
Max. Marks	:	85
	:	15 CCE
Course Code	:	PR-BT-4020

Course Outcome

CO1- Students will be able to understand the immunological techniques like immuno diffusion, immune electrophoresis, ELISA, FAT etc.

CO2- Student will be able to understand the

CO3- Student will be able to learn the production of monoclonal antibody

CO4- They can learn the use of technique of immobilization of enzyme

CO5- They are able to learn the use of microbiological analysis of food production.

1.Immunodiffusion. 2.Immunoelectrophoresis.
3.Study of agglutination & rosette formation.
4.PAGE on native gel & study of isozyme by activity staining.
4. Permanent slide on mammalian physiology.
5.Determination of aspartate content is given sample by enzymatic method.
6.To immobilize chymotrypsin on agarose gel beads by Oxirane method.
7. Production of monoclonal antibody against purified protein.
8.To detect nitrate reductive in leaf extracts by immnuno diffusion test.
9. To detect antibodies in sera by competitive ELISA.
10.Identification of bacteria by using fluorescent antibody techniques (FAT).
11. Quality testing of milk by resazuring test.
12.Determination of phasphatase activity in butter, whey, milk powder.
13. Microbiological analysis of food production.
14.Presumptive test for coliform in butter.
15.Analysis of mycotoxin in fungal contaminated food materials.

Note: 70% of the above list should be compulsorily performed

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Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2017-18 To 2020-21

Class	:	M.Sc.
Semester	:	I
Subject	:	Computer Science & Application
Title of Subject Group	:	DiscreteMathematicsStructures
Max. Marks	:	85
Course Code	:	COMP- 801

Course Outcome

CO1- Solve real world problems logicallyusing appropriate set, function and relationmodelsand interprettheassociatedoperationsandterminologiesincontext.
CO2- Analyze and synthesize the real worldproblemsusingDiscretemathematics.
CO3- Use Mathematical Logic and predicate calculus for solving problem.
CO4- Apply the concepts of Lattices and Boolean Algebra.
CO5- Perform graph traversals using BFS and Algebra.

Unit-1	MathematicalLogic:Statementsand notations,Connectives:Negation,Conjunction,Disjunction. Statement formulas and truth tables, conditional and Biconditional, Well formedformulas. Tautologies, Equivalence of formulas, duality law, Tautological implications,contradiction contingency, Algebra of propositions, the predicate calculus: predicates, thestatementfunction.VariablesandQuantifiers,predicateformulas, freeand boundvariables,theuniverseof discourse.
Unit-2	SetTheory:Basicconceptsofsettheory,notation,inclusionandequalityofsets,thepowerset,types of sets, operations on set, Venn diagrams, some basic set identities, the principle ofspecification,ordered pains, Cartesian products, relations & ordering.
Unit-3	Algebraic Structures: Introduction, algebraic system: example and its general properties,semigroups and monodies: definitions and examples, homomorphism and monoids, grammars andlanguages, polish expressions and their compilations: polish notations, conversion of infixexpressionsto polish notation.
Unit-4	Lattices and Boolean Algebra: Lattices and algebraic system, principle of duality, basicproperties of algebraic systems defined by lattices, distributive and complemented lattices,Boolean lattices and Boolean algebra, identity of Boolean algebraic Boolean functions andBoolean expression, normal forms, simplification of logic expressions using Karnaugh map,switchingcircuits.

Unit-5	Graph Theory: Introduction, basic terminology, multi-graphs and weighted graphs, digraphsandrelations,representationofgraphs:incidence matrix,operationsongraphs,pathandcircuits,Graphtraversal:Depthfirstsearch,breadthfirst search,shortestpathsinweightedgraphs.

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Session – 2017-18 To 2020-21

Class	:	M.Sc.
Semester	:	I
Subject	:	Computer Science & Application
Title of Subject Group	:	ComputerOrganization&Architecture
Max. Marks	:	85
Course Code	:	COMP- 803

Course Outcome

CO1- Identify,understandandapplydifferentnumbersystemsandcodes.
CO2- Understandthedigitalrepresentationof data in a computer system & memoryorganization.
CO3- Represent data using Number system.
CO4- Draw sequential and combinational digital logic circuits.
CO5- Explain Memory organization of Computer.

Unit-1	Data Representation: Data types (Number System – Octal and Hexadecimal Number, Decimal Representation, and Alphanumeric Representation), Complements, Fixed Point and Floating- Point Representation. Digital Logic Circuits: Digital Computer, Logic Gates, Boolean Algebra, Map Simplification, Combination Circuits: Adder, Subtract or, multiplexor, DE multiplexoretc. Flip- Flops: SR Flip- flops, D Flip- Flops, JK Flip-Flops, T Flip-Flops, Edge Triggered Flip- Flops, master- slave, Execution Table, Sequential Circuits.
Unit-2	Register Transfer and Micro – Operations: Register Transfer Language, Register Transfer, Bus and Memory Transfer, Micro operations: Arithmetic, Logical, Shift Micro- Operations, Arithmetic logic shift unit. Basic Computer Organization and Design: Instruction Codes, Computer Resisters, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instruction, Input- Output and Interrupt, Complete Computer Description, Design of Basic Computer.
Unit-3	Programming the Basic Computer: Machine language, Assembly language, The Assembler, Program Loops, Programming arithmetic and logic operations, input-Output Programming, character manipulation, program interrupt. Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, RISC and CISC Characteristics.

Unit-4	Memory Organization: Introduction, memory hierarchy, main memory, auxiliary memory, Associative memory, cache memory, locality of reference, hit/miss ratio, various mapping process: Associative mapping, direct mapping, and Set-Associative mapping, memory management hardware.
Unit-5	Input- Output Organization: Peripheral Devices- ASCII alphanumeric Characters, Input- Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Access (DMA), Input- Output Processor (1OP),Serial Communication. Introduction to Parallel processing, pipelining. Introduction to multiprocessors.

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Session – 2017-18 To 2020-21

Class	:	M.Sc.
Semester	:	I
Subject	:	Computer Science & Application
Title of Subject Group	:	Windows&PC-Software
Max. Marks	:	85
Course Code	:	COMP- 804

Course Outcome

CO1- Use the features a available in Windows.
CO2- Work with System Tools and use Accessibility Features of Windows.
CO3- Create documents using MS Word.
CO4- Create Spreadsheets using MS Excel.
CO5- Create effective presentations using MS Power Point.

Unit-1	IntroductiontoWindows: FeaturesofWindows.DifferenceebetweenCUI&GUIInterfaces,Hardware Requirement for Running Version of Windows. New Installation & Up gradation,Managing Hardware & Software- Installation of Hardware & Software, Desktop, Start Button,Start Menu, Wall paper, Use of Recycle Bin, Computer, Network Icon, Using Scanner WebCamera, Printers, Searching files and programs, Multiple User Feature of Windows, Creatingand Deletion Wiser, Changing User Password etc. Creating folder and shortcuts of applicationon desktop, Using Windows Explorer, Accessories, Control Panel: Display, Internet Options,User Accounts, Backup and Restore, Data and Time, Taskbar, Start Menu, Windows Firewall,WindowsUpdate, Devices and Printers.
Unit-2	System Tools - Backup, Character Map, Clipboard Viewer, Disk Defragmenter, Drive Space,Scandisk,SystemInformation,SystemMonitor,DiskCleanup,BrowsingtheWebwith InternetExplorer and other browsers, Accessibility Features of Windows – Sharing Folders and Drives,Browsing the Entire Network, Using Shared Printers. OLE – Embed/Link Using Cut and PasteanEmbed/ Link, UsingInsert ObjectManageEmbedded/ Linked Object. Introduction to Processing (MS Word):Advantages of Word Processing, Introduction &InstallationEditingaFile,Workingwith'options'underfilemenu,Formatting ToolBar,Setting margins,orientationand sizeof page. UsingParagraphStyles,FormattingText ,Insertingpagenumber, FormatPainter,SpellCheck&WordCount,Newspaper StyleColumn,DropCap,Header &Footer,Endnoteand Footnote.

Unit -3	Advanced Features of MS- Word: Managing page breaks and section breaks, InsertingObjects, Inserting Hyperlink, Cross reference, Bookmark. Inserting Illustration (Smart Art,Shapes,Charts&Pictures),Addingsymbols,signature&equations,SettingUpPrinter,Printingoptions,Insertingwatermark, MailMerge,printinglabels andenvelops,Mathematical Calculations,UsingMacros,TableHandling,CreatingTableofContents&Index,UseofThesaurus, saving document versions, comparing two versions of document, protectingdocument.
Unit-4	Introduction to Spread Sheet (MS Excel): Definition and Advantages of Electronic WorksheetWorking on Spreadsheet, Range and Related Operations, Inserting, Deleting, Coping andMoving of data Cells, Inserting and Selecting Rows and Columns, Protecting Cells, protectingworksheetandworkbook,printingaWORKSHEET,GraphCreation:TypesofGraph,CreatingaCharton ChartSheet,PrintingtheChart. Sort&Filter,Data Validation,Consolidatedata,Goalseek, Data Table, Subtotal, Group 7 ungroup data. Freeze panes, split window, conditionalformatting,insertingcomment, pivottable, textto column/columnto text,what-if-analysis. Importing data from access, from web and from other sources. Built in functions-mathematical,logical,text,date& time,lookupand reference.Working with'Options'under filemenu.
Unit-5	Introduction to MS- Power Point: Elements of Power Point, Exploring Menus of Power Point,Working with Dialog Boxes, Creating presentation with Auto content Wizard, DesigningPresentation: Slide Setup, Adding Text, Formatting Text, Inserting Photo Album, WordArt,Graph,ObjectandPicturetoSlide,Inserting,Deletingandduplicatingslides,Addingmovieandsound to slide, Adding animation to Slide, Custom Animation, Slide Transition, ProtectingPresentation,Printing Slides,View Slide,Outline, SlideSorter Notesand SlidesShow.

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Session – 2017-18 To 2020-21

Class	:	M.Sc.
Semester	:	I
Subject	:	Computer Science & Application
Title of Subject Group	:	Lab I (C++ Programming)
Max. Marks	:	50
Course Code	:	PR-COMP- 802

Course Outcome

CO1- Apply Inheritance and Exception Handling concepts in program code.

CO2- Manage console I/O operations with manipulators.

1. DefineaSTUDENTclass with RollNo. Name, andMarks in 3tests of asubject. Declarean array of10 STUDENT objects. Using appropriate functions, find the average of thetwobetter marks for eachstudent. Print thestudentdetails.
2. Writeavolumefunction whichcalculates thevolume ofsphere,rectangleand cylinderusingfunction overloading.
3. WriteaprogramtofindrootsofQuadratic equation,displayingtheanswer, whetherrootsareequal, real or complex.
4. WriteaC++Programtodemonstrateprivate,publicandprotectedaccessspecifiers.
5. Writeaprogram toimplement singleandmultiple levelinheritance.
6. WriteaC++Program tocreateaclass calledCOMPLEXand implementthefollowingoverloadingfunctions ADDthat returnacomplexnumber:
   (i) ADD(a,s2)– where‘a’ isan integer(realpart)ands2isacomplexnumber.
   (ii) ADD(s1,s2)– wheres1ands2 arecomplex number.
7. Write a C++ program to create an ACCOUNT class which has a parameterizedconstructor for inputting values of account number, name and balance. Class should alsocontain three more functions – Deposit for adding amount, Withdraw for subtractionamount (if account balance is more than withdrawal amount) and Print Details forprintingthe whole account details.
8. WriteaC++Program tocreateatemplate function forsortingof integers and doubles.
9. Write a C++ Program to create a class called STUDENT with data members Roll No.Name field as Age. Using inheritance, create the classes UGSTUDENT andPGSTUDENThavingfieldsassemester,FeesandStipend.Enterthedataforatleast5students.Find thesemester-wise averageageforallUGandPG studentsseparately.
10. Writeaprogram to createafileand than writesometext into thefilethroughC++program.
11. WriteaC++Programtowriteandrealvaluesusingvariablesin/from file.
12. WriteaC++Program towriteandreal object usingreal andwritefunction.
13. Writeaprogramimplementingbasicoperationofclassios.i.e.setf,unsetf, precision etc.
14. Write a program to implementing I/O operations on characters. I/O operations

includesinputtingastring,Calculating length ofthe string,Storing thestringin afile, fetching thestoredcharacters from it,etc.

15. Writeaprogram tocopythe contentsofonefiletoanother.
16. Writeaprogramtoperformread/writebinaryI/Ooperationonafile(i.e.writetheobject of astructure/classtofile).
17. Writeaprogramtomaintainelementarydatabaseofstudentsusingfiles.

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Session – 2020-21

Class	:	M.Sc.
Semester	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	Advanced Computer Networks
Max. Marks	:	85
Course Code	:	COMP- 823

Course Outcome

CO1- Understandtheconceptsofdatacommunicationatdifferentlayersandcompare ISO - OSI model with TCP/IPmodel.

CO2- Knowledge of networking protocolsatdatalink layer.

CO3- Analyze various routing algorithmsand protocols at network layer & transportlayerprotocolsandcongestioncontrolalgorithms.

CO4- ExploreprotocolsatapplicationlayerandunderstandingtheconceptsofITAct&Cyber Law.

CO5- Be aware of IT Act and Cyber Laws and the issues in Network Security.

Unit -1	**Introduction:**Protocolsandstandards.StandardsOrganizations,InternetStandards.InternetAdministration; Overview of Reference models: The OSI model, TCP/IP protocol Suite, Addressing, IPversions.Connectors.TransceiversandMediaconverters,NetworkinterfacecardsandPCcards,Repeaters.Hubs. Bridges. Switches. Routers andGateways.
Unit -2	**IPV6:**whyIPV6,basicprotocols.Extension&option,supportforQOS,Security.etc,neighbordiscovery, auto.- configuration. routing. Change to other protocols. Application Programming interfaceforIPV6. 6Bone. IntroductiontoCryptography:BasicTerms-PlainText,CipherText,EncryptionDecryption.Cryptography. Cryptanalysis, Cryptology, Secret Key. Cipher Principles-Security. Attacks. Services andMechanisms.Classical EncryptionTechniques-Substitution andTransposition Techniques.
Unit -3	**MobilityinNetwork:**Mobile.Securityrelatedissues.IPMulticasting,UnicastRoutingProtocols–IP,OSPF, BGP.Multicasting Routing Protocols,Host Configuration:BOOTP AND DHCP.
Unit -4	TCP extensions for high speed networks. Transaction oriented Applications. ARP, RARP, InternetProtocol,ICMP,IGMP,TCP.UDP.IntroductiontoSocket&Ports.SocketClass,MethodsofSocket.

Unit-5	Network Security at various layers. Secure-HTTP, SSL, PSP, authentication Header. Key stributionprotocols,digital Signature, Digital Certificates,Firewalls. **T Act & Cyber Laws:**Cyber Crime and Cyber Laws, Types of Cyber Crimes. Cyber Law sues in E-Business Management. Overview of Indian IT Act. Information Technology Act)00, InternationalScenario in Cyber Laws: Data Protection Laws in EU and USA, Ethical sues in Intellectual propertyrights, Copy Right. Patents, Data privacy and protection. omain Name. Software piracy, Plagiarism,Issuesin ethical hacking.

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Session – 2020-21

Class	:	M.Sc.
Semester	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	Advanced RDBMS
Max. Marks	:	85
Course Code	:	COMP- 824

Course Outcome

CO1- Masterthebasicconceptsandappreciatetheapplicationsofdatabasesystemsandthebasicsof SQL andconstructqueriesusingSQL.

CO2- Befamiliarwithacommercialrelationaldatabasesystem(Oracle)bywriting SQL using the system &with therelational database theory, and relationalalgebraexpressionsforqueries.

CO3- Mastersounddesignprinciplesforlogicaldesignofdatabases,includingtheE-R method and normalization approach.

CO4- Be familiar with basic databasestoragestructuresandaccesstechniques:file and page organizations, indexingmethodsincludingB-tree,andhashing,query optimization &transactionprocessingand concurrencycontrol.

CO5- Able to handle errors and use triggers.

