22. Programme and course outcomes for all Programmes offered by the

institution

Programme outcomes encompass a broad spectrum of knowledge, skills, abilities and attitudes that students acquire during the pursuit of graduate and post-graduate courses. Kamla Nehru College offers a number of programmes in Science, Arts, Commerce and management, each of them with well-defined outcomes. The learning outcomes of courses are built into the curriculum of each discipline and are available on the University website. The Institute has well defined learning outcomes. The vision and mission of the institution emphasizes on promoting value education through motivated trained faculty to prepare the students to accept the challenges of globalization.

The College has a proper mechanism of communication of the learning outcomes of the Programs and Courses, which includes following:

1. The College has clearly stated learning outcomes of the Programs and Courses. The following mechanism is followed by the institution to communicate the learning outcomes to the teachers and students.

2. Hard Copy of syllabi and Learning Outcomes are available in the departments for ready reference to the teachers and students.

3. Learning Outcomes of the Programs and Courses are displayed on the walls outside each Department.

4. Soft Copy of Curriculum and Learning Outcomes of Programs and Courses are also uploaded to the Institution website for reference.

Bachelor of Vocation (B. Voc.) (B. Voc – Retail Management)

Program Outcomes

- 1) It helps in understanding the Retailing environment.
- 2) It provides guidance on various different Retailing formats which supports in growing the Business.
- 3) It helps in understanding the importance of Product lifecycle.
- 4) Explains the value of Branding.
- 5) Supports in understanding the consumer's Buying behavior approach, for designing the strategies.
- 6) It provides guidance on E-Commerce, and also helps in understanding Global and Local Retail Industry environment.
- 7) It provides knowledge on inventory management, stores space management and routine stores operations.
- 8) It explains the knowledge on Retail store location, Location Strategy which is very supportfull in business.
- 9) It guides in managing overall responsibilities of a Business.
- 10) It helps to become an entrepreneur.

Course Outcomes

Sem-I

Paper – I Management and Accounting

- 1. Introduction to Retail, Retail industry and Retail Store operations in India andInternational.
- 2. Understanding the Process credit applications for purchases.
- 3. Team and Organisation al Dynamics, Demonstrate products to customers.
- 4. Explaining the Features and Benefits of Products during a Product Demonstration.
- Helping customers choose right products, Performing Safe and Valuable ProductDemonstration

Paper – II Retailing

LEARNING OUTCOMES

- 1. Introduction to Retail, Retail industry and Retail Store operations in India andInternational.
- 2. Understanding the Process credit applications for purchases.
- 3. Understanding the importance of Team, how to develop a team and understanding theOrganizational Dynamics,
- 4. Helping the student in Demonstrate products to customers.
- 5. Explaining the Features and Benefits of Products during a Product Demonstration.
- Helping customers choose right products, Performing Safe and Valuable ProductDemonstration

Sem – II Paper – I Retail Marketing-I

LEARNING OUTCOMES

- Create a positive image of self and organization in the customers minds, Promotecontinuous improvement in service.
- 2. Monitoring Changes and Analysing the Impact of Successfully Resolved CustomerService Problems,
- 3. Implementing Changes in Customer Service Standards.
- 4. To organize the delivery of reliable service.
- 5. Helping the student in Demonstrate products to customers.
- 6. Explaining the Features and Benefits of Products during a Product Demonstration.
- Helping customers choose right products, Performing Safe and Valuable ProductDemonstration

Paper – II Retailing & Information Technology's usein Retail Operations

LEARNING OUTCOMES

- Create a positive image of self and organization in the customers minds, Promotecontinuous improvement in service.
- 2. Monitoring Changes and Analysing the Impact of Successfully Resolved CustomerService Problems,
- 3. Implementing Changes in Customer Service Standards.
- 4. To organize the delivery of reliable service.
- 5. Helping the student in Demonstrate products to customers.
- 6. Explaining the Features and Benefits of Products during a Product Demonstration.
- Helping customers choose right products, Performing Safe and Valuable ProductDemonstration

Sem – III Paper – I

Entrepreneurship Development

LEARNING OUTCOME

- 1. Monitor and solve service concerns,
- 2. Improve customer relationship,
- 3. Provide personalised sales & post- sales service support,
- 4. To organize the delivery of reliable service,
- 5. Organize the display of products at the store,
- 6. Maintain the availability of goods for sale to customer,
- 7. Organization & Team Dynamics
- 8. Evolution of the conceptof Entrepreneur,
- 9. Characteristics of an Entrepreneur, Functions of an Entrepreneur

Paper – II Retail Store Operations

LEARNING OUTCOME

- 1. Monitor and solve service concerns,
- 2. Improve customer relationship,
- 3. Provide personalised sales & post- sales service support,
- 4. To organize the delivery of reliable service,
- 5. Organize the display of products at the store,
- 6. Maintain the availability of goods for sale to customer,
- 7. Organization & Team Dynamics
- 8. Evolution of the conceptof Entrepreneur,
- 9. Characteristics of an Entrepreneur
- 10. Functions of an Entrepreneur

Sem – IV Paper – I Modern Retail Practices

LEARNING OUTCOME

- 1. Monitor and solve service concerns,
- 2. Improve customer relationship,
- 3. Provide personalised sales & post- sales service support,
- 4. To organize the delivery of reliable service,
- 5. Organize the display of products at the store,
- 6. Maintain the availability of goods for sale to customer,
- 7. Organization & Team Dynamics
- 8. Evolution of the conceptof Entrepreneur,
- 9. Characteristics of an Entrepreneur
- 10. Functions of an Entrepreneur

Paper – II Store Planning, Layout and Designing

LEARNING OUTCOME

1. Monitor and solve service concerns,

- 2. Improve customer relationship,
- 3. Provide personalised sales & post- sales service support,
- 4. To organize the delivery of reliable service,
- 5. Organize the display of products at the store,
- 6. Maintain the availability of goods for sale to customer,
- 7. Organization & Team Dynamics
- 8. Evolution of the conceptof Entrepreneur,
- 9. Characteristics of an Entrepreneur,
- 10. Functions of an Entrepreneur

Sem – V

Paper – I Merchandizing & Supply Chain Management

LEARNING OUTCOME

- 1. Leadership and Effective Communication,
- 2. Understanding the Human Resource Management,
- 3. Optimize inventory to ensure maximum availability of stocks and minimized losses,
- 4. Execute visual merchandising displays as per standards and guidelines,
- 5. Implement promotions and special events at the stores,
- 6. Adhere to standard operating procedures, processes and policies at the store whileensuring timely and accurate
- 7. Reporting,
- 8. Business Ethics and Corporate Responsibility,
- 9. Project Management, Manage Sales and Service Delivery to increase store profitability

Paper – II Mall Management

LEARNING OUTCOME

- 1. Leadership and Effective Communication,
- 2. Understanding the Human Resource Management,
- 3. Optimize inventory to ensure maximum availability of stocks and minimized losses,
- 4. Execute visual merchandising displays as per standards and guidelines,
- 5. Implement promotions and special events at the stores,
- 6. Adhere to standard operating procedures, processes and policies at the store whileensuring timely and accurate
- 7. Reporting,
- 8. Business Ethics and Corporate Responsibility,
- 9. Project Management, Manage Sales and Service Delivery to increase store profitability

Sem – VI Project Work Project Seminar

LEARNING OUTCOMES

- 1. Leadership and Effective Communication,
- 2. Understanding the Human Resource Management,
- 3. Optimize inventory to ensure maximum availability of stocks and minimized losses,
- 4. Execute visual merchandising displays as per standards and guidelines,
- 5. Implement promotions and special events at the stores,
- 6. Adhere to standard operating procedures, processes and policies at the store whileensuring timely and accurate
- 7. Reporting,
- 8. Business Ethics and Corporate Responsibility,
- 9. Project Management, Manage Sales and Service Delivery to increase store profitability

COs & POs for MBA Program

SEMESTER – I

Semester	I	Course Code	00	Type of Course	Core			
Course Name	INDUCTION cum FOUNDATION COURSE							
Credits	None	Number of 1 hour lectures: Min. 40		4-8 hours per day				
Detailed Course Objectives								
CO1	Given a presentation/ debatable topic, discussion, training, the articulation which will in turn help them in developing effects	ne students will be able to tive communication skills	unders 5.	tand voice modulation, nuances	of diction and			
CO2	Given a workplace setting, the students will not only be awa but also will be able to critically assess the relationship betw	re about their inner qualit een theory and practice in	ties, inn 1 the for:	er potential and importance of h mulation of values.	uman qualities			
CO3	The Students will be able to perform calculations based on elementary statistics and accountancy							
CO4	Given a stressful or demanding situation the students will develop skills like team work, leadership, time management and will also be able to develop self confidence, handle conflicts, be patient and work under pressure.							
CO5	Given a problematic situation/ a dilemma/ a choice the students will be able to distinguish between the ethical and unethical ways and chose the right way of doing things in professional and personal life.							

Semester	Ι	Course Code	1T1	Type of Course	Core
Course Name	MAN	AGERIAL ECONOMICS	5		

Credits	3	Number of 1 hour lectures:	30			
Detailed Course Objectives						
CO1	Given the details regarding price and quantity, the future manager will be able to calculate and interpret price elasticity, income elasticity and cross-price elasticity of demand and will also be able examine the uses and abuses of demand forecasting techniques					
CO2	Given the information about scale of production, the future manager will be able to analyze various aspects of empirical production functions and also will be able to comprehend the difference sources of economies and diseconomies of scale.					
CO3	Given the information pertaining to market structure, the future manager will be able to determine the optimal price and output for firms under different market structures.					
CO4	Given the circular flow model of an economy, the future manager will be able to interpret the role and importance of each component with regard to factor market and product market and will also be able to comment on the implications and control of inflation.					
CO5	Given the information regarding expenses and income in an domestic product using expenditure and income approache will be able to depict the symptoms, causes and effects on e	n economy, the future manager w es and given the details about a p conomic activities of a nation.	ill be able to calculate and explicate the gross hase of the business cycle, the future manager			

Semester	I	Course Code	1T2	Type of Course	Core	
Course Name	MANAGEMENT INFORMATION SYSTEM					
Credits	3	Number of 1 hour lect	30			
Detailed Course Objectives						

CO1	The student will be able to describe different types of management information system from management activity point of view and will also be able to identify and work out KRAs, BOPs and BPPs for various organisations/systems.
CO2	The student will be able to identify the master data, draw report format and interface matrix while making a model of DSS.
CO3	The student will be able to suggest the conceptual model of PMS and will also be able to draw a system model of integrated system (PMS+SCM+Accounting and Billing)
CO4	The student will be able to describe the key features of ERP, SCM and CRM and will also be able to draw functional flow and process flow diagrams for various transactions.
CO5	The student will be able to enumerate the factors affecting system performance and will also be able to comment on the operational feasibility of IT system under consideration

Semester	I	Course Code	1T3	Type of Course	Core	
Course Name	BUSINESS RESEARCH					
Credits	3	Number of 1 hour lectures:30				
Detailed Course Objectives						
CO1	In context of research, the student will be able to define business research problems and will also able to formulate an abbreviated version of research proposal.					
CO2	The student will be able to describe and choose appropriate sample	ing design and will also be at	ole to estimate	e appropriate sample size.		
CO3	The student will be able to develop measurement tools and construct appropriate scales therein.					
CO4	The student will be able to select suitable method of data collection and will be able to make questionnaire/e-questionnaire					
CO5	The student will be able to derive inferences by applying various techniques of interpretation and be and write various types of research reports.					