Unit-1	The Database Life Cycle (DBLC): Initial Study of The Database, Database Design, Implementation andLoading.Testing And Evaluation, Operations andMaintenance. DatabaseAdministration:TheRoleofDatabaseAdministrator.ModelingEnterpriseData,Planning forDatabases,ManagingDataSecurity.BackingUpDatabases.ControllingConcurrentAccess.Ma nagingDataQuality, Data Dictionaries and Repositories.
Unit-2	Transactions:ACIDproperties,statesoftransaction,Concurrentexecutions.conceptsofserializabi lityandrecoverability. Concurrencycontrol:OverviewofLocking,modesoflocking:shared&exclusive,2phaselockingpr otocol,timestamping.Timestamp-orderingprotocol.validation-basedprotocol.multi-versioning ,DeadlockHandling. Recovery: Transaction failure classification, stable storage implementation. log based recovery, Shadowpaging,recovery with concurrent transactions.checkpoints & rollback. Security&Integrity:Securitymeasuresforprotectionofdataatvariouslevels,authorization,views.g rantingofprivileges, security specifications in SQL, Encryption.
Unit-3	DatabaseSystemarchitectures:Centralizedsystems.Client-ServerSystems:ArchitectureAndImplementation.transactionservers.dataservers,Parallelsyste ms,Paralleldatabasearchitectures.Distributed systems and databases : Introduction, Distributed database transparency features. levels ofdata and process distribution, SPSD (Single site Processing. Single-site data). MPSD (Multiple SiteProcessing. Single-site data), MPMD (Multiple Site Processing. Multiple- Site data). Advantage anddisadvantagesof distributed databasesystems.

Unit-4	PL/SQL: Introduction, the SQL execution environment, the PL/SQL syntax, block structure - declarativepart,executablepart.exceptionhandlingpart,variabledeclarationusing%type,%row type,ifstatements, looping structures, oracle transactions, cursors & its types, cursor attributes. nesting ofcursors,parameterizedcursors, error handling inSQL. Concurrency control:Locks, implicit locking, levels of locks, explicit locking, select for...updatestatement,using lock table statement.
Unit-5	Errorhandling:Usernamedexceptionhandlersfori/ovalidationandbusinessrulevalidation. Stored Procedures and Functions: Creating a stored procedure or function, syntax for declaration.Executionandexceptionhandlingparts,advantagesofusingprocedureorfunction.Del etingaprocedureor function. Database Triggers: Introduction. use, database triggers vs procedures, database triggers vs declarativeintegrity constraints. how to apply triggers. Types of triggers, Creating a trigger, deleting trigger. Userdefinederror messages through RaiseApplication ErrorProcedure.

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Session – 2020-21

Class	:	M.Sc.
Semester	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	LabI (Data Structures&Algorithms)
Max. Marks	:	50
Course Code	:	PR-COMP- 822

Course Outcome

CO1- Touseappropriatealgorithmic strategyforbetter efficiency.

CO2- Explain the algorithms related to linked lists and graphs.

SuggestedList of Practical

1. Write a choice based menu driven program to traverse an array, insert an item at the k^{th}positioninthearrayand deleteitem atk^{th} position from thearray.
2. Writeaprogram formatrix multiplication.
3. Writeaprogram to findthemaximum numberfromthegiven array elements.
4. Writeaprogram toimplementPUSH 8POPoperations onastack usingarray.
5. Writeaprogram for evaluationofapostfixexpression usingstack.
6. Writeaprogramforconversionofinfix expressionintopostfix expressionusingstack.
7. Writeaprogramforparenthesismatching ofgiven expressionusing stack.
8. Writeaprogram forselection sort.
9. Writeaprogram furquicksort.
10. Writeaprogram formergesort
11. Writeaprogramforlinearsearch.
12. Writeaprogram forbinary search.
13. WriteaprogramtoImplementInsertionanddeletionoperationonqueueusingarray.
14. Writeaprogramto implementlinked list.
15. Writeaprogramtoimplementbinarytree.

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Session – 2020-21

Class	:	M.Sc.
Semester	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	Lab-II(AdvancedRDBMS)
Max. Marks	:	50
Course Code	:	PR-COMP- 825

Course Outcome

CO1- Able to handle errors and use triggers.

CO2-

Masterthebasicconceptsandappreciatetheapplicationsofdatabasesystemsandthebasicsof SQLanddconstructqueriesusingSQL.

SuggestedList ofPractical

1. WriteaPL/SQLcodetocreateanemployeedatabasewiththetablesandfieldsspecifiedasbelow.

A Employeeb)Worksc)Companyd)Manages Note:Primary keysareunderlined.

2. WriteaPL/SQLcodetocreateastudent database with thetables andfieldsspecifiedas below.

A. Student(Rollno,student_name,course, gender)

a) Student_personal(Roll_no,dob,fathers_name,address,city)

b) Studentenrollment(Roll_no,course,coursecode,sem,total_marks,percentage)

3. Write a PL/SQL code to calculate the total and the percentage of marks of the students in foursubjects from the table-Student with the schema given below. STUDENT (RNO , S1 , S2, S3, S4,total,percentage)

4. WriteaPL/SQLcodetodisplay employeenumber, name andbasic of5highestpaid employees.

5. WriteaPL/SQLcodetocalculate thetotal salaryof firstn records ofemp table.Thevalueof nispassedto cursor as parameter.

6. WriteaPL/SQLcodetoupdate thesalary ofemployees whoearn lessthantheaveragesalary.

7. Writearowtrigger toinsert theexisting valuesofthesalary tableinto anew tablewhen thesalarytableisupdated.

8. Writeatriggeron theemployeetablewhichshows the oldvalues andnewvalues ofEnameafteranyupdationson ename on Employeetable.

9. Writ a PL/SQL procedure to find the number of students in first, second, and third divisionrespectivelyin eachcoursebyusing databasetablesas describedin problem2 above. Also writethecodeto call yourprocedure

10. Create a stored function that accepts 2 numbers and returns the addition of passed values. Also writethecodeto call yourfunction.

11. WriteaPL/SQLfunctionthataccepts departmentnumberand returnsthetotal salaryofthedepartment.Also writeafunction to call thefunction.

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Session – 2020-21

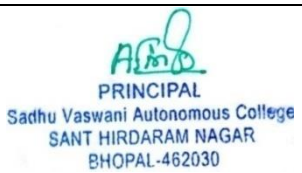
Class	:	M.Sc.
Semester	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	LINUX&SHELLPROGRAMMING
Max. Marks	:	85
Course Code	:	COMP- 826

Course Outcome

CO1- Explain to structure of OS and process management.
CO2- Describe memory and disk management techniques in OS.
CO3- Execute Linux commands.
CO4- Install packages and manage user accounts in Linux.
CO5- Implement basic scripts in shell.

Unit-1	**Introduction:** Definitions, functions and types of operating system. System components. OperatingsystemStructure,SystemCalls.SystemPrograms,Interrupts,Microkernel.**ProcessManagement**: Process Concepts, Process states & Process Control Block. Process Scheduling: Scheduling Criteria,Scheduling Algorithms (Preemptive & Non- Preemptive) -FCFS, SJF. RR. Priority. Multiple-Processor.Real-Time,MultilevelFeedbackQueueScheduling.**ProcessSynchronization:**CriticalSectionProblem,Semaphores,ClassicalProblemsofSynchronizationandtheirSolutions.DeadlockCharacterizations,MethodforHandlingDeadlocks,DeadlockPrevention,DeadlockAvoidance,DeadlockDetection, Recovery from Deadlock
Unit-2	**MemoryManagement:**Introduction,AddressBinding,logicalversusPhysicalAddressSpace.Swapping.Contiguous&Non-ContiguousAllocation.Fragmentation(Internal&External),Compaction, Paging, Segmentation. Virtual Memory, Demand Paging. Performance of Demand Paging.PageReplacement Algorithms. **File & Disk Management:**Concept of File System (File Attributes, Operations, Types). Functions ofFile System, Types of File System, Access Methods (Sequential, Direct & other methods), DirectoryStructure(Single-Level,Two-Level,Tree-Structured,Acyclic-Graph,GeneralGraph),AllocationMethods(Contiguous,Linked,Indexed)**DiskManagement:**DiskSchedulingAlgorithms(FCFS,SSTF,SCAN,C-SCAN,LOOK),SwapSpaceManagement,DiskReliability,Recovery,Security:SecurityThreats, Protection, Trusted Systems, Windows Security.

Unit-3	**Linux Basics:** Introduction to Linux, History, GNU Movement. System Organization (Kernel andShell), Difference between CLI OS & GUI OS, Windows v/s Linux. Importance of Linux Kernel, FilesandDirectories.ConceptofOpenSourceSoftware,Linux, LinuxArchitecture.Linux FileSystem Typesofuser-Rootuser(#)andnormaluser($).Multipleloginsatsametime(Ctrl+Alt+F1,F2F6),Help: whatis,--help, mancommand, init and runlevels. Linux Installation, touch. ls, ls –lt, ls-al, mkdir, rm, rm-rf, cat, cat > file, cat >> file, cp, move, rename,who,Useofall directoriesunder, absolute path&relativepath,Basic calculator,date utilities. **Vim Editor:**Commandmode& Insertmode.cut,yank.undo.
Unit-4	**LinuxAdministration:**Managingmultipleprocesses,changingprocesspriority withnice,croncommands. kill. ps. Filter Commands: tr. head, tail, last, grep. sort, piping. Find Command with variousoptions. **Managing user accounts**- Sudo, users: useradd,usermod&userdel, passwd, Group creation: Primary& Secondary Group. chgrp, chown, permissions: adding and removing permissions. Package installationthroughGUI/ apt-get/yum/dnf. Process, Setup, Partition, fdisk.
Unit-5	**Shell Programming:** Types of Shells. Shell Meta Characters – $#, $*, $?, Shell Variables, Shell Scripts,Debuggingscripts,echo,read,operators,keywords,IntegerArithmeticandStringManipulation,DecisionMaking:if...elif...else...fi,caseesac.LoopControl:while,for,until,break&continue, Functions,I/ORedirectionandPiping.ExceptionHandling. Creatingshellprogramsforautomatingtasks,filehandling,trappingsignalsetc.



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Session – 2020-21

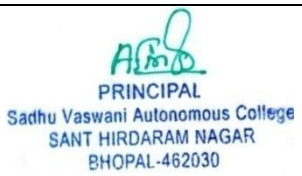
Class	:	M.Sc.
Semester	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	PROGRAMMING SKILLS WITH JAVA
Max. Marks	:	85
Course Code	:	COMP- 828

Course Outcome

CO1- Use an integrated development environment to write, compile, run, and test simple object – oriented Java Programs.
CO2- Create Java Programs using inheritance and exception handling.
CO3- Execute multiple programs simultaneously using multi-threaded programming.
CO4- Design and develop basic Applets.
CO5- Connect database to front end Java Application.

Unit-1	An overview of Java. History and design features of Java, how java works, java virtual machine (JVM)Javadevelopment kit(JDK), JavaVs C++, Data types. Variables, and constants. Arrays, Operators Control statements- Branching, Looping andJumpingObject-OrientedProgramming:Classes,Objects,andmethods:definingaclass,addingvariablesand methods.creating objects,Constructors.Implementing &Designing Classes.
Unit-2	String and string buffer classes, Wrapper classes, Inheritance -Types of inheritance ,Accessspecifiersusing super, method overriding, Packages and interface, Importing package, standard java packages .Definingandimplementinginterface,Extendinginterface,Nestedinterface.MultipleInheritance, Exception handlingfundamentals, exception types, uncaught exceptions, throws, throw, try-catch, final,builtin exceptions, creating yourown exceptions.
Unit-3	Multithreading fundamentals, Java thread model: priorities, synchronization, messaging, thread class,Runnable interface. Java collections Input/ Output-basics-streams, byte and character streams. predefinedstreams,reading and writing from consoleand files. Networking - basics, networking classes and interfaces, using Java.net package, Sockets- doing TCP/IPanddatagram programming.
Unit-4	ApplicationVsApplets-usingthetoolsinJDK, Javadoc,Java,Jdbetc.Appletsprogramming-creatingandexecutingJavaapplets,insertingappletsinawebpage,Javasecurity.JavaGraphicsfundamentals.AWTclasses,eventhandlingandswingclasses,AWTprogramming. working with windows, graphics and text, using AWT controls, layout managers andmenus,handlingimage,animation,soundandvideo.Eventhandling-differentmechanism,Thedelegation event model, event classes. event listener interfaces, adapter and inner classes. Java swing applet,icons and labels,text fields, buttons,comboboxes, tabbed and scrollpanes. trees, tables.

Unit-5	JDBCOverview,ConnectionClassesandinterfacesJDBC,ODBCBridge,Servlets,Lifecycle ofservlet,Cookies,RMI-RemoteMethodInvocation2tier3tierArchitecture.Objectserialization,CORBA - JINI overview. JAVABEANS AND SWING Bean concepts . Events in bean box - Beancustomization - Persistence-Application - deployment using swing - Advanced swing techniques - JARfilehandling



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Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2020-21

Class	:	M.Sc.
Semester	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	Linux and Shell Scripting
Max. Marks	:	50
Course Code	:	PR-COMP- 826

Course Outcome

CO1- Install packages and manage user accounts in Linux.

CO2- Implement basic scripts in shell.

LinuxCommands:

- mkdir
- cd
- rm.rm-f
- cp
- move
- rename
- cat.cat>,cat>>
- findcommand:-name. -uname,-size,-ctime-mtime
- Searchagivenstringinafile(grepcommand)
- Makinggroup.groupaddcommand
- useraddwith–d,-s, -c,-g,-Gswitch
- usermod
- userdel,groupdel
- Is, Is-l,chmod(withalphabeticornumericpermissions)
- Chownand chgrpcommand
- EditCrontabfiletowallmessageonsystemonparticulartimeautomatically.
-

2. Vieditor:

1. Createfile,edit,save andquit
2. highligtingthesearchedtermwithinafile
3. cut,yank, undo

3. ShellScripting

1. Writeashell scripttoprint amessage.
2. Writeashellscript toaccessargumentspassedoncommandline.
3. Writeashellscript tocreatefileswith thenamespassed oncommand line.
4. Writeashell scriptto inputnumberfromuseranddisplay itsfactorial.
5. Writeashellscripttoinputfilenameandcreatemultipledirectoriesindividuallyforthenamein thefilegiven.
6. Writeashellscript to inputnumberfrom user and display whetherit is primenumberor not.
7. Writeashellscript tolist allthefiles inany directorygivenbythe user
8. Writeashellscriptthatreceivesanynumberoffilenamesasargumentschecksifeveryargumentsupplied is a fileor adirectory

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Session – 2020-21

Class	:	M.Sc.
Semester	:	III
Subject	:	Computer Science & Application
Title of Subject Group	:	Programming Skill with JAVA
Max. Marks	:	85
Course Code	:	PR-COMP- 828

Course Outcome

CO1- Create Java Programs using inheritance and exception handling.

CO2- Execute multiple programs simultaneously using multi-threaded programming.

CoreJavaProgramming Lab(UsinganyTexteditor)

1. WriteaProgramto findsum& averageof10 no.usingarrays.
2. Findgreaternumberbetweentwonumbers.(Usingconditionaloperator.)
3. Findthefactorial ofnumberif numberisgiven byuserusing commandlineargument
4. Writeaprogram todisplay gradeaccording tothe marks obtainedby thestudent
5. Writeaprogramtoconvertthegivenno.ofdaysintomonths&daysusingwithclasses,objectsandmethod.
6. WriteaprogramtoconvertgivenstringintoUppercaseandlowercaseandgetthelengthofstringusingarray.
7. Createapackagecalled"Arithmetic-thatcontainsmethodstodealallarithmeticoperations.Alsowriteaprogram to usethepackage.
8. Defineanexceptioncalled'MarksoutofBound"exceptionthatisthrowniftheenteredmarks aregreaterthan 100.
9. Usingapplicationofsingleinheritance.WriteaprogramtoFindtheareaofrectangle&volume ofcube.
10. Developasimplereallifeapplication toillustratetheuseofmultithreading.
11. Writeaprogram usingmultiple inheritancecalculateareaandparameter ofacircle
12. Writeaprogram whichtakes inputfrom keyboardand sendsoutputto theconsole.

AdvancedJavaProgrammingLab(UsingNetBeans/Eelipse)

13. Designa web pagehaving bluecolorbackgroundand whitecolor text withtitle,student details".
14. Designa webpagehavingthreehyperlinked textand twohyperlinked images.
15. Designawebpageto createaregistrationformhaving name,address,password,gender,course,nationality.skill and CVwith appropriate GUIcontrol.
16. WriteanappletprogramtodrawaFilledRectangle.(color =orange)
17. WriteaProgram inJavanetbeansto findwhetherano. isprimeornot.
18. Writeaprogram injava netbeanstofind whether ano.iseven orodd.
19. Writeaprogramin java netbeansto findareaof aright-angled triangle
20. Writeaprogram in netbeans to implement JDBC.
21. Writeaprograminnetbeansto calculatesimpleinterest/Compoundinterestonchoice.
22. Writeaprogram innetbeansto acceptemployeedata andinsert intooracle table.