Semester	I	Course Code	1T4	Type of Course	Core		
Course Name	ORGANIZATIONAL BEHAVIOUR						
Credits	3	Number of 1 hour lectures:30					
Detailed Course Objectives							
CO1	Students will be able to explain the concept of Organisation Design and determine the factors that affect Organisation Design.						
CO2	Students will be able to identify the components of Individual Beh	aviour and apply the concep	t of Learning,	Perception, Attitudes and values.			
CO3	The student will be able to distinguish between the various theories of motivation and their application in organizations and also be able to apply these theories to practical problems in organizations. They will also be able to distinguish between a number of different leadership theories & styles and contribute to the effective performance of a team as the team leader or a group member.						
CO4	The future managers/ students will be able to analyse the behaviour of individuals and groups in organisations in terms of the key factors that influence organisational behaviour and demonstrate skills required for working in groups (team building).						
CO5	The students will be able to justify how organizational change and conflict affect working relationships within organizations and demonstrate how to apply relevant theories to solve problems of change and conflict within organizations						

Semester	Ι	Course Code	1T5	Type of Course	Core	
Course Name	FINANCIAL REPORTING, STATEMENTS AND ANALYSIS					
Credits	3	Number of 1 hour lectures:		30		
Detailed Course Objectives						
CO1	CO1 Given an accounting situation Students will be able to evaluate selected accounting standards and perform their application in actual practice					

CO2	Given the Trial Balance and accompanying financial adjustments the future manager shall be able to <i>prepare</i> the financial statements and <i>calculate</i> the profit or loss of a firm as at the end of the financial year.
CO3	Given the financial statements a student will be able to <i>Prepare</i> Cash Flow statement to <i>evaluate</i> whether a firm is doing well financially and has sufficient cash to meet its obligations and support its growth or not.
CO4	Given the financial statements a student will be able to <i>perform</i> Ratio analysis and comment on the performance of the firm. Whether a firm is doing well or not. (As compared to its peers or year on year basis.)
CO5	Given the financial statements a student will be able to formulate common size statement, trend analysis as well as inter-firm and intra firm comparison (As compared to its peers or year on year basis.)

Semester	I	Course Code	1T6	Type of Course	Core				
Course Name	BUSINESS STATISTICS & ANALYTICS FOR DECISION MAKING								
Credits	3	Number of 1 hour lectures:		30					
	Detailed Course Objectives								
CO1	For a given dataset, the student should be able estimate the dispersion / variance & symmetry of the data using various measures and draw inferences to facilitate decision making.								
CO2	For a given dataset, the student should be able assess the level of a techniques. The students should also be able to predict the values of	ssociation between given var of a variable using regression	riables in the 1 analysis tec	data using various types of corr hniques.	elation analysis				
CO3	For given situations a student should be able determine the various probabilities arising out of the situation and make use of probability theory and appropriate probability distributions for the purpose of decision making.								
CO4	For a given research problem, student should be able to construct appropriate hypotheses and draw conclusions by using a suitable hypothesis testing procedure so as to address the research problem in question.								
CO5	The student will be able to differentiate between various forms of	analytics and will also be ab	le to choose	suitable analytics for decision m	The student will be able to differentiate between various forms of analytics and will also be able to choose suitable analytics for decision making.				

Semester	I	Course Code	1T7	Type of Course	Core		
Course Name	LEGAL & BUSINESS ENVIRONMENT						
Credits	3	Number of 1 hour lectures:30					
Detailed Course Objectives							
CO1	Given the circumstances, the learner will be able to infer legal aspects of doing business & plan business activities. In a given situation, the learner will be able make use of provisions of the Contract Act to evaluate a contract used in commercial practice.						
CO2	In a given situation, learner will be able to distinguish between various types of Companies and explain their comparative advantages and disadvantages. The learner will be able to explain the legal process involved in formation of a company and understand the relationships amongst the various stakeholders of the company.						
CO3	In context of Intellectual Property Rights (IPR) the learner will understand various components of IPR and differentiate between them. The learner can also identify the uses of IPR in business						
CO4	Under the given scenario, the learner will be able to describe various provisions of IT Act and will be able to use various provisions of Consumer Protection Act.						
CO5	A learner will be able to analyze the elements of Social, political, economic environment around a firm.						

Semester	Ι	Course Code	1T8	Type of Course	Core	
Course Name	MANAGERIAL SKILLS FOR EFFECTIVENESS					
Credits	3	Number of 1 hour lectur	res:	30		
Detailed Course Objectives						
CO1	The student will be able to make proper use of group of words, synonyms and antonyms, phrases, idioms, proverbs for effective verbal communication					

CO2	The student will be able to write essays and CV using Word Processor
CO3	The student will be able to draft business letters for given situations using Word Processor
CO4	The student will be able to apply basic functions of PowerPoint and will also be able to create effective PowerPoint Presentations using templates
CO5	The student will be able to use various spreadsheet functions and will also be create useful spreadsheets

SEMESTER – II

Semester	II	Course Code	2T1	Type of Course	Core
Course Name	FINANCIAL MANAGEMENT				
Credits	3	Number of 1 hour lea	ctures:	30	
	Detailed (Course Objectives			
CO1	Given financial cost parameters, the future manager will be able to calculate specific cost of capital (i.e. Cost of debt, preference, equity and retained earnings) and the weighted average cost of capital for any specific given firm.				ity and retained
CO2	Given different financing options, the future manager will be ab suitable long term financing mix for an organization by applying	le to analyze the effect of c EBIT-EPS analysis, Indiffe	operating a rence Leve	nd financial leverage on EPS and el of EBIT and Financial Break-e	d recommend a ven Analysis for
	given financing options.				
CO3	Given the cash-flows pertaining to a project, the future manager will be able to estimate projects' cash flows to distinguish between value creating and value destroying investments using time-value intensive DCF techniques (viz. NPV, IRR, discounted payback period, profitability index) and Non-DCF techniques (i.e. Payback Period and Average rate of return approach)				
CO4	Given the details pertaining to elements of working capital for a current assets and current liabilities and determine the gross and n	given level of activity, the t et operating working capital	future man requiremen	ager will be able to ascertain the nt.	e components of

CO5	Given the expected dividends, future price of shares, investor expected of a share using various dividend discount models and illustrate w	ectations and funding requir hether dividend is relevant	rements; the f for firm value	future manager will be able to co ation or not.	mpute the value	
Semester	II	Course Code	2T2	Type of Course	Core	
Course Name	MARKETING MANAGEMENT					
Credits	3	Number of 1 hour lectures: 30				
	Detailed (Course Objectives				
CO1	For a given marketing objective of a company the student manager	will be able to develop a set	uitable marke	eting mix.		
CO2	For a given product the student managers will be able toapply the three steps of target marketing: market segmentation, target marketing, and market positioning.					
CO3	For various stages in the life cycle of the product the student managers will be able to recommend a suitable pricing strategy.					
CO4	For a given company the student managers will be able to evaluate different distribution channel options and their suitability for the company's product.					
CO5	For a given promotional objective of a company the student manage public relations, personal selling, and direct marketing etc.) for the	er should be able to develo product.	op a suitable p	promotion mix (advertising, sale	s promotion,	

Semester	II	Course Code	2T3	Type of Course	Core		
Course Name	HUMAN RESOURCE MANAGEMENT						
Credits	3	Number of 1 hour lectures: 30					
	Detailed Course Objectives						
CO1	CO1 Students should be able to explain the importance of Human Resource Management for an organisation and also distinguish between Personnel and HR Management.						
CO2	For a given job profile, students should be able to develop a job analysis and produce a job description and job specification.						

CO3	Students should be able to design a Human Resource Plan for an organisation and construct its Selection Process
CO4	Students should be able to justify the applicability of various techniques of Training
CO5	Students should be able to outline the performance appraisal process and identify and explain the utility of various modern and traditional methods of Performance Appraisal.

Semester	II	Course Code	2T4	Type of Course	Core
Course Name	OPERATIONS MANAGEMENT				
Credits	3	Number of 1 hour lectures:30			
	Detailed	Course Objectives			
CO1	At the end of the course the students can apply the concept of operations management in manufacturing and service sector and will be able to plan and implement production and service related decisions.				and will be able
CO2	At the end of the course the student will be able to plan production schedules and plan resources (material and machine) required for production				e) required for
CO3	At the end of the course the students can design maintenance schedules in manufacturing units, identify and propose material handling equipments and implement industrial safety rules				aterial handling
CO4	At the end of the course the students will be able to apply the concepts of purchase, stores and inventory management and analyze and evaluate material requirement decisions				
CO5	At the end of the course the students can measure performance related to productivity and will be able to conduct basic industrial engineering study on men and machines.				