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Class	:	M.Sc.
Semester	:	IV
Subject	:	Computer Science & Application
Title of Subject Group	:	Big Data Analytics
Max. Marks	:	85
Course Code	:	COMP- 830

Course Outcome

CO1- Apply Big Data analytics in Business applications.
CO2- List the components of Hadoop and Hadoop Eco-System
CO3- Access and process Data on Distributed File System
CO4 Use Spark and NoSQL for data analysis
CO5- Apply Machine Learning Techniques using R

Unit-1	IntroductiontoBigData:Introduction-distributedfilesystem-BigDataanditsimportance,FourVsDriversforBigdata, Big dataanalytics, Big dataapplications. Algorithms usingmapreduce.
Unit-2	IntroductiontoHadoop:HadoopArchitecture,BigData-ApacheHadoop&Hadoop Eco System,MovingDatainandoutofHadoop -Understandinginputsand outputs ofMapReduce-DataSerialization
Unit-3	HDFS, HIVE AND HIVEQL, HBASE: HDFS-Overview, Installation and Shell, Java API. Hive Architectureand Installation, Comparison with Traditional Database. HiveQL Querying Data, Sorting And Aggregating, MapReduce Scripts, Joins & Sub queries, HBase concepts, Advanced Usage, Schema Design, Advance Indexing, PIG,Zookeeper, how it helps in monitoring a cluster. HBase uses Zookeeper and how to Build Applications withZookeeper.
Unit-4	SPARK: Introduction to Data Analysis with Spark, Downloading Spark and Getting Started, Programming withRDDs.MachineLearningwithMLlib. NOSQL: No SQL databases, Why No SQL?, Advantages of No SQL. Use of No SQL in Industry, SQL Vs No SQL,New SQL.
Unit-5	DataAnalyticswithRMachineLearning:Introduction.SupervisedLearning,UnsupervisedLearning, CollaborativeFiltering.BigData Analytics with BigR.

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Class	:	M.Sc.
Semester	:	IV
Subject	:	Computer Science & Application
Title of Subject Group	:	Computer Graphics and Multimedia
Max. Marks	:	85
Course Code	:	COMP- 831

Course Outcome

CO1- Describe the working of various display devices
CO2- Implement various algorithms to scan, convert basic geometrical primitives, transformations, Area Filling, Clipping
CO3- Explain 3D-transformations
CO4- Explain the use of Text & Audio file compression concepts
CO5- Apply the fundamentals of video and animation file formats and compressions used in computer graphics

Unit-1	**Devices:** Storage tube graphics display - raster scan displays, random scan systems, 3D viewing devices, Plotters,printers, digitizers. Light pens etc. Active & Passive graphics devices, Scan Conversion techniques, line drawing:simple DDA, Bresenham's Algorithm, Circle Drawing Algorithms. Scan line polygon fill algorithm, boundary-fillandflood-fillalgorithms
Unit-2	**2D transformations:** Translation, Rotation, Scaling. Shearing. Reflection. Inverse Transformation. Homogenouscoordinatesystem,MatricesTransformation,CompositeTransformation. Windowing&Clipping:WorldCoordinateSystem,ScreenCoordinateSystem,Viewing Transformation,LineClipping,CohenSutherland.MidpointLineclippingalgorithms,PolygonClipping:Sutherland -Hodgeman,Weiler-Athertonalgorithms.
Unit-3	**3Dtransformations:**Translation,rotation,scaling,Parallel&PerspectiveProjection,TypesorParallel&Perspective Projection. Hidden Surface elimination: Depth comparison, Back face detection algorithm, Paintersalgorithm.Z-bufferalgorithm.Curvegeneration.BezierandB-splinemethods,Diffusereflection,Specularreflection.Phony Shading.Gourandshading.raytracing,colormodelslikeRGB,YIQ, CMY,HSV.
Unit-4	**Multimedia:**MultimediaTerms,MultimediaHardware,BasictoolsinMultimedia,UsesofMultimedia,Multimedia System Architecture, Text -Types , text compression, Text file formats RTF. TIFF, hypertext andhypermedia Audio- Components of an audio system, Digital **Audio:** digital audio, MPEG, MIDI, processingsound,sampling, compression.Soundcards, Audio fileformats,Audio ProcessingSoftware.

Unit-5	**Video:** Analog and Digital Video. Introduction to graphics accelerator cards, intro to AV/DV and IEEE1394cards,Video file formats, compressionstandards. **Animation:** Uses of Animation, Principles of Animation, Computer based animation, 2D and 3D Animationtechniques.Animationfileformats. Animationsoftware's. Compression.

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Class	:	M.Sc.
Semester	:	IV
Subject	:	Computer Science & Application
Title of Subject Group	:	Lab-IBigDataAnalysis
Max. Marks	:	50
Course Code	:	PR-COMP- 834

Course Outcome

CO1- Apply Big Data analytics in Business applications.
CO2- List the components of Hadoop and Hadoop Eco-System

SuggestedPracticalList

1. Settingupamulti-nodeApacheHadoopclusterfrom scratch
2. PerformingfileI/OusingHDFS.
3. Implementinganend-to-enddatapipelinewithHive
4. CreatingUserDefinedFunctionsinHive
5. WorkingwithHBaseShellandloadingdatafromHive
6. Runninga Map/ReduceJob-WordCount
7. UsingEclipsetobuildMap/ReduceApplications
8. DeployingMap/ReduceJobsunCluster
9. AnalyzingStockMarketDatausingPig/Latin
10. WorkingWithComplexDataTypes
11. AnalyzingweatherdatausingHive
12. WorkingwithHbaseShell
13. LoadingDatainHDFS,Hive&HbaseinVariousformats

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Class	:	M.Sc.
Semester	:	IV
Subject	:	Computer Science & Application
Title of Subject Group	:	Lab-II PHP & My SQL
Max. Marks	:	50
Course Code	:	PR-COMP- 835

Course Outcome

CO1- Create programs for data and file handling in PHP
CO2- Retrieve, insert, update, and delete data from the relational database MySQL

SuggestedPracticalList

1. CreateasimpleHTML.form andaccepttheuser's nameand displaythename throughPHP echostatement.
2. WriteaPHPscripttodemonstratearithmeticoperators,comparisonoperator.andlogical operator.
3. WritePHPScripttoinputmarks,generateresultanddisplaygrade.
4. WritePHPScriptforadditionoftwo2x2matrices.
5. WritePHPscript toobtainfactorialofa number usingfunction
6. WritePHPscripttodemonstratestring,dateandmathfunction.
7. WritePHPscript todemonstrate
8. Createstudentregistrationformusingtextbox,checkbox,radiobutton,select,submitbutton.Anddis playuserinserted value innewPHPpage.
9. Writetwodifferent PHPscript todemonstratepassingvariablesthrough aURL.
10. Writetwodifferent PHPscript todemonstratepassingvariableswithsessions.
11. WritePHPscript todemonstratepassingvariableswithcookies.
12. Writea programto keeptrack of howmanytimesavisitor hasloadedthepage.
13. WritePHPscript todemonstrateexceptionalhandling.
14. WriteaPHPscripttoconnectMySQLserverfrom yourwebsitc.
15. Writeaprogramtoreadcustomerinformationlikecustno,custname,Itempurchase,andmob_no,fro mcustomertable and displayalltheseinformationintable formatonoutputscreen.
16. Writeaprogramtoedit nameofcustomerto"Bob" withcost no=1,andtodeleterecordwithcust_no=3.
17. Writeaprogramtoreademployeeinformationlikeemp_no.,emp_name,designationandsalaryfrom EMPtableand display allthisinformation usingtableformat.
18. Createadynamic websiteusing PHPandMySQL.

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Session 2016-17 To 2020-21

Class	:	M.SC
Semester	:	I
Subject	:	Mathematics
Paper	:	II
Title of Subject	:	Real Analysis
Compulsory	:	Compulsory
Course Code	:	MATH-1002
Max. Marks	:	85

Course Outcomes

CO1- Define Integration and differentiation in the items of Riemann Satieties integral with examples.
CO2- Define the limit of a Sequence, series, uniforms convergence and continuity.
CO3- Test the convergence of a series using Ratio, Root and Comparison tests .
CO4- Define function of several variables and linear Transformation.
CO5- Define the derivatives of a function.

UNIT I	Definition and existence of Riemann-Stieltjes integral and its Properties, Integration and differentiation.
UNIT II	Integration of vector-valued functions, Rectifiable curves. Rearrangements of terms of a series. Riemann's theorem.
UNIT III	Sequences and series of functions, point wise and uniform convergence. Cauchy criterion for uniform convergence, Weierstrass M-test. Uniform convergence and continuity, uniform convergence and Riemann-Stieltjes integration, uniform convergence and differentiation.
UNIT IV	Functions of several variables, linear transformations, Derivatives in an open subset of R", Chain rule, Partial derivatives, Differentiation, Inverse function theorem.
UNIT V	Implicit function theorem, Derivatives of higher order, Power Series, uniqueness theorem for power series, Abel's and Tauber's theorem,

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Session 2016-17 To 2020-21

Class	:	M.SC
Semester	:	I
Subject	:	Mathematics
Paper	:	IV
Title of Subject	:	Complex Analysis
Compulsory	:	Compulsory
Course Code	:	MATH-1004
Max. Marks	:	85

Course Outcomes

CO1- Recognize the concept of complex integration, Cauchy gorses theorem.

CO2- Prove the Morera'stheorem,Liouville'stheorem, Telesis, fundamental theorem of Algebra, theorems with examples.

CO3- Evaluate the integral using cauchy's integral formula and Residue theorems.

CO4- Describe Bilinear Transformation and application part.

UNIT I	Complex integration, Cauchy –Goursattheorem, Cauchy Integral formula, Higher order derivatives.
UNIT II	Morera'stheorem, Cauchy's inequality, Liouville'stheorem, The fundamental theorem of algebra, Taylor's theorem.
UNIT III	The maximum modulus principal, Schwartz lemma, Laurent series, Isolated singularities, *M*eromorphic functions, The argument principle, Rouche'stheorem Inverse function theorem.
UNIT IV	Residues, Cauchy's residue theorem, Evaluation of integrals, Branches of many valued functions with special reference to argz, log z, z^a.
UNIT V	Bilinear transformations, their properties and classification, Definitions and examples of conformal mappings.

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Syllabus recommended by Board of studies of Mathematics
Session 2016-17 To 2020-21

Class	:	M.SC
Semester	:	I
Subject	:	Mathematics
Paper	:	V (1)
Title of Subject	:	Advance Discrete Mathematics
Compulsory	:	(optional-1)
Course Code	:	MATH-1005
Max. Marks	:	85

Course Outcomes

CO1- Define semi group and monodies, Monopod phish, Quotient semi group.
CO2- Define Lattices and application part.
CO3- Illustrate tautology, truth tables Normal forms.
CO4- Discuss the graphs, paths, circuit
CO5- Prove the Algorithms.
CO6- Define trace, Bipartite graphs planar graphs with examples.

UNIT I	Semigroup and monoids, sub semigroupandsubmonoids, Homomorphism of semigroupsand monoids, Congruence relation and Quotient semigroups, Direct products, Basic Homomorphism Theorem.
UNIT II	Lattices - Lattices as partially ordered sets, their properties, Lattices as Algebraic systems, sublattices, Bounded lattices, Distributive Lattices, Complemented lattices.
UNIT III	**Boolean** algebra - Boolean algebra as lattices, various Boolean identities. Joint irreducible elements, minterms, maxterms, mintermBoolean forms, canonical forms, minimization of Boolean functions. Applications of Boolean Algebra to switching theory (Using AND, OR, &NOT gates the Karnaugh**method.**
UNIT IV	Graph Theory - Definition and types of graphs, Paths &circuits. Connected graphs. Euler Graphs, weighted graphs (undirected), Dijkstra'sAlgorithm Trees, Properties of trees, Rooted &Binary trees, spanning trees, minimal spanning tree.
UNIT V	Complete Bipartite graphs, Cut-sets, properties of cut sets, properties of cut sets, Fundamental Cut-sets &circuits, Connectivity and Separability, Planar graphs ,Kuratowski'st*wog*raphs, Euler's formula for planar graphs.

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Class	:	M.SC
Semester	:	II
Subject	:	Mathematics
Paper	:	IV
Title of Subject	:	Complex Analysis- II
Compulsory	:	Compulsory
Course Code	:	MATH-1009
Max. Marks	:	85

Course Outcomes

CO1- Prove the Maier strass factorization theorem, mitten- Loffler's theorem, Schwartz reflection principle.

CO2- Discuss harmonic function on a disc, tension's formula range of analytic function, univalent function.

CO3- Prove the bores, hard Amaral factorization Block's theory.

UNIT I	*W*eierstrass factorization theorem. Gamma and its properties. Riemann Zeta function. Riemann's functional equation.
UNIT II	Mittag-Leffler's theorem. Analytic continuation. Uniqueness of direct analytic continuation. Uniqueness of analytic continuation along a curve. Power series method of analytic continuation.
UNIT III	Schwartz reflection principle. Harmonic function on a disc. Harnax inequality and theorem. Dirichlet problem. Green's function.
UNIT IV	Cannonicalproduct .Jenson's formula. Hadamard's three circles theorem. Order of an entire function. Exponent of convergence. Borels theorem Handamard's factorization theorem.
UNIT V	The range of an analytic function. Bloch's theorem. The little Picard theorem. Schottky's theorem. Montel Caratheodary and great Picard theorem. Univalent function. Bieberbach conjecture and the 14-theorem.

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Class	:	M.SC
Semester	:	II
Subject	:	Mathematics
Paper	:	V
Title of Subject	:	Advanced Discrete mathematic -II
Compulsory	:	(optional-1)
Course Code	:	MATH-1010
Max. Marks	:	85

Course Outcomes

CO1- Define matrix representation of graphs.
CO2- Explain numeric functional application pant with examples.
CO3- Describe formal languages, Automate, Diagram & equivalent machines.
CO4- Prove the kleen's theorem, pumping lemma and explain regular expressions and corresponding regular languages.

UNIT I	Matrix representation of graphs - Incidence matrix, Cut set matrix, Circuit Matrix and Adjacency matrix. Directed graphs Definition of types of directed graphs Binary search trees.
UNIT II	Discrete Numeric functions, Asymptotic Behaviourof Numeric functions, Generating functions. Recurrence Relations, Linear Recurrence Relations with constant coefficient, Homogeneous solutions, particulars solutions, Total Solutions.
UNIT III	Computability and Formal languages - Languages, Phrase structure grammars, Derivation, Sentential forms, Language generated by grammar. Regular, context-free and context sensitive grammars.
UNIT IV	Finite State Automata, Diagram &Language determined by an automaton, Finite State Acceptors, Deterministic and Non-deterministic Finite Automata. Finite State Machines, their transition table &diagrams. Equivalent machines.
UNIT V	Reduced Machines, Kleen'stheorem (statement only), Pumping lemma, Moore and Mealy Machines, Turning Machines. Regular Expressions and corresponding regular languages (Definition only).

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Class	:	M.SC
Semester	:	III
Subject	:	Mathematics
Paper	:	V
Title of Subject	:	Operations research - I
Compulsory	:	Compulsory
Course Code	:	MATH-1015
Max. Marks	:	85

Course Outcomes

CO1- Define operations Research & its scope.
CO2- Explain mathematical formulation & Graphical Solution.
CO3- Discuss Linear Programming Problems and application part.
CO4- Explain Duality.

Unit- 1	Operations Research and its scope, Orgin and Development of Operations Research, Characteristics of Operations Research.
Unit- 2	Model in Operations Research, Phase of Operations Research, Uses and Limitations of Operation Research, Linear Programming Problems.
Unit-3	Mathematical Formulation, Graphical Solution Method.
Unit- 4	General Linear Programming Problem :Simplex Method exceptional cases, artificial variable techniques; Big M method , two phase Method and Cyclic problems, problem of degeneracy.
Unit- 5	Duality, Fundamental Properties of duality and theorem of duality

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Class	:	M.SC
Semester	:	III
Subject	:	Mathematics
Paper	:	V
Title of Subject	:	Spherical Trigonometry and Astronomy -I
Compulsory	:	Optional XIII
Course Code	:	MATH-1016 (A)
Max. Marks	:	85

Course Outcomes

CO1- Define Great circle and small circle.
CO2- Prove Relation between the sides and angles properties.
CO3- Discuss Formula for half angle and application.
CO4- Explain Napier's and , De almber's Analogies.
CO5- student study of Latitude and longitude.

Unit-1	Great circle and small circle, shortest distance joining two points on the surface of a sphere. Properties of poles spherical radius & angle.
Unit-2	Polar triangle – Relation between the sides and angle's properties of spherical triangles. Cosine and sine formulae.
Unit-3	Formula for half angle and half a side Supplemental sine, cosine formula, cotangent formula..
Unit-4	Napier's Analogies and , De almber's Analogies, Right angled triangles.
Unit-5	Position on earth, Latitude and longitude, system of stars, Rate of change of Zenith distance and Azimuth.

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Class	:	M.SC
Semester	:	IV
Subject	:	Mathematics
Paper	:	III
Title of Subject	:	Advanced Special Function-II
Compulsory	:	Compulsory
Course Code	:	MATH-1019
Max. Marks	:	85

Course Outcomes

CO1- Explain Bessel function, generating function.
CO2- Describe the Legendre polynomials, foregoes formula.
CO3- Define hermit polynomials, Leaguers polynomials, Jacobi polynomial.
CO4- Explain orthogonal properties.