Semester	II	Course Code	2T5	Type of Course	Core
Course Name	INTERNATIONAL BUSINESS				
Credits	3	Number of 1 hour lec	tures:	30	
	Detailed 0	Course Objectives			
CO1	Students should be able to understand various concepts and international trade	terminologies involved in	Internatio	onal Business and importance of	of
CO2	Students should be able to evaluate various modes of entry is given a situation.	n to International busines	s and shou	ald be able to select the best mo	ode of entry
CO3	Students should be able to relate and discuss the presence o	f macro factors (PESTEL)	on interna	ational business environment	
CO4	Students should be able to examine and elaborate the role of	f various Government inst	itutions in	ı India which support Internati	onal trade.
CO5	Students should be able to perceive the concepts in recent E foreign trade.	XIM policy of India and re	late it to t	the flow of FDI as well as direct	ion of Indian
Semester	II	Course Code	2T6	Type of Course	Core
Course Name	CORPORATE SOCIAL	RESPONSIBILITY AND	SUSTAIN	NABILITY	
Credits	3	Number of 1 hour lec	ctures:	30	
	Detailed Course Objectives				
CO1	Given the concept of CSR, the future manager will be able to identify the various activities which can benefit the organization under the banner of CSR.				
CO2	Given a chance, the future manager will be able to frame and recommend the CSR policy according to sustainable development.				
CO3	Given the framework, the future manager will be able to pla	n the CSR activity accordin	ng to the v	various laws and regulations.	

CO4	Given the details pertaining to government and non government organizations, the future manager will be able to ascertain the role of various stakeholders in CSR activities and incorporate the guidelines issued by regulatory guidelines in CSR policy.
CO5	Given the task of CSR , the future manager will be able to plan and implement various activities to be taken under CSR activity and evaluate its effectiveness.

Semester	II	Course Code	2T7	Type of Course	Core	
Course Name	COST ACCOUNTING					
Credits	3 Number of 1 hour lectures: 30					
	Detailed Course Objectives					
CO1	Given an information about basic conceptual framework of c classification of cost and will be able to prepare cost sheet an	ost, the student will be abl nd prepare quotations for v	e of ident ⁄arious bu	tify/ classify different elemen siness proposals	its/	
CO2	Given an information about cost, volume and profit for speci point, Marine of safety, Profit volume ratio, desired profit / o	fic product for mention tin lesired sales as well as abl	ne period, e to evalı	, a student will able to comput aate the decision making prop	e Break-even osals(suitable	
	product mix / dropping a product line / fixation of selling p	rice / make or buy decisio	ons/Key F	actor Analysis)		
CO3	Given information about relevant expenses, a student will be able to classify the cost by nature and estimate cost of operating a service					
CO4	Given an information about Expenses & Income / Receipt & Payment / Projected Sales, a student will be able to prepare relevant functional level budgets for an organisation					
CO5	Given an information about standard and actual performance Variances.	e, the student will be able	to determ	nine Direct Material and Direct	t Labour	

Semester	III	Course Code	2T8	Type of Course	Elective
Course Name	MANA	GEMENT CASE ANALYS	SIS		

Credits	4	Number of hours:	40		
	Detailed Course Objectives				
CO1	CO1 Given a situation a student will be able to construct SWOT for a concerned organisation or situation as well as he/she will be able to indentify key actors/stakeholders in the given situation				
CO2	A student will be able to evaluate the dilemma (Problem/ Issues/ Concerns) in the case.				
CO3	A student will be able to develop suitable alternatives for the dilemma identified.				
CO4	A student will be able to analyse and evaluate the alternatives using the theoretical framework.				
CO5	A Student will be able to discuss suggest suitable roadmaps	to overcome the identified dilemma			

SEMESTER – III

Semester	III	Course Code	3P1	Type of Course	Core/ Elective
Course Name	SUMMER INTERNSHIP PROJECT (SPECIALIZATION BASED)				
Credits	6	Number of day	s:	45 to 60	
	Detailed 0	Course Objectives			
CO1	Student is able to construct the company profile by comp achievements and market performance for his / her organiza	iling the brief history, ma ation of internship.	anagemen	t structure, products / servic	es offered, key
CO2	For his / her organization of internship, the student is able to able to determine the challenges and future potential for his	o assess its Strengths, Wea / her internship organizat	knesses, C ion in part	Opportunities and Threats (SW ticular and the sector in generation of the sector in ge	/OT). Student is al.
CO3	Student is able to test the theoretical learning in practical situ	uations by accomplishing t	he tasks a	ssigned during the internship	period.
CO4	Student is able to apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.				
CO5	Student is able to analyze the functioning of internship organization and recommend changes for improvement in processes.				
Semester	III	Course Code	3T1	Type of Course	Elective

Course Name	MM1: SALES AND DISTRIBUTION MANAGEMENT			
Credits	4 Number of hours: 40			
	Detailed Course Objectives			
CO1	Given a situation, student manager will be able to identify appropriate Sales Forecasting method to be adopted by a company.			
CO2	Given a situation of newly launched company, student manager will be able to design an effective Sales Compensation Plan for Sales Executive.			
CO3	Given a situation of distribution channel of a company, student manager will be able to outline different levels of Marketing channel used by the company.			
CO4	Given a situation, student manager will be able to describe the process of Supply Chain and Reverse Logistics.			
CO5	Given a situation, student manager will be able to develop e-retaili	ng strategy as a channel of distribution.		

Semester	III	Course Code	3T2	Type of Course	Elective
Course Name	MM2: DIGITAL AND SOCIAL MEDIA MARKETING				
Credits	4	Number of hours: 40			
Detailed Course Objectives					

CO1	On studying this module, the students will be able to understand the concept of marketing in digital environment. They will also be able to relate traditional marketing concepts with digital marketing and evaluate the use of various channel options available for digital marketing.
CO2	On completing this module, the students will develop the concept of digital marketing research. They will also be able to examine online consumer behaviour and imagine its utility in online/offline marketing strategies
CO3	Upon studying this module, the students will be able to build an understanding of search engines and their utility in digital marketing area. They will also comprehend optimization and the keyword search methodology.
CO4	On properly studying this module, the student will be able to examine the utility of different social media in digital marketing and evaluate their use, as future managers, in actual marketing campaigns.
CO5	On studying this module, the student will be able to create favourable online reputation, later, as future managers, for organizations they serve. Students will also be able to form opinion on current trends in digital marketing area and estimate future trends therein.

Semester	III	Course Code	3T3	Type of Course	Elective
Course Name	MM3: INTEGRATED MARKETING COMMUNICATION AND BRAND MANAGEMENT				
Credits	4	Number of hours:		40	
Detailed Course Objectives					
CO1	At the end of the course the student manager shall be able to Design the Integrated marketing communication Process for a company/product			et	
CO2	At the end of the course the student manager shall be able to develop a creative message strategy for a product and execute it.				
CO3	At the end of the course the student manager shall be able to implement and evaluate a IMC campaign.				

CO4	At the end of the course the student manager shall be able to Identify & Establish Brand Positioning for a given product				
CO5	At the end of the course the student manager shall be able to design be able to evaluate a branding program.	n/develop branding strategie	s for a pro	duct/company, brand marketing p	program and shall
Semester	III	III Course Code 3T1 Type of Course Elective			
Course Name	FM1: INVESTMENT ANALYSIS & PORTFOLIO MANAGEMENT				
Credits	4	4 Number of hours: 40			
	Detailed 0	Course Objectives			
CO1	The student will be able to apply concept oftime value of money in computing the value of fixed income securities. The student will also be able to understand the relationship between interest rates, yield and bond prices.			dent will also be	
CO2	The student will be able to compute and compare the value of a company's equity share with other company's equity by using various methods and tools of equity valuation				
CO3	The student will be able to build and evaluate the relationship between the concept of risk and return and will be able to relate its implication on creating portfolio.				
CO4	The student will be able to learn the theoretical concepts of underlying the portfolio creation				
CO5	The student will be able to assess the tools and strategies for portfolio creation and evaluation and will also be able to evaluate the portfolios of mutual funds by using the tools of portfolio evaluation				

Semester	III	Course Code	3T2	Type of Course	Elective
Course Name	FM2: PROJE	CT APPRAISAL AND FI	NANCE		

Credits	4	Number of hours:	40	
	Detailed C	Course Objectives		
CO1	CO1 The student will be able to assess capital budgeting decisions under uncertain and risk bearing situation and will also be able to build and interpret the decision tree approach for decision making			
CO2	The student will be able to choose between acquisition of long term assets either through lease or financing methods and will also be able to learn process of Private Equity and Venture Capital			
CO3	The student will be able to compare the various theories of capital structure and will be able to determine the impact of debt equity mix on value of firm			
CO4	The student will be able to evaluate and compare the pre and post merger financial position of the firms.			
CO5	The student will be able to determine / estimate the cash requirement in a firm and will also be able to evaluate the impact of trade receivable policy of a firm on its profitability.			

Semester	III	Course Code	3T3	Type of Course	Elective
Course Name	FM3: FINANCIAL DERIVATIVES				
Credits	4	Number of hours:		40	
Detailed Course Objectives					
CO1	The student will be able to describe the concepts of derivatives and its trading and settlement procedures				
CO2	The student will be able to calculate the value of Futures and apply it for risk managed trading strategies.				

CO3	The student will be able to compute the value of Options and plan various option strategies.
CO4	The student will be able to analyse and use the concept of Swaps and will also be able to make Swaps related decisions.
CO5	The student will be able to relate concept of foreign exchange in currency conversion and apply currency forward rate agreements for hedging.

Semester	III	Course Code	3T1	Type of Course	Elective
Course Name	HRM1: MANPOWER PLANNING, RECRUITMENT AND SELECTION				
Credits	4	Number of hours:		40	
	Detailed (Course Objectives			
CO1	Students should be able to explain the factors affecting HRP and HRP process of an organisation.				
CO2	Students should be able to determine the process of demand and supply forecasting while doing human resource planning.			lanning.	
CO3	Students should be able to devise the manpower plan for an organisation.				
CO4	Students should be able to formulate Recruitment and Selection process on the basis of HRP.				
CO5	Students should be able to outline the Recent Trends in	n Manpower Developme	ent and P	lanning	

Semester	III	Course Code	3T2	Type of Course	Elective
Course Name	HRM2: PERFOR	RMANCE MEASUREMEN	NT SYSTI	EM	

Credits	4	Number of hours:	40		
	Detailed Course Objectives				
CO1	O1 Students should be able to distinguish the concept of Performance appraisal & Performance Management and also should be able to establic relationship of performance management with Strategic Planning.				
CO2	Students should be able to determine the Mechanism of Performance Management, and also explain the various steps in performance planning and performance execution.				
CO3	Students should be able to justify the use of various modern and traditional methods of Performance Appraisal under given situation.				
CO4	Students should be able to justify the use of various Performance Assessment Models under given situations; also the student should be able to determine the steps of giving a constructive feedback.				
CO5	Students should be able to discuss the importance and Princi	ples of ethics in performance mana	gement.		