Unit-1	Bessel function, Bessel's differential equation, Generating function, Bessel's integral with index half and an odd interger.
Unit-2	Generating function for Legendre polynomials, Rodrigues formula, Bateman's generating function, Additional generating functions.
Unit-3	Definition of Hermite polynomials Hn(X), Pure recurrence relations, Differential recurrence relation, Rodrigue's formula. Other generating functions, Othogonality, Expansion of polynomials, more generating functions.
Unit-4	Laguerre Polynomials : The LaguerrePloynomials Ln (X), Generating functions,Pure recurrence relations, Differential recurrence relation, Rodrigue's formula.
Unit-5	Jacobi polynomial. Generating functions, Differential Equation of Jacobi Polinomial, Orthogonal Properties.

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Class	:	M.SC
Semester	:	IV
Subject	:	Mathematics
Paper	:	IV
Title of Subject	:	Operations research - II
Compulsory	:	Compulsory
Course Code	:	MATH-1020
Max. Marks	:	85

Course Outcomes

CO1- Describe Transportation problems, Assignment problems, network Analysis.
CO2-Explain – simulation with examples & Game theory.

Unit-1	Transportation problems : North-West Corner Method Least-Cost Method. Vogel's Approximation Method, MODI Method. Exceptional cases and problem of degeneracy.
Unit-2	Assignment problems, Non-Linear Programming Techniques-Kuhn-Tucker constraintsNon –negative Conditions,
Unit-3	Network analysis, constraints in Network, Construction of network, Critical Path Method (CPM) PERT, PERT calculation, Resource Leveling by Network Techniques and advances of network (PERT/CPM).
Unit-4	Simulation :Monte-Carlo Simulation. Simulation of Networks, Advantage and Limitation of Simulation.
Unit-5	Game theory.Two persons, Zero-sum Games, MaximixMinimax principle, games without saddle points. Mixed strategies, Graphical solution of 2xm and mx2 games, solution by Linear Programming.

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Syllabus recommended by Board of studies of Mathematics
Session 2016-17 To 2020-21

Class	:	M.SC
Semester	:	IV
Subject	:	Mathematics
Paper	:	IV
Title of Subject	:	Spherical Trigonometry and Astronomy -II
Compulsory	:	Optional - XIII
Course Code	:	MATH-1023
Max. Marks	:	85

Course Outcomes

CO1- Define motion of sun, Twilight.
CO2- Describe Refraction.
CO3- Student study Kepler's Laws.
CO4- Explain Planetary motion
CO5- Students Study of Parallax and eclipses.

Unit-1	Fundamental definition, motion of sun, Twilight.
Unit-2	Dip of the horizon, Refraction, meridian circle.
Unit-3	Kepler's Laws of Planetary motion, time
Unit-4	Planetary motion Phenomena, Aberration.
Unit-5	Precession and mutation, parallax and eclipses.

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SADHU VASWANI AUTONOMOUS COLLEGE
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Syllabus Recommended by Board of Studies of Physics
Session 2016-17 To 2020-21

Class	:	M.Sc.
Semester	:	I
Subject	:	Physics
Paper	:	I - MATHEMATICAL PHYSICS
Course Code	:	PHY-3001
Max. Marks	:	85+ 15CCE

Course Outcomes

CO1- Learn about Gradient, Divergence and Curl in orthogonal curvilinear and their typical Applications in physics.

CO2- Mathematical Physics to develop a understanding of physics and solve the complex problem under the quantum mechanics classical mechanics and fluid dynamics.

CO3- Get introduced to Special functions like Bessel functions, Hermite and Legendre and their recurrence relations.

CO4- Students have cleared a concept of vector and tensor analysis.

CO5- Students should also be able to understand the Fourier and Laplace Transform, Series and Analytic functions to solve many complex problems and useful to higher Studies.

Unit-1	Differential equations: Recursion relation, generating functions and orthogonality of Bessel functions of first and second kind, Hermite, Legendre, Associate Legendre and Laguerre Polynomials,Curvilinear co-ordinate system with specific cases of Cartesian, Cylindrical, and Spherical coordinate systems.
Unit-2	Integral transforms Fourier integral, Fourier Transform and Inverse Fourier Transforms. Fourier Transform of derivatives, Convolution Theorem. Elementary Laplace transforms. Laplace Transform of derivatives, Applications to a damped harmonic oscillator.
Unit-3	Green's Functions: Non homogenous boundary value problems, Green's Function for one dimensional problems, Eigen Function, expansion of Green's function, Fourier Transform Method of constructing Green's Function, Green's Function for electrostatic boundary value problems and quantum mechanical scattering problem.
Unit-4	Complex variables: Analyticity of complex functions, Cauchy Riemann equations, Cauchy theorem, Cauchy integral formula, Taylors, Maclaurin, Laurent series & mapping, Theorem of residues, Simple cases of contour integration, Jordan's lemma Integrals involving multiple valued functions (Branch points).
Unit-5	This unit will have a short note question covering all the four units. The students will have to answer any two questions out of the four.

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Class	:	M.Sc.
Semester	:	I
Subject	:	Physics
Paper	:	II - CLASSICAL MECHANICS
Course Code	:	PHY-3002
Max. Marks	:	85+ 15CCE

Course Outcomes

CO1- The Lagrangian and Hamiltonian approaches in classical mechanics.
CO2- The classical background of Quantum mechanicsand get familiarized with Poisson brackets and Hamilton -Jacobi equation.
C03- Kinematics and Dynamics of rigid body in detail and ideas regarding Euler's equations of motion.
CO4- Theory of small oscillations in detail along with basis of free vibrations.
CO5- Students will be able to understand the possibility to extend ordinary vector analysis to four dimensional formulations by four vectors and four momentums.

Unit-1	Newtonian mechanics of one and many particles systems: Conservation laws, Constraints and their classification, Principle of virtual work: D' Alembert's principlein generalized coordinates, The Lagrange's equation from D'Alembert'sprinciple, Configuration space, Hamilton's principle deduction from D'Alembert's principle, Generalized momenta and Lagrangian formulation of the conservation theorems, Reduction to the equivalent one body problem; the equation of motion and first integrals, the differential equation for the orbit.
Unit-2	The equations of canonical transformation and generating functions, The Hamilton-Jacobi Action and Angle variables, Possion's brackets; simple algebraic properties of Possion's brackets, The equation of motion in Possion's brackets notation, Possion's theorem, principle of least action, The Kepler problem, Inverse central force field, Rutherford scattering.
Unit-3	Theory of small oscillations, Equations of motion, Eigen frequencies and general motion, normal modes and coordinates, Applications to coupled pendulum and linear bistable molecule, Rotating coordinate systems, Acceleration in rotating frames, Coriolis force and its terrestrial astronomical applications, Elementary treatment of Eulerian coordinates and transformation matrices, Angular momentum inertia tensor, Eular equations of motion for a rigid body, Torque free motion for a rigid body.
Unit-4	Symmetries of space and time, Invariance under Galilion transformation, Covariant four- dimensional formulation, 4-vectors and 4-scalers, Relativistic generalization of Newton's laws 4- momentum and 4- force, variance under Lorentz transformation relativistic mechanics, Covariant Lagrangian, covariant Hamiltonian, Examples.
Unit-5	This unit will have a short note question covering all the four units. The students will have to answer any two questions out of the four.

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Class	:	M.Sc.
Semester	:	I
Subject	:	Physics
Paper	:	III - QUANTUM MECHANICS -I
Course Code	:	PHY-3003
Max. Marks	:	85+ 15CCE

Course Outcomes

CO1- In Quantum mechanics, Schrodinger equation gives us a detailed account of the form of the wave functions of probability waves that control the motion of same smaller particles.

CO2- The equation also describes how these waves are influenced by external factors.

CO3- Linear vector space, Hilbert space, concepts of basis and operators and bra and ket notation.

CO4- Both Schrodinger and Heisenberg formulations of time development and their applications.

CO5- Solve the linear harmonic oscillator and hydrogen-like atom problems.

Unit-1	Basic Postulates of quantum mechanics, equation of continuity, Normality, Orthogonality and closure properties of Eigen functions, expectation values and Ehrentest theorems, solution of Schrodinger equation for one dimensional (a) potential well (b) potential step and (c) potential barrier.
Unit-2	Linear vector space, concept of Hilbert space, bra and ket notation for state vector, representation of state vectors and dynamical variables by matrices and unitary transformation (Translation and rotation), creation and annihilation operators, matrices for x and p. Heisenberg uncertainty relation through operators (Schwartz inequality).
Unit-3	Solution of Schrodinger equation for (a) Linear harmonic oscillator (b) hydrogen-like atom (c) square well potential and their respective application to atomic spectra, molecular spectra and low energy nuclear states (deutron)
Unit-4	Angular momentum in quantum mechanics, Eigen values and Eigen function of L^2 and L_z in term of spherical harmonics, commutation relation, Time independent perturbation theory, Non- degenerate and degenerate cases.
Unit-5	This unit will have a short note question covering all the four units. The students will have to answer any two questions out of the four.

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Class	:	M.Sc.
Semester	:	I
Subject	:	Physics
Paper	:	IV - ELECTRONIC DEVICES
Course Code	:	PHY-3004
Max. Marks	:	85+ 15CCE

Course Outcomes

CO1- Understanding of the devices their characteristics and applications, to be able to use them in electronic circuits.

CO2- To have knowledge about photonic materials such as LEDs and solar cell their working principles.

CO3- The Syllabus is systematically organized and the presentation has been kept at a level suitable for a student with basic knowledge of circuit theory and electronic devices.

CO4- Expanded and improved coverage of CMOS Logic.

CO5- Understanding ofElectro-optic, Magneto-optic and Acoustic-optic effects.

Unit-1	Transistors: JFET, BJT, MOSFET and MESFET, structure derivations of the equations for I-V characteristics under different condition, microwave devices, tunnel diode, transfer electron devices (Gunn diode), avalanche transits time devices, Impatt diodes and parametric devices.
Unit-2	Photonic devices: radiative and non- radiative transitions, optical absorption, bulk and thin film photo conductive devices (LDR), diode photo detectors, solar cell (open circuit voltage and short circuit current, fill factor), LED (high frequency limit, effect of surface and indirect recombination current, operation of LED), semi-conductors; diode lasers (conditions for population inversion in active region, light confinement factor, optical gain and threshold current for lasing.
Unit-3	Memory Devices: Read Only Memory (ROM) and Random Access Memory (RAM), Types of ROM: PROM, EPROM, EEPROM and EAPROM, static and dynamic RAM (SRAM & DRAM), characteristics of SRAM and DRAM. Hybrid Memories: CMOS and NMOS memories, Nonvolatile RAM, Ferro- electric memories, charge coupled devices (CCD), storage devices: Geometry and organization of magnetic (FDD & HDD) and optical (CD-ROM, CD-R, CD-R/W, DVD) storage devices.
Unit-4	Electro-optic, Magneto-optic and Acoustic-optic effects, material properties related to get these effect, important Ferro electric, liquid crystal and polymeric materials for these devices, piezoelectric, electrostrictive and magnetostrictive effects, Important materials for these properties and their applications in sensors and actuator devices, acoustic delay lines, piezoelectric resonators and filters, high frequency piezoelectric devices-surface, acoustic wave devices.
Unit-5	This unit will have a short note question covering all the four units. The students will have to answer any two questions out of the four.

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Class	:	M.Sc.
Semester	:	I
Subject	:	Physics
Paper	:	Practical
Course Code	:	PR PHY-3005

Course Outcomes

CO1- Understanding of the devices their characteristics and applications, to be able to use them in electronic circuits.

CO2- To have knowledge about photonic materials such as LEDs and solar cell their working principles.

CO3- The Syllabus is systematically organized and the presentation has been kept at a level suitable for a student with basic knowledge of circuit theory and electronic devices.

I.AB (A)

1. Verification of Cauchy's formula.
2. Verification of Fresnel's formula.
3. Young's modulus of a metal rod by Newton's ring (interference method)
4. Characteristics of a tetrode valve.
5. Characteristics of a pentode valve.

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Class	:	M.Sc.
Semester	:	I
Subject	:	Physics
Paper	**:**	Practical
Course Code	**:**	PR PHY-3006

Course Outcomes

CO1- Understanding of the devices their characteristics and applications, to be able to use them in electronic circuits.

CO2- To have knowledge about photonic materials such as LEDs and solar cell their working principles.

CO3- The Syllabus is systematically organized and the presentation has been kept at a level suitable for a student with basic knowledge of circuit theory and electronic devices.

l.AB (B)

1. Determination of Energy Band Gap of a semiconductor by reverse saturation.
2. To plot input & output characteristic curves of a given transistor in CE mode and calculate 'h' parameter.
3. To study Drain & Mutual characteristics of a FET & calculation of u,r_d and g_f.
4. Study of Uni-Junction Transistor (UJT).
5. To Study Cathode Ray Oscilloscope (CRO).

NOTE : Experiments of similar standards can also be designed by the faculty members.

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Class	:	M.Sc.
Semester	:	II
Subject	:	Physics
Paper	:	I - QUANTUM MECHANICS-II
Course Code	:	PHY-3007
Max. Marks	:	85+ 15CCE

Course Outcomes

CO1- Approximation methods for time-independent problems like the WKB approximation.

CO2- Perturbation theory and Interaction of an atom with the electromagnetic field.

CO3- Theory of scattering and calculation of scattering cross section.

CO4- Einstein's A and B Coefficients and transition probability.

CO5- Relativistic Quantum Mechanics using Dirac equation, Dirac matrices, The Klein Gordon Equationetc.

Unit-1	**Approximation method for bound states:** Rayleigh-Schrodinger perturbation theory of non- degenerate and degenerate levels and their applications to perturbation of an oscillator, Normal helium atom and first order stark effect in hydrogen, Variation method and its applications to ground state helium, WKB Approximation method, connection formula, ideas on potential barrier with application to theory of alpha decay.
Unit-2	**Time dependent perturbation theory:** Method of variation of constants and transition probability, adiabatic and sudden approximation, wave equation for a system of charged particles under the influence of external electromagnetic field, absorption and induced emission, Einstein'sA and B coefficients transition probability.
Unit-3	Theory of Scattering, Physics concepts, scattering amplitude, scattering cross-section, Born- Approximation and partial waves, scattering by perfectly rigid sphere, complex potential and absorption, scattering by spherically symmetric potential, identical particles with spin, Pauli's spin matrices.
Unit-4	Schrödinger's relativistic equation (Klein-Gordon equation), Probability and current density, Klein- Gordon equation in presence of electromagnetic field, hydrogen atom, short comings of Klein-Gordon equation, Dirac's relativistic equation for free electron, Dirac's Matrices, Dirac's relativistic equation in electromagnetic field, negative energy states and their interpretation hydrogen atom, hyperfine splitting.
Unit-5	This unit will have a short note question covering all the four units. The students will have to answer any two questions out of the four.

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Class	:	M.Sc.
Semester	:	II
Subject	:	Physics
Paper	:	III - ELECTRODYNAMICS AND PLASMA PHYSICS
Course Code	:	PHY-3009
Max. Marks	:	85+ 15CCE

Course Outcomes

CO1 Have gained a clear understanding of Maxwell's equations and electromagnetic boundary conditions.

CO2 Students will able to understand the concept of electromagnetic theory, EM wave Propagation by different modes, ionosphere and communication techniques will be useful in our daily life.

CO3 The concept of various potentials and gauge transformation give a working knowledge and applications.

CO4- Extend their understanding of special theory of relativity by including the relativistic Electrodynamics.

CO5- Students have studied Introduction of Plasma, occurrence of plasma and plasma wave's that is motivated to research in plasma.

Unit-1	Review of Basics of electrostatics and magnetostatics (electric field, Gauss's law, Laplace and Poisson equations, method of images, Biot- Sawart law, Ampere's law, Maxwell's equations, scalar and vector potentials, Gauge transformation, Lorentz Gauge, Coulomb Guage, Solution of Maxwell equations in conducting media radiations by moving charges, retarded potentials, LienardWiechrt potentials, fields of charged particles in uniform motion, fields of arbitrarily moving charge particle.
Unit-2	Fields of an accelerated charge particles at low velocity and high velocity, angular distribution of power radiated, Review of four vector and Lorentz transformation in 4- dimensional spaces, Invariance of electric charge, relativistic transformation properties of E and H fields, Electromagnetic fields tensor in 4- dimensional Maxwell equation, Four Vector current and potential and their invariance under Lorentz transformation, covariance of electrodynamics, Lagrangian and Hamiltonian for a relativistic charged particle in external EM field, motion of charged particles in electromagnetic field, Uniform and non-uniform E and B fields.
Unit-3	Elementary concept of occurrence of plasma, Gaseous and solid state plasma, Production of gaseous and solid state plasma, Plasma parameters, Plasma confinement pinch effect instability in a pinched- plasma column, Electrical neutrality in a plasma, Debye screening distance, Plasma oscillations: Transverse oscillations and longitudinal oscillations.
Unit-4	Domain of Magnetohydrodynamics and plasma physics: magnetohydrodynamics equations, magnetic hydro-static pressure hydrodynamic waves: magneto-sonic and Alfven waves, particle orbits and drift motion in a plasmas, Experimental study of Plasma, the theory of single and double probes.
Unit-5	This unit will have a short note question covering all the four units. The students will have to answer any two questions out of the four.

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Class	:	M.Sc.
Semester	:	II
Subject	:	Physics
Paper	:	IV - ATOMIC AND MOLECULAR PHYSICS
Course Code	:	PHY-3010
Max. Marks	:	85+ (CCE) 15 = 100

Course Outcomes

CO1- Know about different atom models and will be able to differentiate different atomic systems, different coupling schemes and their interactions with magnetic and electric fields.

CO2- Atomic Spectroscopy is the study of the electromagnetic radiation absorbed and emitted by atoms.

CO3- Be able to apply the principle of Raman spectroscopy and its applications in the different field of science & technology.

CO4- Atomic Spectroscopy pays a Major role as the basis of a wide range of analytical technique.

CO5- Have gained ability to apply the techniques of microwave and infrared spectroscopy to elucidate the structure of molecules.

Unit-1	Quantum states of one electron atom, Atomic orbitals, Hydrogen spectrum, Pauli's principle, Spectra of alkalielements, spin orbit interaction and line structure of alkali Spectra. Methods of molecular quantum mechanics, Thomas Fermi statistical model, Hartree and Hartree fock method, Two electron system, Interaction energy in L-S and J-J coupling, hyperfine structure (qualitative), line broadening mechanisms (general ideas).
Unit-2	Types of molecules, Diatomic linear, Symmetric top, asymmetric top and spherical top molecules, Rotational spectra of diatomic molecules as a rigid rotator, Energy level and spectra of non- rigid rotator, intensity of rotational lines.
Unit-3	Vibrational energy of diatomic molecule, diatomic molecule as a simple harmonic oscillator, Energy levels and spectrum, Morse potential energy curve, Molecules as vibrating rotator, Vibration spectrum of diatomic molecules, PQR branches, IR spectrometer (qualitative).
Unit-4	Introduction to ultraviolet, visible and infra-red spectroscopy, Raman spectroscopy: Introduction, pure rotational and vibrational spectra, Techniques and instrumentation, photo electron spectroscopy, elementary idea about photoacoustic spectroscopy and Mossbauer spectroscopy (principle).
Unit-5	This unit will have a short note question covering all the four units. The students will have to answer any two questions out of the four.

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Class	:	M.Sc.
Semester	:	II
Subject	:	Physics
Paper	:	Practical
Course Code	**:**	PR PHY-3011

Course Outcomes

CO1- Know about different atom models and will be able to differentiate different atomic systems, different coupling schemes and their interactions with magnetic and electric fields.

CO2- Atomic Spectroscopy is the study of the electromagnetic radiation absorbed and emitted by atoms.

CO3- Be able to apply the principle of Raman spectroscopy and its applications in the different field of science & technology.

LAB (A)

1. To draw B-H curve for the specimen of iron in the form of an anchor ring by Ballistic method.
2. Verification of Child's law.
3. Verification of Richardson's equation.
4. To determine the self & mutual inductance of a given coil by Anderson's method.
5. To determine the specific charge (e/m) of electron by Thomson's method.

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Class	:	M.Sc.
Semester	:	II
Subject	:	Physics
Paper	:	Practical
Course Code	**:**	PR PHY-3012

Course Outcomes

CO1- Know about different atom models and will be able to differentiate different atomic systems, different coupling schemes and their interactions with magnetic and electric fields.

CO2- Atomic Spectroscopy is the study of the electromagnetic radiation absorbed and emitted by atoms.

CO3- Be able to apply the principle of Raman spectroscopy and its applications in the different field of science & technology.

LAB(B)

1. Study of Multivibrator (transistorized).
2. Study of two stages R-C coupled amplifier.
3. Study of two Emitter-Followers.
4. Study of MOSFET.
5. Study of Wien's- bridge oscillator.

NOTE:- Experiments of similar standards can also be designed by the faculty members.

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Class	:	M.Sc.
Semester	:	III
Subject	:	Physics
Paper	:	I - Condensed Matter Physics-I
Course Code	:	PHY-3013
Max. Marks	:	85+15CCE

Course Outcomes

CO1- Able to understand properties of solid.

CO2- Able to correlate the x-ray diffraction pattern for a given crystal structure based on the corresponding reciprocal lattice.

CO3- Able to understand the quantum theory of Lattice vibrations.

CO4- Know the concepts of Phonons and its applications.

CO5- Understanding skin effect and anomalous skin effect.

Unit-1	**Crystal Structure** Bravais lattice in two and three dimension. Simple crystal structures: Hexagonal close packed structure, Diamond structure, Zinc blende structure, Sodium chloride structure, Cesium chloride structure.
Unit-2	**Crystal diffraction by X-Ray** Reciprocal lattice, Reciprocal lattice of bcc and fcc lattice. Relation between crystal lattice axes and crystal reciprocal lattice axes, Bragg's diffraction, Condition in terms of reciprocal lattice vector, Brillouin zones.
Unit-3	**Elastic Properties of Solids** Stress and strain components, elastic compliance and stiffness constants, elastic energy density, reduction of number of elastic constants, elastic stiffness constants for isotropic body, elastic constant for cubic isotropic bodies, elastic waves, waves in (100) direction, experimental determination of elastic constants.
Unit-4	**Lattice Vibration and Phonons** Lattice dynamics of a diatomic linear lattice, Lattice vibration spectrum, The concept of phonons, momentum of phonons, Inelastic scattering of photons by phonons, inelastic scattering of neutrons by phonons, Inelastic scattering of X-Ray.
Unit-5	**Thermal Properties and band theory of solids** Anharmonicity, thermal expansion, thermal conductivity, equation of state of solids, Gruneisen constant, Band theory, classification of solids, concepts of effective mass, Fermi surfaces, anomalous skin effect, De Hass van alphen effect, cyclotron resonance, Magneto resistance.

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Class	:	M.Sc.
Semester	:	III
Subject	:	Physics
Paper	:	II - Nuclear and Particle Physics
Course Code	:	PHY-3014
Max. Marks	:	85+15CCE

Course Outcomes

CO1- After completion of the course students get a sound knowledge of nucleus, interaction with nucleons, size and nuclear force.

CO2- Students understand the properties and nuclear reaction on the basis of different models such as Liquid drop, Shell model and collective model.

CO3- Students get the knowledge with high energy based Accelerator like Betatron, Synchrotron, Linear accelerator and other. Students also explore the concept of Alpha, Beta and Gamma rays.

CO4- Students familiarize to fundamental of particles and its nature which will useful in research.

CO5- Understand the basic forces in nature and classification of particles and study in detail conservations laws.

Unit-1	**Nuclear Interaction and Nuclear Reaction** Nuclear forces, exchange and tensor forces, meson theory of nuclear forces, Low-energy n-p scattering and spin dependence of n-p forces, Direct and compound nuclear reaction mechanism, reciprocity theorem.
Unit-2	**Accelerators of charged particles** Study of cyclotron, phase stability, frequency modulated cyclotron (synchrocyclotron) magnetic induction accelerator (Betatron), Electron synchrotron and linear accelerator (LINAC).
Unit-3	**Nuclear models** Liquid drop model, Bohr- wheeler's theory of nuclear fission, shell model, spin orbit interaction, magic number, spin and angular momenta of nuclear ground state, nuclear quadrupole moment.
Unit-4	**Nuclear decay and elementary particles** β Decay, general features of β ray spectrum, Fermi theory of β decay, selection rules, parity in β decay, multipole radiation, internal conversion, nuclear isomerism.
Unit-5	**Elementary particles** Classification of elementary particles, fundamental interaction, parameters of elementary particles, Symmetry and conservation laws, symmetry schemes of elementary particles SU (3) Symmetry.

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Class	:	M.Sc.
Semester	:	III
Subject	:	Physics
Paper	:	III - Digital Electronics
Course Code	:	PHY-3015
Max. Marks	:	85+ 15CCE

Course Outcomes

CO1- The fundamental concepts of digital electronics and commonly used codes in digital systems and the basic digital circuit.

CO2- Various number systems and commonly used codes in digital systems included.

CO3- Digital electronics basics using logic gates and working of major digital devices like flip flops.

CO4- Students will learn about counters and their use in digital electronics.

CO5- The A/D and D/A converters form an important part of many digital systems and the commonly used techniques for such conversions are included.

Unit-1	Number system (Binary, Octal, Decimal, Hexadecimal) and conversion between them, Boolean arithmetic signed and unsigned binary numbers, 1's complement, 2's complement.
Unit-2	Codes:BCD, Gray, ASCII, EBCDIC, De- morgan's theorem, Gates: OR, AND, NOT, NOR, NAND, XOR, XNOR, Boolean algebra,karnaugh map, adder and subtractor circuit design.
Unit-3	Multiplexer, Demultiplexer, encoder, decoder, parity checker and generator, Flip- Flops: R-S,J-K, J-K Master slave, D Flip –Flop, race around condition, registers: shift registers(left and right shift).
Unit-4	Counters: asynchronous (ripple) counter, synchronous (parallel) counter, MOD-5 counter and MOD-10 counter, BCD counters, UP –Down counter, Shift register counter (Ring counter).
Unit-5	Digital to analog conversion (Binary) weighted register method, R-2R ladder network method, complete DAC structure, Analog to digital converters (Stair case or counter method, single slope, equal slope successive approximation ADC).

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Class	:	M.Sc.
Semester	:	III
Subject	:	Physics
Paper	:	IV - Atomic and Molecular Physics
Course Code	:	PHY-3016
Max. Marks	:	85+ 15 CCE

Course Outcomes

CO1- Students learned the atomic and molecular spectroscopy and various techniques used to study the spectra.

CO2- Students learned rotational, vibrational, electronic and Raman spectra of molecules.

CO3- The principle and working of Raman spectroscopy, Mossbauer spectroscopy to study the spectra of material.

CO4- Students will also familiar with Electron Spin resonance and Nuclear magnetic resonance techniques which are useful for high Studies and research work.

CO5- To find solutions to problems related different spectroscopic systems.

Unit-1	**Nuclear Magnetic Resonance Spectroscopy** Concept of Nuclear Magnetic Resonance spectroscopy, Interaction between nuclear spin and magnetic field, population of energy level, relaxation processes, spin-spin interaction and spin-spin coupling between two and more Nuclei (qualitative).
Unit-2	**Electronic Spectra of Diatomic Molecules** Franck Condon principles, dissociation and pre-dissociation, dissociation energy, Born-Oppenheimer-approximation, vibration coarse structure of electronic spectra (bands progression and sequence)
Unit-3	**Raman Spectra** Raman effect, quantum theory of Raman effect, Molecular Polarisibility in Raman effect, Vibrational Raman spectra, vibration-rotation Raman Spectra of diatomic molecules, application of Raman and infrared spectroscopy in the structure determination.
Unit-4	**Mossbauer Spectroscopy** Mossbauer Effect, principles of Mossbauer spectroscopy, recoil less emission of gamma emission, line width and resonance absorption, application of Mossbauer spectroscopy (Isomer shift, Quadra pole splitting magnetic field effect).
Unit-5	**Electron Spin Resonance Spectroscopy** Elementary idea about ESR, principle of ESR , ESR spectrometer, splitting of electron energy levels by a magnetic field, G- Values, simple experimental setup of ESR, ESR spectra of free radicals in solution, An Isotropic system.

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Class	:	M.Sc.
Semester	:	III
Subject	:	Physics
Paper	**:**	Practical
Course Code	**:**	PR-PHY-3017

Course Outcomes

CO1- Students learned the atomic and molecular spectroscopy and various techniques used to study the spectra.

CO2- Students learned rotational, vibrational, electronic and Raman spectra of molecules.

CO3- The principle and working of Raman spectroscopy, Mossbauer spectroscopy to study the spectra of material.

LAB (A)

1. Study of Silicon Controlled Rectifier (SCR) characteristics.
2. To study Electron Spin Resonance (ESR).
3. Determination of Hall coefficient of a semiconductor.
4. Study of 555 Multivibrator.
5. To study the characteristics of a Voltage Regulator Tube.

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Sant Hirdaram Nagar, Bhopal
Syllabus Recommended by Board of Studies of Physics
Session 2017-18 To 2020-21

Class	:	M.Sc.
Semester	:	III
Subject	:	Physics
Paper	**:**	Practical
Course Code	**:**	PR-PHY-3018

Course Outcomes

CO1- Students learned the atomic and molecular spectroscopy and various techniques used to study the spectra.

CO2- Students learned rotational, vibrational, electronic and Raman spectra of molecules.

CO3- The principle and working of Raman spectroscopy, Mossbauer spectroscopy to study the spectra of material.

LAB (B)

1. Analog to Digital converter.
2. Study of Hartley Oscillator.
3. To study the operation of amplitude Modulation & Demodulation.
4. Basic computer programmers and their execution.
5. To study the characteristics of Radio Receiver.

NOTE:- Experiments of similar standards can also be designed by the Faculty members

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Class	:	M.Sc.
Semester	:	IV
Subject	:	Physics
Paper	:	I - Condensed Matter Physics –II
Compulsory/ Optional	:	Compulsory
Course Code	:	PHY-3019
Max. Marks	:	85+ 15CCE

Course Outcomes

CO1- Superconductivity: Properties of superconductors with discussion on Meissner effect. London's equations are covered and discussion on superconducting magnets is carried out.

CO2- Able to differentiate between type-I and type-II superconductors and their theories.

CO3- In Magnetic properties of solids, Diamagnetism, paramagnetic susceptibility and ferromagnetism is discussed and a quantum picture of Heisenberg exchange energy is covered.

CO4- Students will be able to learn thin films.

CO4- Students will be able to learn different methods of preparation of nano materials.

Unit-1	**Superconductivity** Concept of superconducting state, persistent current, critical temperature, Meissner effect, thermodynamics of the superconducting transitions, London equation and penetration depth, coherence length, Type I and Type II superconductors, B.C.S. theory of superconductivity, AC and DC Josephson effects, Josephson Tunneling.
Unit-2	**Magnetism** Weiss theory of ferromagnetic Heisenberg model and molecular field theory, Domain and Bloch wall energy, Spin waves and magnons, curie Weiss law for susceptibility, Ferri and Anti ferrimagnetic.
Unit-3	**Imperfection in Crystals** Imperfection in atomic packing, point defects, interstitial Schottky and Frenkle defects, lattice vacancies color centres, F centres, F′centres, coagulation of F centres, production of color centres and V centres, explanation of experimental facts, line defects, edge and screw dislocation mechanism of plastic deformation in solids, stress and strain fields of screw and edge dislocation, elastic energy of dislocation, slip and plastic deformation, shear strength of single crystal, burgers vector stress fields around dislocation
Unit-4	**Thin Film** Study of surface topography by multiple beam interferometer, conditions for accurate determination of step height and film thickness (Fizeau fringes) Electrical conductivity of thin films, expression for electrical conductivity of thin films, Hall-

	coefficient quantum size effect in thin film.
Unit-5	**Nano Structure** Definition and properties of nano structured material, different method of preparation of nano materials, plasma enhanced chemical vapor deposition, electro deposition. Structure of single wall carbon nano tubes (classification, chiral vector Cn, Translational vector T. Symmetry vector R. Unit Cell, Brillouin Zone) Electronic, mechanical, thermal and phonon properties.

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Class	:	M.Sc.
Semester	:	IV
Subject	:	Physics
Paper	:	II - Laser Physics
Compulsory/ Optional	:	Compulsory
Course Code	:	PHY-3020
Max. Marks	:	85+ 15CCE

Course Outcomes

CO1- Absorption, spontaneous and stimulated emission in two level systems.

CO2- Explain principle of Lasers.

CO3- Basic properties of the most common laser i.e. He-Ne, and carbon –dioxide, Ruby, Nd-YAg.

CO4- Students will be able to learn different applications of Laser.

CO5- Non- Linear optical frequency conversion optical parametric conversion.