Semester	III	Course Code	3T3	Type of Course	Elective	
Course Name	HRM3: COMPENSATION AND BENEFITS MANAGEMENT					
Credits	4	Number of hours: 40				
Detailed Course Objectives						
CO1	Students should be able to compare the applicability of vario	us Job Evaluation methods	under g	iven situations.		
CO2	Students should be able to determine the importance of Wage	Differentials and Differen	ntiate be	etween different types of wages		
CO3	Students should be able to align the compensation strategy w	ith business strategy				
CO4	⁴ Students should be able to design and develop the incentive and benefits plans					
CO5	Students should be able to outline the various Statutory Provisions related to Compensation					
Semester	III	Course Code	3T1	Type of Course	Elective	

Course Name	OM1: LOGISTICS AND SUPPLY CHAIN MANAGEMENT			
Credits	4	Number of hours: 40		
Detailed Course Objectives				
CO1	At the end of the course the student will be able to analyze the business requirement and apply supply chain strategies			
CO2	The student will be able to design effective distribution network for a company.			
CO3	The student shall be able to reduce transportation costs by a	pplying optimization techniques.		
CO4	The student shall be able to map the supply chain requirement as per the resources available by identifying the non value added services within the supply chain.			
CO5	The student will be able to measure the performance of the s	supply by applying various metrics i	in different areas	

Semester	III	Course Code	3T2	Type of Course	Elective	
Course Name	OM2: QUALITY TOOLKIT FOR MANAGERS					
Credits	4	Number of hours:		40		
Detailed Course Objectives						
CO1	The student will be able to analyze the dimensions of Quality and apply quality systems for effective quality improvement.					
CO2	The student will be able to select appropriate statistical tools for quality analysis.					
CO3	The student will be able to recommend appropriate SPC tools to improve process quality.					

CO4	The student will be able to set bench marks for the organization and apply TQM tools for quality improvement.
CO5	The student will be able to apply productivity tools for improving efficiency in the plant.

Semester	III	Course Code	3T3	Type of Course	Elective	
Course Name	OM3: OPERATIONS RESEARCH					
Credits	4	Number of hours: 40				
	Detailed Course Objectives					
CO1	The students will be able to attempt operation related problems by suggesting various operation research tools.					
CO2	The students will be able to analyze LPP and Game Problems and	find solutions for business de	ecisions.			
CO3	The students will be able to analyze and evaluate assignment problems to find solutions.					
CO4	The students will be able to analyze and evaluate Transportation problems to optimize costs.					
CO5	The students will be able to apply PERT/ CPM tools for optimizing time and cost in project management.					

Semester	III	Course Code	3T1	Type of Course	Elective
Course Name	BA1: DATA VISUALIZATION FOR MANAGERS				
Credits	4	Number of hours: 40			
Detailed Course Objectives					

CO1	The student will be able to identify and use Interactive data visualization software desktop tools and will also be able to create Interactive data visualization software desktop workspace				
CO2	The student will be able to connect data and will also be able	to use Interactive data vis	sualizatio	on software's File Types effectiv	vely.
CO3	The student will be able to create analytics pane and will also	o be able to use Sort, Filte	rs, Sets, (Groups and Hierarchy functions	
CO4	The student will be able to create calculations to enhance the	data visualisation			
CO5	The student will be able to build effective dashboard				
Semester	III	Course Code	3T2	Type of Course	Elective
Course Name		BA2: DATA MINING			
Credits	4	Number of hours	s:	40	
	Detailed (Course Objectives			
CO1	Given overview of Data Mining and Data pre-processing, mining, Kinds of data and applications, Data Cleaning; Data	the future manager will Integration; Data Reducti	be able on; Data	to outline major research cha Transformation and Data Discr	allenges of data retization.
CO2	Given the overview of Data Warehousing, the future manage OLAP and also able to identify the process of Data Generalis	er will be able to classify ation	the Conc	ept of Data Warehousing using	Data Cube and
CO3	Given the details pertaining to Pattern Mining, the future ma compressed or approximate patterns; explore patterns and	anager will be able to eva its applications.	l uate Pa	tterns using colossal patterns, r	mining
CO4	Given the details pertaining to Pattern Mining, the future manager will be able to analyse clusters using partitioning method, hierarchical method, density based method and grid based method				
CO5	Given the details pertaining to Pattern Mining, the future ma be able to explain the trend in data mining.	anager will be able to cor	relate the	e use of data mining to the socie	ety and also will

Semester	III	Course Code	3T3	Type of Course	Elective	
Course Name	BA3: DATA SCIENCE USING R					
Credits	4	Number of hours: 40				
	Detailed Course Objectives					
CO1	Given overview of types of Data, the future manager will be a	able to read data from diff	erent fil	es and create matrices and data	frames using R	
CO2	Given the overview of functions, subset and loop; the future control statement and do loop.	manager will be able to e	explain t	the character functions, date fun	nction, package,	
CO3	Given the basic statistical data, the future manager will be ab	le to draw charts, histogra	am and p	lots, and measure central tender	ncies.	
CO4	CO4 Given the data for testing of hypothesis, the future manager will be able to test the hypothesis by applying t-test, ANOVA and Chi-square test					
CO5	Given the data of variables, the future manager will be able to apply Linear Regression, Logistic regression, Cluster Analysis, Time Series, Decision Tree and Random Forest					

Semester	III	Course Code	3T1	Type of Course	Elective
Course Name	ED1: ENTREPRENEURIAL THEORY AND PRACTICES				
Credits	4	Number of hours: 40			
Detailed Course Objectives					
CO1 On completion of module, the student will be able understand the concept of entrepreneurship and what entrepreneurs do. They will also be able to relate the work of few prominent Indian entrepreneurs with the learned concept and compare the work of a manager with that of an entrepreneur.					
CO2	On completing this module, the student will learn how entrepreneurship evolved from its earlier disorganized form to the current Government supported form. They will also be able to justify the role of EDPs in growth of entrepreneurship.				
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CO3	Upon studying this module, the students will be able to explain the theories of entrepreneurship and also how the entrepreneurial knowledge gained can be applied to developing entrepreneurial ventures in different economic sectors in India.
CO4	On properly studying this module, the student will be able to examine the impact of different financial aspects on entrepreneurship and can evaluate his/her own ability to set up a small scale venture.
CO5	On studying this module, the student will be able to create a mental map of the network of Government support system and various institutions purposely designed and set up, at national, state and district level, for assisting entrepreneurial ventures.

Semester	III	Course Code	3T2	Type of Course	Elective
Course Name	ED2: BUS	INESS PLAN FORMULA	TION		
Credits	4	Number of hours	:	40	
	Detailed (Course Objectives			
CO1	On completion of module, the student will be able understand the concept and importance of a business plan in entrepreneurship. They will also be able to explain the elements of a good business plan, in order to be effective.				
CO2	On studying this module, the students will be able to classify projects into categories and will also be able to formulate a basic business plan (project).				
CO3	Upon going through this module, students will be in a position to understand how to develop ideas for a business project. They will also be able to assess the role of environment on different economic sectors and opportunities in India.				
CO4	On properly studying this module, the student will be able to examine the importance of project appraisal and can evaluate the different parameters that contribute to feasibility of a business project.				
CO5	Detailed study of this module will enable students to formulate steps in starting a small enterprise and visualise a model of small business. They will be able to relate the project to various permissions required for entrepreneurial ventures.				

Semester	III	Course Code	3T3	Type of Course	Elective	
Course Name	ED3: SOCIAL ENTREPRENEURSHIP					
Credits	4	Number of hours: 40				
	Detailed Course Objectives					
CO1	Under given circumstances the Learner shall identify the mo	tivating factors and succe	ss factor	rs of a Social enterprise.		
CO2	In context of the Indian Society, the learner shall enlist the s	socio economic challenges	s and ide	entify the Opportunities for crea	ation of a Social	
	Enterprise					
CO3	CO3 Under exemplified conditions the Learner shall be able to discover the business models of Social Entrepreneurship.					
CO4	Under different circumstances the learner will be able to select an appropriate form of Social enterprise.					
CO5	Given the case the learner shall be able to interpret the busin	ess model and illustrate tl	he reaso	ns for success of a social enterpri	ise.	

Semester	III	Course Code	3T1	Type of Course	Elective
Course Name	IB1: INTERNATIONAL MARKETING MANAGEMENT				
Credits	4	Number of hours: 40			
Detailed Course Objectives					
CO1 At the end of the course the student shall be able to differentiate between domestic marketing and international marketing and understand clearly features of International Marketing.			understand		

CO2	At the end of the course the student shall be able to plan , explain and practice various procedures in International marketing.
CO3	At the end of the course the student manager shall be able to design and develop Global Product Policy decisions.
CO4	At the end of the course the student manager shall be able to design/develop strategies for International Service Sector Marketing
CO5	At the end of the course the student manager shall be able to design/develop functional level strategies for Global Branding.