Unit-1	**Basic Principles of Laser** Introduction to Laser, spontaneous and stimulated emission, Einstein coefficients, Idea of light amplification, Population inversion, Laser pumping schemes for two and three level system with threshold condition for Laser oscillation.
Unit-2	**Properties of Laser Beams and Resonators** Properties of Laser- Temporal coherence, spatial coherence, directionality and monochromaticity of Laser beam, resonators, vibrational mode of resonators, Laser amplification, open resonator.
Unit-3	**Types of Laser** Solid state Laser i.eRuby Laser, Nd- Yag Laser, Semiconductor Laser, Gas Laser i.e. Carbon dioxide Laser, He –Ne Laser, Basic idea about liquid Laser, Dye Laser and chemical Laser i.e. HCI and HF Lasers.
Unit-4	**Applications of Laser** Holography and its principle, theory of holograms, Reconstruction of image, characteristics of Holographs Application of Laser in chemistry and optics, Laser in Industry i.e. Laser welding, Hole drilling, Laser cutting, applications of Laser in medicines.
Unit-5	**Basic idea about non- linear optics** Harmonic generation, Second and third harmonic generation, phase matching, optical mixing, parametric generation of light, self- focusing of light.

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Session 2017-18 To 2020-21

Class	:	M.Sc.
Semester	:	IV
Subject	:	Physics
Paper	:	III - Computer Programming and Informatics
Compulsory/ Optional	:	Compulsory
Course Code	:	PHY-3021
Max. Marks	:	85+15 CCE

Course Outcomes

CO1- Students able to understand introduction, algorithm, operators and languages of computer.

CO2- Students able to write a programme in C++ language using commands that is useful in scientific purpose.

CO3- Students also learn the LAN, WAN and MAN networking of computers that will connected to worldwide.

CO4- Students learn about Internet explorer navigation and introduction to HTML and brief idea about HTTP.

CO5- HTML language and C++ language explore the creative programming for research purposes.

Unit-1	Conceptual framework of computer languages (Algorithm, Flowcharts) Need of structured programming, Top- down, bottom-up and modular programming design, Introduction to languages- basic structure of C program, Character set, keyword and identifiers, C data types, variable and data type declaration. Various operators like arithmetic, relational, logical, assignment, conditional, increment and decrement operators, Evaluation of expression and operator precedence.
Unit-2	Input and output statement, control statement (if, if-else, nested-if, if-else statements, switch, while, Do…while and for statements) simple C programs like search of prime number between given range of numbers, finding the smallest and largest of three numbers, sum of algebraic series, factorial of given numbers, roots of a quadratic equation, binary to decimal and decimal to binary conversion etc.
Unit-3	Functions: Need of functions, calling the function by value and by reference, category of function: no argument no return, argument but not return, argument with return, Recursion, One and two dimensional arrays. String and string handling functions like sprintf(), strcpy(), sscanf(), strlen(), sizeorf(), strcmp() etc. Simple programs using user define functions, arrays and string functions.

Unit-4	**Network** Terminals- Dump terminals, smart terminals, intelligent terminals Types of network: • According to range: LAN, MAN, WAN, Client server. • According to topologies : BUS, RING ,STAR, Mesh Network. Internet: History Of Internet Service Provider (ISP), Introduction of types of internet account- shell/AC, TCP/IP A/c. types of connectivity- Dialup, Leased lines, Satellite, IP Address- Class A, Class B, Class C Domain Name Address, URL- absolute and relative.
Unit-5	**Web enabled technology(Email and HTML)** Web Browser: Internet Explorer, Netscape Navigator, Station and Dynamic web page, Introduction to HTML, HTML tags: • <HTML>, <TITLE>, <HEAD>, <BODY> • <P>, , <ALIGN>, <I>, <B>, <DIV>, <PRE>, and their attributes. • <IMG>, <a>,and their attributes. • Ordered and Unordered list tags. • Tags and associated tags and its properties. Creation of simple forms using text, Password, text area, radio, submit, Reset And Hidden, Brief idea about HTTP. Search engine, its working, types of search engines: sub directories Meta search engines, search function –AND andOR, Population search engines.

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Class	:	M.Sc.
Semester	:	IV
Subject	:	Physics
Paper	:	(IV-D) - Communication Electronics
Compulsory/ Optional	:	Optional
Course Code	:	PHY-3022
Max. Marks	:	85+ 15CCE

Course Outcomes

CO1- Many Practical circuits for AM and FM generation and detections have also been incorporated.
CO2- Students will be able to learn Propagation of waves and satellite communication.
CO3- To understand Different communication system.
CO4- Pulse Code Modulations (PCM) also discusses other systems such as Delta Modulation and Adaptive Delta Modulation.
CO5- Students will be able to Data Transmission

Unit-1	**Communication Electronics** Amplitude modulation – generation of AM waves demodulation of AM waves, DSBSC modulation, Generation of DSBSC waves, coherent detection of DSBSC waves, SSB modulation, generation and detection of SSB waves, vestigial sideband modulation.
Unit-2	**Propagation of Waves** Ground Waves, sky wave, space wave, propagation, maximum usable frequency, skip distance, virtual height, fading of signals, Satellite communication: orbital satellite, geostationary satellites, orbital pattern, look angles, orbital spacing, satellite system, link modules.
Unit-3	**Microwave** Advantages and disadvantages of microwave transmission loss in free-space, propagation of microwaves, atmospheric effects on propagation, Fresnel Zone problem used in microwave communication systems.
Unit-4	**Digital Communications** Pulse- Modulation system, sampling theorem, low pass and Band pass signals, PAM, channel BW for a PAM signal, Natural Sampling, Flat top sampling, signals Recovery through Holding, Quantization of signals, Quantization, Differential PCM Delta Modulation, Adaptive Delta Modulation, and CVSD.
Unit-5	**Data Transmission** Base-band signal receiver, probability of error, optimum filter, white noise, matched filter and probability of error, coherent reception correlation, PSK, FSK, non coherent detection of FSK, differential PSK, QPSK, calculation of error probability for BPSK,BFSK and QPSK.

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Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2016-17 To 2020-21

Class	:	PGDCA.
Semester	:	I
Subject	:	Computer Science & Application
Paper	:	Introduction to Information Technology
Max. Marks	:	85
Course Code	:	PGDCA- 5001

Course Outcome

CO1- Describe computer with its characteristics, its usage, limitations and benefits
CO2- Use computer peripherals and memory efficiently
CO3- Compare between various operating systems and their functions
CO4- Identify network fundamentals and various communication networks
CO5- To apply basic concepts and features of word processing, spreadsheet and database applications

Unit-1	The world wide web, how it happens, connecting to web, browsing, locating information web multimedia, information system, software and data, It in business and industry home and at play, education and training, entertainment and arts, sciences, engineering, maths, computer in hiding, GPS. Types of computers systems and central processing unit.
Unit-2	Input and output devices, keyboard, graphics, inputting text, pointing devices, pixels & resolutions, fonts, the range of color, screen types, Laser printers, color printers, other printers. How data is storage, characteristics, floppy disks, hard disk drives, optical disk, increasing data storage, backing up your data, the smart card. Software, user interface, application program, operating system, its types, file management, utilities, document centric computing major software issues, network, computing.
Unit-3	Entering and editing documents, other word processing features, formatting documents, desktop publishing for print, screen, spreadsheet applications, introduction, entering data, charts and graphs. Database, application – introduction, principles of data storage, working with a database, queries, internet connectivity. Network applications – fax, voice and information service, person to person communication, group communication, exchanging files, LAN – introduction, architecture, the exe system, WAN – introduction, devices and media, protocols, high bandwidth personal connections.

Unit-4	Multimedia – Introduction, paint and draw application, graphics effects & tech. sounds & music, video, multimedia authoring tools, presentation devices, sound & motion, video & television. Corporate computing- introduction, transaction processing, information tools for management control, marketing, advertising, sales, design, production, manufacturing, business on internet, virtual office, career, recent trends.
Unit-5	Programs- introduction, first and second generation languages, programming languages, procedural methods, how programs are developed, programming techniwues- introduction, branching & looping, functions and decomposition, corporate development. Personal social and ethical issues.

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Class	:	PGDCA.
Semester	:	I
Subject	:	Computer Science & Application
Paper	:	Operating System
Max. Marks	:	85
Course Code	:	PGDCA- 5002

Course Outcome

CO1- Describe the basics of Operating Systems
CO2- Explain the mechanism of Process Management and Process Synchronization
CO3- Explain Virtual memory concepts and file management methods
CO4-Illustrate disk management and describe UNIX system organization and LINUX architecture
CO5- Develop basic Shell scripts

Unit-1	History of operating system : Zeroth generation, first, second, third, fourth generation. Computer architecture : introduction, 4GL program, 3GL program, 2GL program, 1GL 0GL, the context of a program, interrupts.Operating System : introduction, different services, uses of system call, user's view, the micro facility, GUI, the kernel. Booting.
Unit-2	Information management : information, file system, device drive, terminal i/o Process management : introduction, process, evolution of multiprogramming, contect switching, process, kill process, dispatch process hierarchy, poerations on a process, block, dispatch, time up, wake up, suspend/resume operation, multitasking. Inter- process communication : The producer- consumerproblem, solution.
Unit-3	Deadlocks : introduction, graphical representation, prerequisites. Memory management : introduction, single contiguous management, fixed partitioned, variable partitioned, non contiguous allocation- general concepts, paging, segmentation, combined systems, virtual memory managements system.
Unit-4	Parallel processing : introduction, difference between distributed and parallel, advantages, writing programs, classification, machine architecture. Operating system in distributedprocessing : introduction, distributed processing, LAN environment and protocols. Graphical user interface and the operating system : various concepts.
Unit-5	Unix : introduction, history & overview of UNIX, file system, data structure for process/memory management, process states & transactions, ececution and termination a program in UNIX, using the system, process scheduling memory management.

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Class	:	PGDCA.
Semester	:	I
Subject	:	Computer Science & Application
Paper	:	PC Software
Max. Marks	:	85
Course Code	:	PGDCA- 5003

Course Outcome

CO1- Describe computer with its characteristics, its usage, limitations and benefits
CO2- Use computer peripherals and memory efficiently
CO3- Compare between various operating systems and their functions
CO4- Identify network fundamentals and various communication networks
CO5- To apply basic concepts and features of word processing, spreadsheet and database applications.

Unit-1	Computer appreciation and DOS, computer application, disk operating system, additional DOS commands, configuring DOS and batch files.
Unit-2	Window, Windows basic, Windows accessories, using file manager program manager.
Unit-3	MS Word : Introduction, editing a document, move & copy text, help system, formatting text & paragraph , finding & replacing text, spell checking, using tabs, enhancing documents, columns, columns, tables and other features, using graphics, templates, wizards, using mail-merge,, miscellaneous features, of word.
Unit-4	MS Excel : introduction to worksheet and excel, getting started with excel, editing cells and using commands & functions, moving & copying, inserting & deleting rows and columns, getting help and formatting a worksheet, printing the worksheet, using statistical, maths& financial functions, database in a worksheet, additional formatting commands, drawing toolbar, miscellaneous commands & function. Multiple worksheet and macros**.**
Unit-5	Introduction to desktop publishing, overview PowerPoint, computer viruses, e-mail.

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Class	:	PGDCA.
Semester	:	I
Subject	:	Computer Science & Application
Paper	:	Object Oriented Programming in **C++**
Max. Marks	:	85
Course Code	:	PGDCA- 5004

Course Outcome

CO1- Implement Object Oriented Programming through C++
CO2- Use the concepts related to data types and functions to make programs in C++
CO3- Use arrays and pointers in C++ programming
CO4- Apply concepts of concepts of strings, classes and structures in program code
CO5- Implement overloading, inheritance and polymorphism in C++

Unit-1	Introduction to programming in C++: simple programs, output operator, characters & string literals, string length, comments, data types, variables, objects & their declaration, keywords & identifiers, initializing in the declaration, chained assignments, semicolon, operators and their precedence, increment & decrement operators, compound assignment expressions, program style. Conditional statements : relational operators, IF & IF……ELSE Statement, compound statement, compound conditions, Boolean expression, nested conditions, SWITCH statement, conditional expression operator, scope, enumeration types.
Unit-2	Iterations : WHILE statement, DO….WHILE statement, FOR statement, BREAK statement, CONTINUE statement, real number types, type conversions, constants, variables, and objects. Functions : standard C library functions, user-defined functions, Test drivers, function declaration & definition, local variables, VOID function, Boolean function, I/O function, passing by value & reference, passing by constant reference, inline function, function scope, overloading, MAIN() and EXIT() functions.
Unit-3	Arrays : introduction, processing array, initialization, passing array to a function, type definition, multidimensional arrays. Pointers and reference : introduction, references, pointers, Derived type, objects & values, returning a reference, arrays & pointers, NEW operator, DELETE operator, dynamic array, using CONST with pointers, array of pointers and pointers to arrays.

Unit-4	Strings: introduction, review of pointers, string, string I/O, CIN member functions, character functions defined in <CTYPE.H>, array of string, C-string handling library. Classes : introduction, class declaration, constructor, its initialization, access functions, private member function, copy constructor, the destructor, constant objects, structure, pointers to objects, ststic data members, static function members.
Unit-5	Introduction, overloading assignment operator, overloading arithmetic operator, overloading relational operator, overloading increment & decrement operators, introduction to composition & inheritance, virtual function, polymorphism.

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Class	:	PGDCA.
Semester	:	II
Subject	:	Computer Science & Application
Title of Subject Group	:	Internet Engineering
Max. Marks	:	85
Course Code	:	PGDCA- 5005

Course Outcome

CO1- To design and create Web pages
CO2- To program websites using HTML
CO3- To use HTML editors of Net beans and Dream Viewer
CO4- To apply basics of website development
CO5- To apply CSS to web pages.

Unit-1	Introduction to Internet & World Wide Web, introduction addressing, browsers, URL, Web Service, Web site, Homepage, Domain names – Basic concepts, Facilities available over the Internet – email, www, ftp, telnet, Usenet, blog, faq,chat. Components of internet – Client/service, modem, cable, modem backbone, router, IP addresses, address classes, DNS name, subnet UDP & TCP, uses of internet.
Unit-2	Internet :Evoluution, concepts, Internet VS Internet, growth of Internet, ISP, ISP IN India, Types of connectivity – Dial – up, leased line, DSL, Broadband, RF, VSAT etc. methods of sharing of internet connection, use of proxy service. Concept of search engines, search engine types, searching the web, web servers. E-Mail : Concepts, POP and WEB based E-mail, merits, address, basics of sending & receiving, E- mail protocols, mailing list, free e- mail service, e-mail service and e-mail clients programs.
Unit-3	Introduction to HTML – HTML Overview, Structure of HTMLdocuments, Types of documents, HTML Elements and Attributes. Basic Formatting of HTML Document layout – Font Lists, paragraph, break Rule, Horizontal rule, Colors, backgrounds, text elements, <PRE> etc. Links in html – anchor element and its attributes, images and anchors, using META information. HTML media types – media like element ,<MARQUEE>, Audio & Video support in web browsers.
Unit-4	Advance layout : Tables, Frames, Layers. Tables – layout, elements and attributes, ROWSPAN, COLSPAN. Frames – Using frames, layout of frames, problems using frames. Layers – Concept of layers, Positioned and Inflow Layers.
Unit-5	Styles streets – Basic Concepts of Style sheet, using style sheet, Cascading Style Sheets (CSS), using style sheets – basics and properties, positioning with style sheets. Basic Interactivity in html: Concepts of Forms, <FORM> element, attribute, Controls used for forms, examples of form, and examples of form design.

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Class	:	PGDCA.
Semester	:	II
Subject	:	Computer Science & Application
Paper	:	Visual Basic & Oracle
Max. Marks	:	85
Course Code	:	PGDCA- 5006

Course Outcome

CO1- To analyses Data Base design methodology.
CO2- Acquire knowledge in fundamentals of Data Base Management System.
CO3- Be able to analyses the difference between traditional file system and DBMS.
CO4- Design, create, build, and debug Visual Basic applications.
CO5- Explore Visual Basic's Integrated Development Environment (IDE).

Unit-1	RDBMS Concepts : Introduction to network, Hierarchical, Relational models, DBMS Terminologies, DBMS Components (overview); Normalization (1,2,3); ER Diagrams. Interactive SQL : Invoking SQL *Plus, The Oracle Data Type, Two Dimension matrix Creation, Insertion of Data into tables, Updating the contents of table, Deletion operations. The many faces of the Select Command, Modifying the structure of table, Removing/Deleting/Dropping Tables, Data Constraints, Computations in expression.
Unit-2	List used to select data, Logical operators, Range searching, pattern matching, Oracle Function, Grouping data from tables in SQL. Manipulating Dates in SQL, Joins, Constructing an English Sentence with Data from TablesColumns, Sub queries, Using the Union, Intersect and Minus Clause, Indexes, Views, Sequence, Granting Permission, Revoking the permission given, Creation of Reports in SQL *Plu. PL/SQL : Introduction, the PL/SQL execution environment, The PL/SQL syntax, understanding the PL/SQL lock structure, Oracle transactions, concurrency control in Oracles Lock, Cursors, Error handling in PL/SQL.
Unit-3	Visual basic : Visual Basic Programming Environment: Menu Bar, Toolbars, Project explorer, toolbox, Properties windows, form layout window, Object Browser, Concept of VB Project, Visual development and event – driven programming.
Unit-4	Programming Fundamentals : Modules, data types, Variables, Constants, Arrays, Procedures, Control Structure. Built – in functions.