Semester	III	Course Code	3T2	Type of Course	Elective
Course	IB2: EXPORT DO	CUMENTATION AND I	PROCEDU	RES	
Name					
Credits	4	Number of hours: 40			
	Detailed Course Objectives				
CO1	Students should be able to understand various preliminaries for exports and IEC codes and should be able to analyze functions of export marketing organizations and trading houses.				
CO2	Students should be able to understand various preliminaries of importand should be able to perceive concepts involved in import documentation and procedures.				
CO3	Students should be able to relate the concepts with selection of products and markets for exports as well as examine the pricing and payment methods in exports				
CO4	Students should be able to understand and elaborate various concepts in Export documentation, export procedures and contracts.				
CO5	Students should be able to perceive the procedures and intricacies of excise clearance and should be able to understand various shipment and post-shipment formalities				

Semester III	Course Code	3T3	Type of Course	Elective
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Course Name	IB3: INTERNATIONAL FINANCE			
Credits	4 Number of hours: 40			
Detailed Course Objectives				
CO1	Students Should be able to perceive various concepts involved in International Monetary system and various concepts like international liquidity and SDR			
CO2	Students should be able to understand methods of exchange rate determination , understand working of foreign exchange market and relate these concepts with existing scenario in India			
CO3	Students should be able to understand and analyze currency contracts and options. They should be able to examine risks involved in foreign trade and ways to manage the risks.			
CO4	Students should be able to understand management of short term finance in Multinational corporations and international financing decisions including funding and borrowing decisions			
CO5	Students should be able to understand and analyze various concepts like BOP, transfer pricing, structure of International banking and standards of international accounting			

Semester	II	Course Code	3T8	Type of Course	Core
Course Name	STRATEGIC MANAGEMENT				
Credits	3	Number of 1 hour lectures: 30			
Detailed Course Objectives					
CO1	The student will be able to evaluate alternative paradigms of strategy and their influence on strategic decision making.				
CO2	The student will be able to analyse and develop the vision and mission statement for given organisations and will also be able to differentiate between the external and internal components of environment while performing SWOT analysis.				
CO3	The student will be able to design and develop corporate level strategies for any organization.				

CO4	The student will be able to design/develop business level strategies for any organization.
CO5	The student will be able to evaluate all levels strategies and will also be design/develop functional level strategies for any organization.

SEMESTER – IV

Semester	IV	Course Code	4T1	Type of Course	Elective
Course Name	MM4: RETAIL SALES MANAGEMENT AND SERVICES MARKETING				
Credits	4	Number of hours: 40			
	Detailed C	Course Objectives			
CO1	1 On completion of this module the students will be able to utilise the knowledge gained on Retail Industry and the existing retail environment. The student will also be able to plan their retail business as future manager by applying retail segmentation.				
CO2	On completing this module, the students will be able to take part in the decisions involved in running a retail firm. They will also be able to form their own opinion on various retail formats and recommend strategies for retail planning.				
CO3	On completing this module, the students will be able to draw relationship between retail merchandising, marketing communication, CRM and retail success. They will also be in a position to predict impact of changing trends in Indian market scenario on retail business.				
CO4	On completion of this module, the students will be able to analyse concepts, functions, and techniques of the craft of service marketing services and will also be able to identify critical issues in service design & delivery. As future managers they will also be able to adapt a particular model of service marketing to a firm they work with.				
CO5	On completing this module, the students will be able to examine the application of integrated marketing communication (IMC) to retail business and develop an effective service marketing system for retail business. Students will also be in a position to recommend ethical rules for conduct of retail business in India.				

Course Name	FM4: MANAGING BANKS AND FINANCIAL INSTITUTIONS			
Credits	4 Number of hours: 40			
Detailed Course Objectives				
CO1	The student will be able to identify role of banking in economic development of country.			
CO2	The student will be able to assess the impact of monetary policy and its instruments on banking sector			
CO3	The student will be able to analyse the health and risk of bank balance sheet and will also be able to appraise credit management parameters of a bank			
CO4	The student will be able to identify the NPAs and will also be able to appraise the process of securitisation.			
CO5	The student will be able to distinguish the utility of various non banking institutions like insurance, housing finance and credit rating			

Semester	IV	Course Code	4T1	Type of Course	Elective
Course Name	HRM4: TEAM DYNAMICS				
Credits	4	Number of hours: 40			
Detailed Course Objectives					
CO1	Students should be able to justify the applicability of various theories of Motivation in given situation and appraise the role of motivation in Team Behavior				of motivation in
CO2	Students should be able to determine the importance of Interpersonal Communication and application of FIRO-B and Johari Window.				
CO3	Student should be able to explain the various steps of Group Formation and types of team				

CO4	In a given situation, Students should be able to justify the Conflict resolution strategy.
CO5	Students should be able to apply various OD Intervention tools under given situation.

Semester	IV	Course Code	4T1	Type of Course	Elective				
Course Name	OM4: SALES AND OPERATIONS PLANNING								
Credits	4	Number of hours:		40					
Detailed Course Objectives									
CO1	At the end of the course the student will be able to develop short term, medium term and long term forecasting needs in the organization.								
CO2	The student will be able to apply forecasting models for forecasting.								
CO3	The student will be able to develop aggregate planning by applying aggregate strategies.								
CO4	The student will be able to plan MPS and calculate bill of materials and MRP for production plan.								
CO5	The students will be able to plan distribution of finished goods taking into consideration various inputs and constraints.								

Semester	IV	Course Code	4T1	Type of Course	Elective			
Course Name	BA4: WEB AND SOCIAL MEDIA ANALYTICS							
Credits	4	Number of hours:		40				
Detailed Course Objectives								
CO1	The student will be able to choose theright tools for website design for measured outcomes.							
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CO2	The student will be able to construct a modern metrics of better performance from eight specific metrics for web performance.							
CO3	The student will be able to develop a model for moving quickly from data to actions on a particular website.							
CO4	The student will be able to develop themodel for measuring the success of a Mobile & Social Media Campaign							
CO5	The student will be able to develop a model for the website Outcome.							
Semester	IV	Course Code	4T1	Type of Course	Elective			
Course Name	ED4: ENTREPRENEURIAL MARKETING							
Credits	4	Number of hours:		40				
Detailed Course Objectives								
	Detailed							
CO1	The student will be able to interpret the micro and macro en	vironment of the firm						
CO1 CO2	The student will be able to interpret the micro and macro en The student will be able to use entrepreneurial approaches to	vironment of the firm						
CO1 CO2 CO3	The student will be able to interpret the micro and macro en The student will be able to use entrepreneurial approaches to The student will be able to describe consumer buying decisio	vironment of the firm o marketing functions. on process						
CO1 CO2 CO3 CO4	The student will be able to interpret the micro and macro end The student will be able to use entrepreneurial approaches to The student will be able to describe consumer buying decision The student will be able to justify the franchising mechanism	vironment of the firm o marketing functions. on process a as a tool for entrepreneu	rial marke	eting				

Semester	IV	Course Code	4T1	Type of Course	Elective
Course Name	IB4: INTERNATIONAL HUMAN RESOURCE MANAGEMENT				
Credits	4	Number of hours	5:	40	

Detailed Course Objectives				
CO1	Students will be able to differentiate between international and domestic HRM and analyze issues in IHRM and competencies of international managers			
CO2	Students will be able to understand recruitment and selection process for expatriates and various concepts involved in it such as HR outsourcing			
CO3	Students will be able to perceive concepts involved in training and development of expatriates and concepts such as diversity training and cross cultural team building.			
CO4	Students will be able to understand and examine various international performance management processes and compensation of expatriates			
CO5	Students will be able to understand and analyze various cultural dimensions, cultural sensitivity as well as should be able to elaborate collective bargaining and employee relations in various countries.			

Semester	IV	Course Code	4P5	Type of Course	Elective		
Course Name	PROJECT WORK AND VIVA VOCE						
Credits	4	Number of hours:		40			
	Detailed Course Objectives						
CO1	In a specialization domain of his / her choice, student manager will be able to choose an appropriate topic for study and will be able to clearly formulate & state a research problem						
CO2	For a selected research topic, student manager will be able to compile the relevant literature and frame hypotheses for research as applicable						
CO3	For a selected research topic, student manager will be able to plan a research design including the sampling, observational, statistical and operational designs if any						
CO4	For a selected research topic, student manager will be able to compile relevant data, interpret & analyze it and test the hypotheses wherever applicable						
CO5	Based on the analysis and interpretation of the data collected, student manager will be able to arrive at logical conclusions and propose suitable recommendations on the research problem						
CO6	Student manager will be able to create a logically coherent project report and will be able to defend his / her work in front of a panel of examiners						

Semester	IV	Course Code	4S6	Type of Course	Elective	
Course	EXIT SEMINAR AND OPEN DEFENCE					
Name						
Credits	4	Number of h	ours:	40		
Detailed Course Objectives						
CO1	The student will be able to apply knowledge of management theories and practices to solve business problems					
CO2	The student will Foster Analytical and Critical thinking abilities for data-based decision making					
CO3	The student will acquire Ability to develop Value Based Leadership ability					
CO4	The student will develop the Ability to understand, analyse and communicate global, economic, legal, and ethical areas of business					
CO5	The student will acquire the Ability to lead themselves and others in the achievement of organizational goals, contributing effectively to a team environment.					
	POs for MBA Program					
PO1 : Apply knowledge of management theories and practices to solve business problems						
PO2 : Foster Analytical and Critical thinking abilities for data-based decision making						
PO3 : Ability to develop Value Based Leadership ability						
PO4 :Ability to understand, analyse and communicate global, economic, legal, and ethical areas of business						
PO5 : Ability to lead themselves and others in the achievement of organizational goals, contributing effectively to a team environment						

M. Com (Computer Management) as per NEP 2020

PROGRAMME OUTCOMES (POs)

PSO1. The students will be able to transform complex Business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies.

PSO2. Design and development of solutions by applying computer skills, knowledge of quantitative techniques in computer and management applications in practice.

POS3.The student will be able to develop a product or process by applying knowledge of programming, web, database, human computer interaction and networking and security tools.

PSO4.The student will be able to contribute to research in their chosen field, function and communicate effectively, to perform both individually and in multi-disciplinary team.

PSO5.The student will be able to make decisions related to work that demonstrate intellectual curiosity, a commitment to lifelong learning in students and understanding of being an ethical computing professional with societal and environmental concerns.

Course Outcomes

M. Com (Computer Management) Semester-I

Paper-I

Course code- Python

LO1. Given information on different types of programming languages so that Students will be able to **distinguish** the high-level language and **understand** the benefits of using python for development of application program.

LO2. Given information on control statements of program student will be able to understand the program flow and will able to **implement** control statement and functions for effective code design.

LO3 Given information on advance program structure Students will able to **interpret** multiple data structured elements while developing real life application for business solution.

LO4 Given information on basics of object oriented programming will be able **create and use** different types of objects, classes and File handling operations for redesigning the program structure.

Paper-II Course code-Cloud Computing

LO1. Given information on basics of Cloud Computing, students will be able to **understand** the different paradigms, also able to **define** fundamental terminologies of Cloud Computing.

LO2. Given information on architecture and deployment model, students will be able to **remember** structure and the use of Cloud management with its types.

LO3. Given information on various cloud service models students will be able to **differentiate** and illustrate its Virtualization.

LO4. Given information on service providers, students will be able to describe the cloud service Model and understand the importance of its service providers.

Paper-III Course code-Advanced Java

LO1. Given information on basics of the use of connectivity(JDBC) and networking which helps for client server application, students will be able to **create** management applications practices emphasized for network based client server application

LO2. Given information is used for creation of enterprise edition work with servlet's and session tracking mechanism; students will be able to **develop** the solution for human computer interaction.

LO3. Given information on event handling and Java Server Pages, students will be able to **design** and **create** the web by using action tags with the help of JSP API

LO4. Given information on Extensions and Standard Tags library students will be able to Apply advance Tags in their web pages and able to **design** and develop the application by using technologies.

M. Com (Computer Management) Semester-II

Paper-I

Course code-ASP.Net

LO1. Given information on **development** and **deployment** cycles of enterprise applications so that Students will be able to understand the ASP.Net frame work to and enhance the web page with the combination of advance web designing tools(CSS3,HTML5) build distributed enterprise application.

LO2. Given information to **understand** server controls like secure protocols and also **examine** the entered data on the web page which helps to handle Master page with cookies.

LO3. Given information to **access** the backend (database) with suitable connectivity controls and **deploy** a secure client server in real life application with customized web page like secure web access methods.

LO4. Given information will **deploy** the web application by application interface control and WCF services so that Students will be able to **create** dynamic web applications using a combination of client-side(JavaScript, HTML, XML,WML) and server-side technologies(ASP.NET,ADO.NET)

Paper-II Course Code-Information Security & Cyber Law

LO1. Given information on information security and threats students will be able to **understand** structure, mechanics and evolution of various crime threats and able to remember the security mechanism.

LO2. Given the information on various security mechanism, students will be able to **define** various security tools used to protect the data.

LO3. Given the information on IT Act 2000 students will be able to **illustrate** different terminologies used bin IT Act 2000.

LO4. Given information on various tools used in security, students will be able to **recognize** which tool is best suited in fields.

Paper-III Course code-Android Programming

LO1. Given information on basics interface and architecture student will be able to develop and grasp of the Androids OS Architecture (using various android views and view groups).

LO2. Given the information on designing different themes for android applications which help students will be to understand the handling the data by using external devices and also for the networking communication application.

LO3. Given the information will help the students to understand the geographical locations on the maps with the help of geo-coding and reverse geo-coding as well as application will enrich with use of graphics and animation.

LO4. Given information will help students to familiarize with android development by selecting tools for including device emulator, profiling tools and IDE as well as Identity, analyse data storage, retrieval use preference, files and content providers.

M. Com (Computer Management) Semester-III

Paper – I Course Code – Advance Database Management System

LO1. Given the information on various types of Database Management System, database architecture and normalization techniques student will be able to **identify** the features provided by database systems and will also be able to **execute** its scope for organization and also able to **Create** Database for organization.

LO2. Given the information on Structured Query Language, student will be able to **analyze** an information storage problem and **derive** an information model expressed in the form of entity relation diagram.

LO3. Analyzing the different types of schema's student will be able to use and implement the processing through DBMS, to understand the role of database administrator and manager.

LO4. Describe the concept of data warehousing and data mining so that student will be able to **formulate** the techniques for analytical processing, so that students will able to handle the backup and recovery techniques.

Paper – II Course Code - Management Information System

LO1. Given the information on Management Information System in a digital firm, Business Performance, and Security challenges for E-enterprises student will be able to **describe** the role of information technology / system and **analyse** its impact on firm.

LO2.Given the information on Decision making, Business Intelligence and system engineering student will be able to **understand** the decision making concepts and its importance in business and **Analyse** and **design** the model accordingly.

LO3. Given the information on various processes of MIS, Strategic Design and Business process reengineering student will be able to **Ascertain** and **determines** the class and requirement of information and Implement the Business strategies for various Business Process Re-engineering using different models.

LO4. Given the information on application areas, Support System and ERP Concepts of Management information system, student will be able to **interpret** how to use information technology to solve business problems and **illustrate** the impact of information systems in society.

Paper – III Course Code – Data Communication & Computer Network

LO1. Given information on data communication concepts students will be able to **understand** the basic terminologies used in computer network and able to **categorize** networks according to size, purpose, design issues, and transmission technologies.

LO2 .Given information on components and media used in networking students will be able to **analyze** network performance parameters and transmission impairments.

LO3. Given information on different layers, issues and error control, students will be able to **apply** error control methods including error detection and correction, and sliding windows flow control protocols.

LO4 .Given information on algorithms, diagram subnets, students will be able to **describe** network layer services and its scheduling.

M. Com (Computer Management) Semester –IV

Paper – I Course Name – Software Engineering

LO1 Given information on basic knowledge of SW engineering methods and practices, Students will able to **find** the appropriate application to ensure good quality software.

LO2 Given information of software engineering tools such that Students will able to specify and **analyse** the function oriented software-designing techniques for adopting recent and advance system.

LO3 Given information on the concept of Unified modelling language, design and developed the software application, so that students will **reanalysing** the existing system for better performance.

LO4 Given information to analyse the existing system, with computer added software techniques so that students will able to **reuse** and **maintenance** the software code for creating real application.

Paper – II Course Name – Mobile Computing

LO1 Given information on mobile computing students will comprehend the fundamentals and advancements in mobile computing, techniques and technology

LO2 Given information on mobile telecommunication system students will be able to understand the architecture, protocols, and operational aspects of cellular systems

LO3. Given information on mobile network layer students will comprehend the protocols and dynamics of mobile network layers, encompassing Mobile IP, routing, and security.

LO4 Given information on mobile transport and application, layer students will understand the characteristics and development environments of major mobile device operating systems their specific constraints and requirements for application development.

Paper – III Course Name – Big Data & Hadoop

LO1 Given information on the basic structure and framework of big data & hadoop Student will able to **apply** computer skills to **design** the database.

LO2 Given information on advance database technologies Student will able to **compare** and **create** database applications used as advance reporting tool.

LO3 Given information on various platforms suitable for database application Student will able to **use** and **implement** advance programming tools while creating robust database application.

LO4 Given information on advance database management system by using Hive, pig, as well as various report tools Students will able to **process** the data for generating reports from the database.

Paper – IVCourse Name – Web with Word Press

LO1 Given information on basics of word press student will gain a comprehensive understanding of WordPress setting up a local development environment, installing WordPress, and creating and managing site content using themes and plugins.

LO2 Given information on design and customisation student will be able to explore, install, and customize WordPress themes and templates.

LO3 Given information on content management student will be able to create and manage posts and pages, organizing content, handling media files, and extending site functionality with essential and custom plugins.

LO4 Given information on advance features and SEO student will be able to learn to set up and manage an online store.

Two Year Masters of Commerce Degree Examination NEP MCOM (Accounting and Taxation) SEM I PROGRAMME OUTCOMES

Major Subject: Accounting and Taxation

Programme Outcomes

PO 1: The student will be able to apply professional knowledge of accounting and taxation in real life business situations

PO 2: The student will be able to interpret and analyse the financial statements

PO 3: The student will be able to demonstrate effective oral and written business communication

PO 4: The student will be able to implement traditional and modern strategies and practices of costing, management, auditing and taxation.

PO 5: Develop competency in students to make them employable in the accounting and taxation industry

Two Year Masters of Commerce Degree Examination NEP

MCOM (Accounting and Taxation) SEM I COURSE OUTCOMES

Major Core Subject: Advanced Financial Accounting - I

Course Outcomes

CO 1: Student will be able to gain knowledge about Computer Software Accounting, and will be able to amount of Insurance claim.

CO 2: Student will be able be aware of Hire Purchase system and instalment system.

CO 3: To develop competency of students to solve problem in accounting for Service Sector.

CO 4: To develop competency of students to solve problem in accounting for non-profit organization.

Major Core Subject: Advanced Cost Accounting

Course Outcomes

CO 1: Student will be able the gain knowledge about classification of cost, methods and techniques, and student will be able to calculate the cost of goods.

CO 2: To familiarizes the student for process account.

CO 3: Student will be able to calculate the profit on contract.

CO 4: Student will be able to evaluate the reconciliation of cost and Financial Accounting

Major Core Subject: Indian Financial System

Course Outcomes

CO 1: Students will be able to understand various components of Formal Financial System

CO 2: Students will be able to acknowledge the definition of Banking and creation of money banking System.

CO 3: Students will be able to understand the basics of Insurance and components related to it.

CO 4: Students will have the knowledge of process of creating funds in Capital Market.

Elective Subject A: Advanced Statistics

Course Outcomes

CO 1: To impart knowledge of Auditing such as Audit programs, Vouching, Verification, and Valuation.

CO 2: To understand the significance of using computers in the Audit program.

CO 3: To provide hands-on training in Auditing of a Limited Company.

CO 4: To understand the Management Audit and different firms Audit.

Elective Subject B: Advanced Auditing

Course Outcomes

CO 1: Students will develop an understanding of basic Statistical decision making and analyze the significance.

CO 2: Students will be able to understand Statistical quality control and will also be able to draw association of attributes and F test.

CO 3: Students will be able to understand Analysis of time series and will also be able to calculate probability.

CO 4: Student will be able to perform regression analysis, interpolation and also know their usages.

Major Core Subject: Research Methodology

Course Outcomes

CO 1: Formulate a research problem and identify appropriate research design for a specific research problem

CO 2: Construct a data collection tool and identify appropriate processing tools for verification of hypothesis

CO 3: Articulate research findings and be able to present the findings in research report

CO 4: Understand various dimensions related to Intellectual Property Rights.

MCOM (Accounting and Taxation) SEM II COURSE OUTCOMES

Major Core Subject: Advanced Financial Accounting - II

Course Outcomes

CO 1: To understand the concept of corporate restructuring, its accounting methods.

CO 2: To understand the concept of corporate Reconstruction, its accounting methods.

CO 3: To understanding the Consolidation of Financial Statements of Holding Companies & two Subsidiary Companies.