Unit-5	Working with form and controls : Using form template, Creating and using controls. Classification of controls, properties of Control, method, Control arrays, Menu Interface, Menu editor, Pop – uo menus, Mouse events, Dialog boxes, Modal and Modeless, Debugging Tools, Handling runtime Errors, Graphical controls, Multiple document interface (MDI), Creating a toolbar, Creating status bar, Active X controls in VB, Calling API functions from VB.

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Class	:	PGDCA.
Semester	:	II
Subject	:	Computer Science & Application
Paper	:	Software Engineering
Max. Marks	:	85
Course Code	:	PGDCA- 5007

Course Outcome

CO1- Use various software metrics for effective project estimation and scheduling
CO2- Perform requirement analysis for a given software
CO3- Design a software using various approaches
CO4- Implement and test software using various methods
CO5- Effectively maintain and manage a software.

Unit-1	Introduction to Software Engineering : Software characteristics & components, software paradigms, Software consideration, Software project estimation techniques & software project scheduling.
Unit-2	Requirement Analysis principles, complexity measures, object oriented analysis, software prototyping 7 specifications, various requirement analysis methods, storage & processing time analysis, database requirements.
Unit-3	Software design process : Design fundamentals, top down & bottom up design, design representations, modular design, architectural design, procedural design, and data directed design, data structure oriented design, and object oriented design, real time design, software tools**.**
Unit-4	Software implementation language & coding, language classes, coding style, coding efficiency, software quality assurance, software testing techniques, software testing strategies, comparison of test methods, choice of test data, classification of tests.
Unit-5	Software maintenance &management :maintenance characteristics, software maintainability, maintenance & task, maintenance organization, maintenance side effects & issue, software configuration management (SCM), SCM process & standards.

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Session-2018-19 To 2020-21

Class : Fashion Designing
Year :I
Semester :I
Subject : Basic Designing
Paper : Basic Designing
Course Code : FD-01
Theory Max. marks : 20

Course outcomes

CO1- Its purpose is to draw marking and layout
CO2- Have knowledge of cutting
CO3- Tailoring done from a boutique or from home

Unit-1	**Introduction of Fashion Designing** Fashion Designing is art of making clothes and applying natural beauty to clothes and similarly a designer creates all types of dresses, in which there are many types of clothes, suits, skirts, indo-western etc. So that tailoring and cutting master job can be found at any boutique.
Unit-2	**Fabric Study** Fabric study under textile cover everything from fiber to fabric it is important to understand how this cloths make length, width, diagonal, cross diagonal, wearing and which material
Unit-3	**Fashion Illustration** Fashion illustration forms the initial face of every design. It can be defined as the basic transmission of an idea into a creative design through diagrams and drawing. Fashion illustrations a visual way of explaining different design ideas
Unit-4	**Element of Design** Of all the Elements of design, colour is probably the most challenging to understand. we have to learn a little science to fully understand the nature of colour
Unit-5	**Fashion Theory** Fashion theories indicates the process of fashion ideas. The theories explain the fashion trend. It also tells about how fashion moves from one stage to another stage

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Session-2018-19 To 2020-21

Class : Fashion Designing
Year : I
Semester : I
Subject : Basic Sketching
Paper : Basic Sketching
Course Code : FD-02
Theory Max. marks : 20

Course outcomes

CO1- Draw proper figure
CO2- Body twist and turn
CO3- Figure movement

Unit-1	**Basic Sketching** What is sketching and what is its meaning to explain it in theoretical form
Unit-2	**Vertical and Horizontal Sketch** It helps in learning the right precise line along with shadows and transitions, as well as it helps in teaching from drawing to correct figure position**.**
Unit-3	**Stick and Flash out Figure** Basic Fashion Illustration Classes Making the right positioning of the best in fashion helps with Pattern designing.

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Class	:	Fashion Designing
Year	:	I
Semester	:	I
Subject	:	Basic Designing
Paper	:	Basic Designing
Course Code	:	PR-FD-01
Theory Max. marks	:	30

Course outcomes

CO1- Its purpose is to draw marking and layout
CO2- Have knowledge of cutting
CO3- Tailoring done from a boutique or from home

Unit-1	Cloth cutting type of Baby kit, all basic designs etc. so that tailoring and cutting can be master
Unit-2	From fabric's length, width diagonal and weaving cross weaving and all methods.
Unit-3	Fashion illustration forms the initial face of every design. It can be defined as the basic transmission of an idea into a creative design through diagrams and drawing. Fashion illustrations a visual way of explaining different design ideas
Unit-4	Of all the Elements of design, colour is probably the most challenging to understand. we have to learn a little science to fully understand the nature of colour

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Session-2018-19 To 2020-21

Class	:	Fashion Designing
Year	:	I
Semester	:	I
Subject	:	Basic Sketching
Paper	:	Basic Sketching
Course Code	:	PR-FD-02
Theory Max. marks	:	30

Course outcomes

CO1- Draw proper figure
CO2- Body twist and turn
CO3- Figure movement

Unit-1	Sketching From the basic is an age old method used for drawing**.**
Unit-2	Legnth and width mean different things in drafting and sketching, it is very important to know about it as a fashion stylist
Unit-3	Basic Fashion Illustration Classes Making the right positioning of the best in fashion helps with dress designing.

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Class	:	Fashion Designing
Year	:	I
Semester	:	I
Subject	:	Fashion Accessories
Paper	:	Fashion Accessories
Course Code	:	PR-FD-03
Theory Max. marks	:	30

Course outcomes

CO1- To match different things with dresses
CO2- How to wear neckless, bracelet, hairstyle knowledge
CO3- Knowledge of safety accessories.

Unit-1	Belt according to the dress you wear, mantilla, Bags etc. are required and accordingly your right hairstyle is also called finishing touch along with choosing the right colours. Fashionable handicraft accessories are also used.
Unit-2	Neckless , Earrings, Brouch as fashionable items have long been used to add a stylish touch to all kinds of outfits, they also hold an important place in fashion accessories. Shoes, Watch, Kangan, bracelet, nail paint, Makeup etc. comes in all fashion accessories, which is very important for the fashion designer to be aware of.
Unit-3	Gloves are an important fashion accessory, they are worn in many places to protect the hands in summer while in many styles they are worn elegantly. Also fashionable with safety caps**.**
Unit-4	Frill, lace, quilting, piping, thermacol, buttons and different types of thred

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Class : Fashion Designing
Year : I
Semester : I
Subject : Embroidery
Paper : Embroidery
Course Code : PR-FD-04
Theory Max. marks : 50

Course outcomes

CO1- Revamping clothes by embroidery
CO2- Hand work
CO3- Traditional work

Unit-1	**Introduction of Embrodery** Hand Embroidery is a unique individual and very human art. Hand embroidery is done in various ways in India. Hand embroidery in a apparel plays an important role in its beauty and this is followed by other styles and regionally specific tradition.
Unit-2	**Traditional Embrodery** There are two types of embroidery, by hand and by computer, here we are talking about hand embroidery, in this common material is used and it has been making its identity since time immemorial, as well as traditional is taught in the first course. Kantha, workchain, halfback, fullback, kamalkshida, Phulkari, Lucknowi, cashmere,patch And so on.
Unit-3	**Various name of stitches** Simple running, long and short chain, feather, Stain, blanket, kamalkashida, kashmiri, sindhi, karai etc. The classes of handwork and workshop operator is given.

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Session-2018-19 To 2020-21

Class	:	Fashion Designing
Year	:	I
Semester	:	I
Subject	:	Aari
Paper	:	Aari
Course Code	:	PR-FD-05
Theory Max. marks	:	50

Course outcomes

CO1- Revamping clothes by embroidery
CO2- Hand work
CO3- Traditional work

Unit-1	**Cloth Framing** Before doing aari work, the cloth has to be framed, that is called a Framing(adda).The adda is a type of bed, which is made of wood on which the cloth is tightened before doing aari.
Unit-2	**Preparation of stencil** The fabric is traced with gateway (trace) paper, a type of coating is prepared to trace the fabric**.** **Unit III-Used tool** Zari, Zardozi, Needle, Huck, Aari, Big needle, Pearl Stars, different type of threads, Satin thread and many more.
Unit-3	The classes of art and craftand workshop operator is given.

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Class	:	Fashion Designing
Year	:	I
Semester	:	I
Subject	:	Draping
Paper	:	Draping
Course Code	:	PR-FD-06
Theory Max. marks	:	50

Course outcomes

CO1- Simple dummy draping
CO2- Different way of draping clothes on a dummy
CO3- Making a fall on the dress by doing different types and rap.

Unit-1	**Understanding Draping** Understanding drap from basic types and terminologies
Unit-2	**Variety of Draping** Different type of pattern are made from different types of variety draping such as Basic dress, Cowl neckline, Circular skirt, Wrap round, Cascade, Raffles top etc.
Unit-3	**Assess and propose various techniques related to manufacturing of draping and designing of garments.**
Unit-4	**With all these things , you can become designer dress co-ordinator**

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Class	:	Fashion Designing
Year	:	I
Semester	:	I
Subject	:	Textile Designing
Paper	:	Textile Designing
Course Code	:	PR-FD-07
Theory Max. marks	:	40

Course outcomes

CO1- Market trend Knowledge
CO2- Get knowledge of different types of cloths
CO3- Along with the colour of the cloth the knowledge of print the cloth also understand according to the season
CO4- Understanding the quality of life of clothes

Unit-1	**Furnishing Textile** Before doing textile designing it is necessary to understand the colour mix favorite printing design knitting trends prints and market trends.
Unit-2	**Creative textile** Textile design is a creative process by which different types of fabrics are made by weaving threads and threads in them.
Unit-3	**Combination in Textile** Textile Design, Design Idea, Technique, Colour Scheme, Fabric Thickness etc.
Unit-4	**Quality in textile** Knowledge of fabric and its print, thickness and quality before quality in textile design.
Unit-5	Tie and dye , batik design, print design ,bag design taught in designing class.

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Session-2018-19 To 2020-21

Class	:	Fashion Designing
Year	:	I
Semester	:	II
Subject	:	Fashion Adorment
Paper	:	Fashion Adorment
Course Code	:	FD-08
Theory Max. marks	:	20

Course outcomes

CO1- Fabric is selected according to the season

CO2- The choice of the colour of the clothes you are wearing according to the season is most important.

CO3- Information on how to be Fashion Stylish

CO4- How to become fashion adviser

Unit-1	What is meaning of fashion colour, meaning of colour scheme, presentation colour wheel
Unit-2	How is our fabric product, whether it is handicraft or the choice of some other explanation
Unit-3	The cross of the weight of the fabric on which the cloths is made is the break and the amount of fiber is selected
Unit-4	Choice of Colour Occasion Day Night Weather and Choice of Colour Quality
Unit-5	Decide the pattern only after considering the choice of pattern according to the occasion, when, where and how to wear it
Unit- 6	Understand the role of becoming Exhibition organizer and Accessories seller

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Class	:	Fashion Designing
Year	:	I
Semester	:	II
Subject	:	Advance Aari and Embroidery
Paper	:	Advance Aari and Embroidery
Course Code	:	FD-09
Theory Max. marks	:	20

Course outcomes

CO1- Traditional and advance Handwork Knowledge
CO2- Highlight dresses by choice
CO3- History of Aari and embroidery
CO4- Name and explanation about Aari and embroidery

Unit-1	Complete information and material of Aari Embroidery explained.
Unit-2	How to match work on dress and accessories in advance stitch. To enhance the beauty of the dress, it occasionally uses aari and embroidery **to** highlight any dress explain in it.
Unit-3	Resham, Zari, Zardozi, Chain, Madkan, Naka Tika, Long and Short, Mirror work etc.So that one can setup his own workshop.
Unit-4	Twist, chain, wepd, chain, cable, magic, cross, fish, Roman, open cartain, more than 18 stitches
Unit-5	After learning about Aari and Embroidery you will be able to perform art and craft even better

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Class	:	Fashion Designing
Year	:	I
Semester	:	II
Subject	:	FashionAdorment
Paper	:	FashionAdorment
Course Code	:	PR-FD-08
Theory Max. marks	:	25

Course outcomes

CO1- Fabric is selected according to the season
CO2- The choice of the colour of the clothes you are wearing according to the season is most important.
CO3- Information on how to be Fashion Stylish
CO4- How to become fashion adviser

Unit-1	**Season** How different types of collars and sleeves are made
Unit-2	**Production** What type of cloths is, what colours are used with what material in it and in which season it is worth wearing these things are given information.
Unit-3	**Loom** The cross of the weight of the fabric on which the cloths is made is the break and the amount of fiber is selected
Unit-4	**Colour** Choice of Colour Occasion Day Night Weather and Choice of Colour Quality
Unit-5	**Pattern** Decide the pattern only after considering the choice of pattern according to the occasion, when, where and how to wear it
Unit-6	Understand the role of becoming Exhibition organizer and Accessories seller

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Class	:	Fashion Designing
Year	:	I
Semester	:	II
Subject	:	Advance Aari and Embroidery
Paper	:	Advance Aari and Embroidery
Course Code	:	PR-FD-09
Theory Max. marks	:	25

Course outcomes

CO1- Traditional and advance Handwork Knowledge
CO2- Highlight dresses by choice
CO3- History of Aari and embroidery
CO4- Name and explanation about Aari and embroidery

Unit-1	Complete information and material of Aari Embroidery
Unit-2	How to match work on dress and accessories in advance stitch. To enhance the beauty of the dress, it occasionally uses aari and embroidery to highlight any dress explain in it
Unit-3	Resham, Zari, Zardozi, Chain, Madkan, Naka Tika, Long and Short, Mirror work etc. So that one can setup his own workshop
Unit-4	Twist, chain, wepd, chain, cable, magic, cross, fish ,Roman, open cartain, more than 18 stitches
Unit-5	After learning about Aari and Embroidery you will be able to perform art and craft even better

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Class	:	Fashion Designing
Year	:	I
Semester	:	II
Subject	:	Technique and Article
Paper	:	Technique and Article
Course Code	:	PR-FD-10
Theory Max. marks	:	50

Course outcomes

CO1- Colour combination knowledge, Tie and dye designer
CO2- Design idea ,Different types of print
CO3- Meaning of colour wheel in which 36 colour can be made from 3 colour
CO4- Knowledge of different types of texture

Unit-1	You can show your creativity in any way with any object like-pencil, pen, sketch pen, charcoal it is a design idea colour wheel and colour scheme. Which is also known as handwork designing.
Unit-2	Technique is used for colouring for given shadow the technique and transparency of the fabric tie and dye batic design technique
Unit-3	**Print technique** Dark to light, both side, checks, lines Etc. Technique from everyone, which can be used on the dress to make it a designer or make it colourful.
Unit-4	Marchandiser knowledge of history of fashion as well as a presentation of aari and embroidery articles etc. which helps you in becoming Fashion presentator

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Class	:	Fashion Designing
Year	:	I
Semester	:	II
Subject	:	Advance Designing
Paper	:	Advance Designing
Course Code	:	PR-FD-11
Theory Max. marks	:	75

Course outcomes

CO1- Boutique knowledge.
CO2- Innovative ways to becomefashion stylish,
CO3- knowledge of fashion models
CO4- Qualities to be in fashion exhibition organizer

Unit-1	**Pattern making** Knowing which pattern should be used and what is to be insert as pattern in a modern way on dress
Unit-2	**Designer Dress Design** According to the occasional moment, the dress has to be designed whether to keep it light or make it heavy
Unit-3	**Indo western design** To redesign indo western outfits, you should have knowledge of all the things like your fabric and what is your location and your choice
Unit-4	Before putting up a boutique, there should be some knowledge of colour combination, knowledge of marketing, good behavior with customer, dealing with customer and quality of making all kinds of patterns and fashion stylish.

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Class	:	Fashion Designing
Year	:	I
Semester	:	II
Subject	:	Garment Designing
Paper	:	Garment Designing
Course Code	:	PR-FD-12
Theory Max. marks	:	75

Course outcomes

CO1- Theme work
CO2- Team work
CO3- Market Knowledge
CO4- Qualities of fashion exhibitioner

Unit-1	Market survey, Fabric Knowledge, Measurement of cloth, Show organizer, Sketch designer
Unit-2	**Inspiring theme** Dresses made by inspiring from anything and doing printing on it is Garment Designing
Unit-3	**Dress designs**Which location to make the dress
Unit-4	**Colouring**Colours inspired by mood board
Unit-5	**Shading** Shedding that was in that team like Greenery, Flower, Leaf, Skymood, Hills, Rainbow, Etc
Unit-6	**Fabric Selection**The clothes should be purchased according to the type of clothes to be worn at the location or what the weather is like.
Unit-7	**Dress making**On the basis of all these, the silk dress is prepared and presented after taking the name and cutting

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Session-2018-19 To 2020-21

Class : Garment Designing
Duration : Six Months
Subject : Basic Designing
Paper : Basic Designing
Course Code : GD-01
Theory Max. marks : 20

Course outcomes

CO1- Its purpose is to draw marking and layout
CO2- Have knowledge of cutting
CO3- Tailoring done from a boutique or from home

Unit-1	**Introduction of Fashion Designing** Fashion Designing is art of making clothes and applying natural beauty to clothes and similarly a designer creates all types of dresses, in which there are many types of clothes, suits, skirts, indo-western etc. So that tailoring and cutting master job can be found at any boutique.
Unit-2	**Fabric Study** Fabric study under textile cover everything from fiber to fabric it is important to understand how this cloths make length, width, diagonal, cross diagonal, wearing and which material
Unit-3	**Fashion Illustration** Fashion illustration forms the initial face of every design. It can be defined as the basic transmission of an idea into a creative design through diagrams and drawing. Fashion illustrations a visual way of explaining different design ideas
Unit-4	**Element of Design** Of all the Elements of design, colour is probably the most challenging to understand. we have to learn a little science to fully understand the nature of colour
Unit-5	**Fashion Theory** Fashion theories indicates the process of fashion ideas. The theories explain the fashion trend. It also tells about how fashion moves from one stage to another stage

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Class	:	Garment Designing
Duration	:	Six Months
Subject	:	Textile Designing
Paper	:	Textile Designing
Course Code	:	GD-02
Theory Max. marks	:	25

Course outcomes

CO1- Market trend Knowledge
CO2- Get knowledge of different types of cloths
CO3- Along with the colour of the cloth the knowledge if of print of the cloth also understand according to the season
CO4- Understanding the quality of life of clothes

Unit-1	**Furnishing Textile** Before doing textile designing it is necessary to understand the colour mix favorite printing design knitting trends prints and market trends.
Unit-2	**Creative textile** Textile design is a creative process by which different types of fabrics are made by weaving threads and threads in them.
Unit-3	**Combination in Textile** Textile Design, Design Idea, Technique, Colour Scheme, Fabric Thickness etc.
Unit-4	**Quality in textile** Knowledge of fabric and its print, thickness and quality before quality in textile design
Unit-5	Tie and dye , batik design, print design ,bag design taught in designing class

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Class : Garment Designing
Duration : Six Months
Subject : Basic Designing
Paper : Basic Designing
Course Code : PR-GD-01
Theory Max. marks : 25

Course outcomes

CO1- Its purpose is to draw marking and layout
CO2- Have knowledge of cutting
CO3- Tailoring done from a boutique or from home

Unit-1	Cloth cutting type of Baby kit, all basic designs etc. so that tailoring and cutting can be master
Unit-2	From fabric's length, width diagonal and weaving cross weaving and all methods
Unit-3	Fashion illustration forms the initial face of every design. It can be defined as the basic transmission of an idea into a creative design through diagrams and drawing. Fashion illustrations a visual way of explaining different design ideas
Unit-4	Of all the Elements of design, colour is probably the most challenging to understand. we have to learn a little science to fully understand the nature of colour

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Class	:	Garment Designing
Duration	:	Six Months
Subject	:	Textile Designing
Paper	:	Textile Designing
Course Code	:	PR-GD-02
Theory Max. marks	:	75

Course outcomes

CO1- Market trend Knowledge
CO2- Get knowledge of different types of cloths
CO3- Along with the colour of the cloth the knowledge if of print of the cloth also understand according to the season
CO4- Understanding the quality of life of clothes

Unit-1	**Furnishing Textile** Before doing textile designing it is necessary to understand the colour mix favorite printing design knitting trends prints and market trends
Unit-2	**Creative textile** Textile design is a creative process by which different types of fabrics are made by weaving threads and threads in them.
Unit-3	**Combination in Textile** Textile Design, Design Idea, Technique, Colour Scheme, Fabric Thickness etc.
Unit-4	**Quality in textile** Knowledge of fabric and its print, thickness and quality before quality in textile design.
Unit-5	Tie and dye , batik design, print design ,bag design taught in designing class.

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Class	:	Garment Designing
Duration	:	Six Months
Subject	:	Aari
Paper	:	Aari
Course Code	:	PR-GD-03
Theory Max. marks	:	50

Course outcomes

CO1- Revamping clothes by embroidery
CO2- Hand work
CO3- Traditional work

Unit-1	**Cloth Framing** Before doing aari work, the cloth has to be framed, that is called a Framing(adda).The adda is a type of bed,which is made of wood on which the cloth is tightened before doing aari.
Unit-2	**Preparation of stencil** The fabric is traced with gateway (trace) paper, a type of coating is prepared to trace the fabric**.**
Unit-3	**Used tool** Zari, Zardozi, Needle, Huck, Aari, Big needle, Pearl Stars, different type of threads, Satin thread and many more
Unit-4	The classes of art and craft and workshop operator is given.

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Class	:	Garment Designing
Duration	:	Six Months
Subject	:	Embroidery
Paper	:	Embroidery
Course Code	:	PR-GD-04
Theory Max. marks	:	75

Course outcomes

CO1- Revamping clothes by embroidery
CO2- Hand work
CO3- Traditional work

Unit-1	**Introduction of Embrodery** Hand Embroidery is a unique individual and very human art. Hand embroidery is done in various ways in India.Hand embroidery in a apparel plays an important role in its beauty and this is followed by other styles and regionally specific tradition.
Unit-2	**Traditional Embrodery** There are two types of embroidery, by hand and by computer, here we are talking about hand embroidery, in this common material is used and it has been making its identity since time immemorial, as well as traditional is taught in the first course. Kantha, workchain, halfback, fullback, kamalkshida, Phulkari, Lucknowi, cashmere,patch And so on.
Unit-3	**Various name of stitches** Simple running, long and short chain, feather, Stain, blanket, kamalkashida, kashmiri, sindhi, karaietc**.**The classes of handwork and workshop operator is given.

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Session-2018-19 To 2020-21

Class	:	Garment Designing
Duration	:	Six Months
Subject	:	Fashion Accessories
Paper	:	Fashion Accessories
Course Code	:	PR-GD-05
Theory Max. marks	:	50

Course outcomes

CO1-To match different things with dresses
CO2- How to wear neckless, bracelet, hairstyle knowledge
CO3- Knowledge of safety accessories

Unit-1	**Finishing Touch** Belt according to the dress you wear,mantilla,Bags etc. are required and accordingly your right hairstyle is also called finishing touch along with choosing the right colours. Fashionable handicraft accessories are also used.
Unit-2	**Accessories** Neckless ,Earrings,Brouch as fashionable items have long been used to add a stylish touch to all kinds of outfits, they also hold an important place in fashion accessories. Shoes,Watch, Kangan, bracelet, nail paint,Makeup etc. comes in all fashion accessories, which is very important for the fashion designer to be aware of.
Unit-3	**Safety Accessories** Gloves are an important fashion accessory, they are worn in many places to protect the hands in summer while in many styles they are worn elegantly.Also fashionable with safety caps**.**
Unit-4	**Trimming and Decoration** Frill, lace, quilting, piping, thermacol, buttons and different types of thred

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Class	:	Garment Designing
Duration	:	Six Months
Subject	:	Draping
Paper	:	Draping
Course Code	:	PR-GD-06
Theory Max. marks	:	50

Course outcomes

CO1- Simple dummy draping
CO2- Different way of draping clothes on a dummy
CO3- making a fall on the dress by doing different types and drap

Unit-1	**Understanding Draping** Understanding drap from basic types and terminologies
Unit-2	**Variety of Draping** Different type of pattern are made from different types of variety draping such as Basic dress, Cowl neckline, Circular skirt, Wrap round, Cascade, Raffles top etc.
Unit-3	Assess and propose various techniques related to manufacturing of draping and designing of garments.
Unit-4	With all these things , you can become designer dress co-ordinator

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Syllabus recommended by Board of Studies of Personality Development
Session – 2017-18 To 2020-21

Class	:	Personality Development
Subject	:	Personality Development
Title of Subject Group	:	Personality Development
Max. Marks	:	30
Course Code	:	PD-CRT-017

Course Outcome

CO1- This course makes the student groom their personality and prove themselves a good Samaritans of Society.

CO2- Develop and exhibit and an accurate sense of self.

CO3- Develop and nurture a deep understanding of personal motivation.

CO4- Develop and understanding of and practice personal and professional responsibility.

CO5- Effective communication skill along with impressive presentation.

Unit-1	**Personality** • Definition • Elements • Determinants **Personal Grooming** • Personal Hygiene • Social Effectiveness Business Etiquettes (Power Dressing)
Unit-2	**Body Language** • Non-Verbal Communication • Types of Body Language • Functions of Body Language • Role of Body Language • Proxemics

Unit-3	**Art of Good Communication** • Verbal & Non-Verbal Communication • Difference between Oral and Written Communication • 7'Cs of Effective Communication • Importance of Effective Communication
Unit-4	**Team Behaviour** • Types of Teams • Team Roles and Behaviour **Group Discussion** • Do's and Don't
Unit-5	**Interview Preparation** • Introduction • Resume Writing • Dress Code • Mock-Interview • How to be Successful in an Interview

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Sadhu Vaswani Autonomous College
Sant Hirdaram Nagar, Bhopal
Syllabus recommended by Board of Studies of Personality Development
Session – 2017-18

Class	:	Personality Development
Subject	:	Personality Development
Title of Subject Group	:	Personality Development
Max. Marks	:	20
Course Code	:	PR-PD-CRT-017

Course Outcome

CO1- This course makes the student groom their personality and prove themselves a good Samaritans of Society.

CO2- Develop and exhibit and an accurate sense of self.

CO3- Develop and nurture a deep understanding of personal motivation.

CO4- Develop and understanding of and practice personal and professional responsibility.

CO5- Effective communication skill along with impressive presentation.

Unit-1	**Personality** • Definition • Elements • Determinants **Personal Grooming** • Personal Hygiene • Social Effectiveness Business Etiquettes (Power Dressing)
Unit-2	**Body Language** • Non-Verbal Communication • Types of Body Language • Functions of Body Language • Role of Body Language • Proxemics
Unit-3	**Art of Good Communication** • Verbal & Non-Verbal Communication

	• Difference between Oral and Written Communication • 7'Cs of Effective Communication • Importance of Effective Communication
Unit-4	**Team Behaviour** • Types of Teams • Team Roles and Behaviour **Group Discussion** • Do's and Don't
Unit-5	**Interview Preparation** • Introduction • Resume Writing • Dress Code • Mock-Interview • How to be Successful in an Interview

PRINCIPAL
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Sadhu Vaswani Autonomous College
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Syllabus recommended by Board of Studies of Computer Science & Application
Session – 2017-18 To 2020-21

Class	:	Tally
Subject	:	Computer Science & Application
Title of Subject Group	:	Tally. ERP9
Max. Marks	:	50
Course Code	:	Cer./Tally/2019/101/01

Course Outcome

CO1- After successfully qualifying practical examination, students will be awarded certificate to work with well-known accounting software i.e. Tally ERP.9

CO2- Student will do by their own create company, enter accounting voucher entries including advance voucher entries, do reconcile bank statement, do accrual adjust print financial statements, etc. In Tally ERP.9 Software.

CO3- Students do possess required skill and can also be employed as Tally data entry operator.

1 **Basics of Accounting**:

Types of Accounts, Golden Rules of Accounting, Accounting Principles, Concepts and Conventions, Double Entry System of Book Keeping, Mode of Accounting,FinancialStatements,Transactions,RecordingTransactions

2 Fundamentals of Tally .ERP 9

a. GettingFunctionalwithTally.ERP9
b. Creation / SettingupofCompanyinTally.ERP9

3 Accounting Masters in Tally .ERP 9

c. F11:Features
d. F12:Configurations
e. Setting up Account Heads

4 Inventory in Tally .ERP 9

f. Stock Groups
g. Stock Categories
h. God owns/Locations

i. Units of Measure
j. Stock Items
k. Creating Inv. entry Masters for National Traders

5 Voucher Entry in Tally .ERP 9

l. Accounting Vouchers
m. Inventory Vouchers
n. Invoicing

6 Advanced Accounting in Tally .ERP 9

o. Bill-wise Details
p. Cost Centers and Cost Categories
q. Voucher Class and Cost Centre Class
r. Multiple Currencies
s. Bank Reconciliation
t. Interest Calculations
u. Budgets & Controls
v. Scenario Management

7 Advanced Inventory in Tally.ERP 9

w. Order Processing
x. Reorder Levels
y. Tracking Numbers
z. Batch- ise Details
aa. Additional
bb. Cost Details
cc. Bill of Materials(BoM)
dd. Price Levels and Price Lists
ee. Stock Valuation
ff. Zero Valued Entries
gg. Inventory Ageing Analysis
hh. Different Actual and Bill end Quantities

8 Value Added Tax (VAT)

ii. ConfiguringVATinTally.ERP9
jj. Creating Masters
kk. Entering Transactions
ll. Accounting for Return of Goods
mm. Rate Difference in Purchase/Sales
nn. Accounting for Interstate Transactions
oo. Exempt Transaction sunder VAT
pp. Purchases from Unregistered Dealers

qq. Claiming IT Con Capital Goods
rr. Inter-State Branch Transfers
ss. VAT Reports
tt. VAT for Composite Dealers

9 Central Sales Tax(CST)
uu. Basics of Central Sales Tax(CST)
vv. Enabling CS Tin Tally.ERP 9
ww. RecordingInterstateTransactionsinTally.ERP9
xx. Payment of CST
yy. CST Reports

10 Point of Sale(PoS)
zz. Features of Point of Sale(PoS)inTally.ERP9
aaa. ConfiguringPointofSaleinTally.ERP9
bbbEntering POS Transactions
ccc POS Reports

11 Job Costing
bbb. ConfiguringJobCostingInTally.ERP9
ccc. Creating Masters for Job Costing
ddd. Recording Transactions
eee. Job Costing Reports

12 Multilingual Capabilities
fff. Configuring Tally.ERP 9forMultilingualCapabilities
ggg. Creating Masters
hhh. Entering Transactions in Multiple Languages
iii. Transliteration
jjj. Generating Reports

13 Technological Advantages of Tally .ERP 9
kkk. Tally Vault
lll. Security Control
mmm. Tally Audit
nnn. Backup and
ooo. Restore
ppp. Split Company Data

qqq. Export and Import of Data
rrr. ODBC Connectivity
sss. Web Enabled, Print Preview and Online Help
ttt. Printing of Reports and Cheques

14 Tally.NET and Remote Capabilities
uuu. OverviewofTally.NET
vvv. Configure Tally .NET Features
www. ConnectCompanyonTally.NET
xxx. Create Remote Users
yyy. Authorize Remote Users
zzz. Remote Access

15 Application Management and Controls
aaaa. Concept of Control Centre
bbbb. Installing&ActivatingTally.ERP9
cccc. Logging to Control Centre
dddd. Managing Accounts using Control Centre

16 Online Help and Support
eeee. Features of Support Centre
ffff. Accessing the Support Centre
gggg. Using Support Centre

17 Service Tax
hhhh. Basics of Service Tax
iiii. ConfiguringTally.ERP9forServiceTax
jjjj. Creating Masters
kkkk. Entering Transactions
llll. Accounting for Advance Receipts
mmmm. Accounting for Opening Service Tax Credit
nnnn. Payment of Service Tax
oooo. Service Tax Reports

18 Tax Dedutedat Source
pppp. Basic concepts of TDS
qqqq. ConfiguringTDSinTally.ERP9
rrrr. Creation of Masters
ssss. Processing Transactions
tttt. TDS Reports

19 Tax Collected data Source

uuuu. Basic Concepts of TCS

vvvv. ConfiguringTally.ERP9forTCS

wwww. Creating Masters

xxxx. Entering Transactions

yyyy. TCS Reports

20 Excise for Dealers

zzzz. Basic Concepts

aaaaa. Salient Features of Dealer Excise

bbbbb. EnablingDealerExciseinTally.ERP9

ccccc. Creating Masters

ddddd. Entering Transactions

eeeee. Excise Reports

fffff. Sales & Purchase Extract

21 Excise for Manufacturers

ggggg. Basic Concepts of Excise Duty

hhhhh. ConfiguringExciseinTally.ERP9

iiiii. Creation of Masters

jjjjj. Processing Transactions

kkkkk. Excise Reports

22 Payroll Accounting and Compliance

lllll. Configuring Payroll inTally.ERP 9

mmmmm. Creating Payroll Masters

nnnnn. Processing Payroll in Tally.ERP9

ooooo. Accounting for Employer PF Contributions

ppppp. Accounting for Employer ESI Contributions

qqqqq. Payment of Professional Tax

rrrrr. Generating Payroll Reports

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