CO 4: To Prepare Statement of Affairs of the Companies in Liquidation

Major Core Subject: Cost Control and Analysis

Course Outcomes

CO 1: To understand the concept of corporate restructuring, its accounting methods.

CO 2: To understand the concept of corporate Reconstruction, its accounting methods.

CO 3: To understanding the Consolidation of Financial Statements of Holding Companies & two Subsidiary Companies.

CO 4: To Prepare Statement of Affairs of the Companies in Liquidation

Major Core Subject: Financial Analysis and Control

Course Outcomes

CO 1: Students will develop an understanding of basic financial analysis.

CO 2: Students will be able to analyze the Balance Sheets to interpret the business's financial situation.

CO 3: Students will be able to use financial analysis and control tools in the future.

CO 4: By providing knowledge of various capital budgeting techniques, students will be able to understand the tools required to manage risks, make wise investment decisions, and achieve financial goals

Elective Subject A: Business Ethics & Corporate Responsibility

Course Outcomes

CO 1: To familiarize the learners with the concept and relevance of Business Ethics in the modern era.

CO 2: To analyse ethical aspect in finance. To get aware about the consequences of unethical behaviour in finance.

CO 3: To trace the historical evaluation of CSR. To analyses the factors affecting the growth of CSR.

CO 4: To analyze the provision for Corporate Social Responsibility in Companies Act 2013.

Elective Subject B: Advanced Financial Management

Course Outcomes

CO 1: Student will understand the use of various tools, techniques and methods of Financial Management.

CO 2: Student will be able to sharpen their critical thinking about working capital management.

CO 3: Student will understand the methods & computation of cash Management.

CO 4: Student will be able to sharpen their decision making about Debtors, Creditors and Inventory Management.

On Job Training

MCOM (Accounting and Taxation) SEM III COURSE OUTCOMES

Major Core Subject: Advanced Management Accounting

Course Outcomes

CO 1: Students will be able to understand the various concepts in Management Accounting, and able to Interpretation of Ration

CO 2: Students will gain some basic knowledge on preparation of budget and interpretation of financial statements.

CO 3: Students will understand the use of MIS and BEP.

CO 4: Students will be able to sharpen their thinking skills regarding use of working capital management.

Major Core Subject: Income Tax

Course Outcomes

CO 1: Students will be able to understand the various concepts in Income From Profession, and able to Computation of Income From Profession

CO 2: Students will gain some basic knowledge Income head and able to Computation Gross income.

CO 3: Students will understand the Capital Gain, and how to calculate.

CO 4: Students will gain some basic knowledge deduction under section 80, and able to Computation taxable income.

Major Core Subject: Special Areas in Accounting

Course Outcomes

- CO 1: Students will be able understand revenue based accounting standards.
- CO 2: Students will be able understand knowledge of valuation type of Shares and Goodwill.
- CO 3: Students will be able understand knowledge of preparation of final statement of liquidator.
- CO 4: To impart knowledge of accounts and records under students GST.

Elective Subject A: Operation Research

Course Outcomes

- CO 1: Students will develop an understanding of basic linear Programming.
- CO 2: Students will gain some basic knowledge on recent trends in Transportation and Assignment.
- CO 3: Students will understand the use of Replacement and Inventory models
- CO 4: Students will be able to sharpen their thinking skills regarding use of PERT/CPM.

Elective Subject B: Strategic Management

Course Outcomes

- CO 1: Students will be able to understand the various concepts in Strategic Management.
- CO 2: Students will gain some basic knowledge on recent trends in Strategic Management.

CO 3: Students will understand the use of various tools, techniques and methods of Strategic Management.

CO 4: Students will be able to sharpen their thinking skills regarding use of technology as a strategy in the Digital.

Research Project

MCOM (Accounting and Taxation) SEM IV COURSE OUTCOMES

Major Core Subject: Accounting for Managerial Decisions

- CO 1: To understand the concept of management Accounting.
- CO 2: To understand the concept & implementation of Decision making and accounting.
- CO 3: To understanding the Fund Flow Statement.
- CO 4: To understanding the Cash Flow Statement

Major Core Subject: Business Tax Assessment & Planning

Course Outcomes

- CO 1: To understand the concept of management Accounting.
- CO 2: To understand the concept & implementation of Decision making and accounting.
- CO 3: To understanding the Fund Flow Statement.
- CO 4: To understanding the Cash Flow Statement

Major Core Subject: Indirect Tax

Course Outcomes

- CO 1: Students will be able to basic and practical knowledge of Indirect Tax specially of GST.
- CO 2: Students will be able to practical knowledge of GST input and output tax payable.
- CO 3: Students will be able to basic knowledge of GST liabilities of multiple suppliers.

CO 4: Students will be able to basic and practical knowledge of Indirect Tax specially of Customs Duty.

Elective Subject A: Human Resource Accounting

Course Outcomes

- CO 1: Student will be able to understand the values of Human Resources in Organisations.
- CO 2: To acquaint the students with the process and approach of Human Resource Accounting.
- CO 3: To acquaint the students with the process and approach of Human Resource Planning.
- CO 4: To familiarise the students with the process and approach of Human Resource Investment.

Elective Subject B: Tax Assessment Process & Appeals

Course Outcomes

- CO 1: Students will be able to understand the various concepts in Income tax authorities and power.
- CO 2: Students will gain some basic knowledge on filling of income tax returns.
- CO 3: Students will understand the assessment procedure.
- CO 4: Students will gain some basic knowledge of appeals and revision

Research Project

Two Year Masters of Commerce Degree Examination NEP MCOM (Business Administration) PROGRAMME OUTCOMES

Major Subject: Business Administration

Programme Outcomes

PO 1: Develop necessary professional knowledge and skills in in various functional areas of business and commerce

PO 2: Demonstrate the ability to apply various theories of business management to solve business problems

PO 3: Demonstrate effective oral and written business communication

PO 4: Implement traditional and modern strategies and practices of business management, business economics and allied areas.

PO 5: Develop competency in students to make them employable in the corporate world

MCOM (Business Administration) SEM I COURSE OUTCOMES

Major Core Subject: Organisation Behaviour

Course Outcomes

CO 1: Student will be able to gain knowledge about Computer Software Accounting, and will be able to amount of Insurance claim.

CO 2: Student will be able be aware of Hire Purchase system and instalment system.

CO 3: To develop competency of students to solve problem in accounting for Service Sector.

CO 4: To develop competency of students to solve problem in accounting for non-profit organization.

Major Core Subject: Business Law

Course Outcomes

CO 1: Student will be able to gain knowledge about Computer Software Accounting, and will be able to amount of Insurance claim.

CO 2: Student will be able be aware of Hire Purchase system and instalment system.

CO 3: To develop competency of students to solve problem in accounting for Service Sector.

CO 4: To develop competency of students to solve problem in accounting for non-profit organization.

Major Core Subject: Managerial Economics

Course Outcomes

CO 1: To analyze key economic theories and their applications in managerial decision-making.

CO 2: Evaluate market structures and competitive strategies to optimize business performance.

CO 3: Apply economic principles to assess cost, pricing, and production decisions.

CO 4: Examine the impact of economic policies and external factors on business strategies.

Elective Subject A: Fundamentals of Financial Management

Course Outcomes

CO 1: Understand basic financial concepts and their role in managing a business.

CO 2: Analyze financial statements to assess a company's performance and health.

CO 3: Apply financial management techniques to budgeting, forecasting, and investment decisions.

CO 4: Evaluate financial risks and returns to make informed decisions on capital structure and funding.

Elective Subject B: International Business

Course Outcomes

CO 1: Understand the principles and dynamics of international trade and global business environments.

CO 2: Analyze the impact of international regulations, policies, and economic factors on global business operations.

CO 3: Apply strategies for entering and competing in international markets, including market entry modes and cross-cultural management.

CO 4: Evaluate global business risks and opportunities, including currency exchange, geopolitical factors, and international financial systems..

Major Core Subject: Research Methodology

Course Outcomes

CO 1: Formulate a research problem and identify appropriate research design for a specific research problem

CO 2: Construct a data collection tool and identify appropriate processing tools for verification of hypothesis

CO 3: Articulate research findings and be able to present the findings in research report

CO 4: Understand various dimensions related to Intellectual Property Rights

MCOM (Business Administration) SEM II COURSE OUTCOMES

Major Core Subject: Indian Financial System

Course Outcomes

CO 1: Students will be able to understand various components of Formal Financial System

CO 2: Students will be able to acknowledge the definition of Banking and creation of money banking System.

CO 3: Students will be able to understand the basics of Insurance and components related to it.

CO 4: Students will have the knowledge of process of creating funds in Capital Market.

Major Core Subject: Company Law

Course Outcomes

CO 1: Understand the fundamental principles and legal framework governing company formation and structure.

CO 2: Analyze the roles, responsibilities, and liabilities of company directors and officers.

CO 3: Apply legal principles to company governance, including shareholder rights and corporate compliance.

CO 4: Evaluate procedures related to company financing, mergers, acquisitions, and dissolution.

Major Core Subject: Project Management

Course Outcomes

CO 1: Understand the fundamental concepts and methodologies of project management.

CO 2: Analyze project planning, scheduling, and resource allocation techniques.

CO 3: Apply tools and techniques for effective project execution, monitoring, and control.

CO 4: Evaluate project performance and manage risks to ensure successful project delivery.

Elective Subject A: Advance Financial Management

CO 1: Understand advanced financial theories and their application in strategic financial decisionmaking.

CO 2: Analyze complex financial statements and use advanced financial metrics to evaluate business performance.

CO 3: Apply sophisticated financial management techniques for capital budgeting, risk management, and investment analysis.

CO 4: Evaluate and develop financial strategies for mergers, acquisitions, and corporate restructuring.

Elective Subject B: Basics of GST

Course Outcomes

CO 1: Understand the fundamental principles and structure of Goods and Services Tax (GST).

CO 2: Analyze GST registration requirements, compliance, and documentation procedures.

CO 3: Apply GST concepts to calculate tax liability, input tax credits, and file GST returns.

CO 4: to evaluate the impact of GST on business operations and financial reporting.

On Job Training

MCOM (Business Administration) SEM III COURSE OUTCOMES

Major Core Subject: Human Resource Management

Course Outcomes

CO 1: Understand the key principles and functions of human resource management.

CO 2: Analyze methods for effective recruitment, selection, and employee onboarding training.

CO 3: To apply strategies for performance management, training, and development.

CO 4: Evaluate HR practices related to employee relations, compensation, and organizational culture.

Major Core Subject: Service Sector Management

CO 1: Understand the unique characteristics and challenges of managing service-oriented businesses.

CO 2: Analyze service quality models and techniques for improving customer satisfaction.

CO 3: Apply strategies for IT service design, delivery, and innovation to enhance operational efficiency.

CO 4: Evaluate service sector performance metrics and develop strategies for growth and competitive advantage.

Major Core Subject: Cooperation & Rural Development

Course Outcomes

CO 1: Understand the structure and functions of cooperatives in India and their role in rural development.

CO 2: Analyze policies and programs related to rural development and their impact on economic and social progress.

CO 3: Apply principles of cooperative management and rural development to enhance community participation and resource utilization.

CO 4: Evaluate the effectiveness of rural development initiatives and cooperative strategies in addressing rural challenges and improving livelihoods.

Elective Subject A: Agricultural Economics

Course Outcomes

CO 1: Understand the principles and scope of agricultural economics in the Indian context.

CO 2: To analyze agricultural policies, market structures, and their impact on agricultural productivity and rural development.

CO 3: Apply economic theories to evaluate agricultural production, pricing, and resource allocation.

CO 4: Assess the challenges and opportunities in Govt. policies in agriculture, including sustainability, technology adoption, and market access.

Elective Subject B: Indian Banking System

CO 1: Understand the structure, functions, and regulatory framework of the Indian banking system.

CO 2: To analyze the role of various types of banks, including commercial, cooperative, and development banks, in the Indian economy.

CO 3: Apply concepts related to banking operations and financial products.

CO 4: Evaluate the impact of banking reforms, technology advancements, and regulatory changes on the Indian banking sector.

Research Project

MCOM (Business Administration) SEM IV COURSE OUTCOMES

Major Core Subject: Entrepreneurship Development

Course Outcomes

CO 1: Understand the fundamentals of entrepreneurship and the role of entrepreneurs in the Indian economy.

CO 2: Analyze the challenges and opportunities faced by entrepreneurs in India, including regulatory and financial aspects.

CO 3: Apply strategies for starting and managing new ventures, including business planning, funding, and innovation.

CO 4: Evaluate government policies such as Start-up India and support systems designed to foster entrepreneurship.

Major Core Subject: Corporate Social Responsibility

Course Outcomes

CO 1: Understand the principles and importance of corporate social responsibility (CSR) in modern business practices.

CO 2: Analyze CSR strategies and frameworks, and their impact on stakeholder relationships and corporate reputation.

CO 3: Apply corporate governance principles to ensure effective oversight, accountability, and ethical conduct in CSR initiatives.

CO 4: Evaluate the integration of CSR into corporate governance structures and assess its influence on organizational transparency and compliance..

Major Core Subject: Marketing Management

CO 1: Understand the core fundamental concepts and strategies of marketing management.

CO 2: Analyze market segmentation, targeting, and positioning to develop effective marketing plans.

CO 3: Apply marketing techniques and tools to design and implement successful marketing campaigns.

CO 4: Evaluate marketing performance and adapt strategies based on market trends and consumer feedback.

Elective Subject A: International Marketing

Course Outcomes

CO 1: Understand the fundamental concepts of international marketing and the dynamics of global markets.

CO 2: Analyze international market entry strategies, including adaptation versus standardization approaches.

CO 3: Apply international marketing techniques such as franchising, FDI to develop and implement effective global marketing plans.

CO 4: Evaluate the impact of cultural, economic, and regulatory factors on international marketing strategies along with role international banking.

Elective Subject B: Insurance Procedures & Practices

Course Outcomes

CO 1: Understand the fundamental principles and regulations governing the Indian insurance industry.

CO 2: Analyze various types of insurance products and their applications in personal and commercial contexts.

CO 3: Apply IRDA procedures for policy issuance, claims processing, and risk management.

CO 4: Evaluate industry practices, including regulatory compliance and customer service standards, to enhance insurance operations.

Research Project

Four Year Bachelor of Commerce Degree

B. COM. SEM I PROGRAMME OUTCOMES

Major Subject: Accounting and Taxation

Programme Outcomes

- PO 1: Develop necessary professional knowledge and skills in accountancy and taxation
- PO 2: Demonstrate the ability to interpret and analyse financial statements
- PO 3: Demonstrate effective oral and written business communication

PO 4: Implement traditional and modern strategies and practices of costing, management, auditing and Taxation

PO 5: Develop competency in students to make them employable in the accounting and taxation Industry

Major Subject: Business Administration

Programme Outcomes

PO 1: Implement traditional and modern strategies and practices of business management and Administration

PO 2: Demonstrate effective oral and written business communication

PO 3: Develop competency in students to make them employable in the corporate world

PO 4: Develop ethical practices and imbibe values for better corporate governance.

PO 5: Demonstrate the ability to analyse in detail the Company's act 2013 and other business regulations

Major Subject: Computer Applications

Programme Outcomes

PO 1: Problem analysis: Identify, formulate, review, research, and analyse complex organisational problems reaching substantiated conclusions using principles of information technology and ethics of management.

PO 2: Design/development of sustainable solutions: Design solutions for problems that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, legal, ethical and environmental considerations using different computer application tools.

PO 3: Skills in Programming: Possess practical and theoretical knowledge of programming skills, database and web development tools sufficient to earn a living and contribute to the economic development of the region, state and nation.

PO 4: Communication: Communicate effectively on complex technical activities with the community and society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 5: Life-long learning: Recognize the need and ability to engage in independent and lifelong learning in the broadest context of emerging markets and technological change.

Major Subject: Finance and Banking

Programme Outcomes

PO 1: Develop necessary professional knowledge and skills in banking and finance.

PO 2: Demonstrate the ability to analyze the financial markets.

PO 3: Understanding the rules and regulations laid down by market regulators like RBI, SEBI, IRDA, etc

PO 4: Implement traditional and modern strategies and practices of banking, finance, and insurance.

PO 5: Develop competency in students to make them employable in the banking, finance and insurance industry.

Four Year Bachelor of Commerce Degree

BCOM SEM I COURSE OUTCOMES

Major Subject: Principles of Business Management

Course Outcomes

CO 1: The student will be able to identify different functions of management and management thoughts.

CO 2: The student will be able to differentiate between Management and Administration as well as identify the skills required for a manager.

CO 3: The student will be able to Outline and illustrate plans for various activities.

CO 4: The Student will be able to develop competency of decision making while working in a group.

CO 5: The student will be able to apply various management principles in his/ her day-today life.

Open Elective Group A (1): Foundations of Financial Accounting

Course Outcomes

CO 1: The students will be able to understand the concept of accounting and its importance in business.

CO 2: The students will be able to record and summarise financial transaction of a business.

CO 3: The students will be able to prepare final accounts for a proprietorship business.

CO 4: The students will be able to understand norms and standards of accounting practices.

Open Elective Group A (2): Economic Systems

Course Outcomes

CO 1: The students will be able to understand various types of economic systems.

CO 2: The students will be able to understand socialist economic system.

CO 3: The students will be able to understand the working mechanism of Capitalist Economy.

CO 4: The students will be able to understand the structure of a mixed economy.

Open Elective Group B: Elements of Business Environment

Course Outcomes

CO 1: The Students will be able to compare and contrast internal and external environment of business.

CO 2: The students will be able to understand economic environment of business

CO 3: The students will be able to understand the socio-cultural environment of business and social responsibilities of business.

CO 4: The students will be able to understand technological business environment and its impact.

Vocational Skill: Computer Application for Business

Course Outcomes

CO 1: The students will be able to compare various types of operating systems.

CO 2: The students will be able to perform basic tasks using word processing tools

CO 3: The students will be able to perform basic mathematic operations and data presentation using Charts in MS-Excel.

CO 4: The students will be able to create simple PowerPoint presentations

Skill Enhancement Course: Start-up Support Executive

Course Outcomes

- CO 1: To understand various ideas and the legality of Start-up solutions.
- CO 2: To know the registrations and statutory compliances of Partnership.
- CO 3: To identify Ideas and analyses the applicability of statutory filings
- CO 4: To describe procedural codes of Registrar of Company
- CO 5: To comprehend the preparation of documents

Ability Enhancement Course: English

- CO 1: To develop basic communication skills of the students.
- CO 2: To develop positive soft skills in order to meet the global standards.
- CO 3: To enhance creative and critical thinking
- CO 4: To sharpen critical acumen
- CO 5: To build comprehensive skills

Value Education Course: Environmental Studies

Course Outcomes

CO 1: To comprehend Environmental Science and Atmospheric Science along-with the components of Environment

CO 2: To know the importance of Environmental Education.

CO 3: To identify the fundamentals of atmospheric science including formation, depletion and effects of ozone layer and acid rain on environment.

CO 4: To know the various physical and chemical characteristics and properties of Water and Soil

CO 5: To classify the Ecology and its allied branches

Indian Knowledge System: Indian Economics and Business Model

Course Outcomes

CO 1: The students will be able to compare past and present Indian thoughts.

CO 2: The students will be able to understand Kautilya's Economic thoughts.

CO 3: The students will be able to understand agriculture and manufacturing framework in ancient India.

CO 4: The students will be able to compare various Indian Business Models.

Two Year Masters of Commerce Degree Examination NEP

MCOM (Accounting and Taxation) SEM I PROGRAMME OUTCOMES

Major Subject: Accounting and Taxation

Programme Outcomes

PO 1: The student will be able to apply professional knowledge of accounting and taxation in real life business situations

PO 2: The student will be able to interpret and analyse the financial statements

PO 3: The student will be able to demonstrate effective oral and written business communication

PO 4: The student will be able to implement traditional and modern strategies and practices of costing, management, auditing and taxation.

PO 5: Develop competency in students to make them employable in the accounting and taxation industry

Two Year Masters of Commerce Degree Examination NEP

MCOM (Accounting and Taxation) SEM I COURSE OUTCOMES

Major Core Subject: Advanced Financial Accounting - I

Course Outcomes

CO 1: Student will be able to gain knowledge about Computer Software Accounting, and will be able to amount of Insurance claim.

CO 2: Student will be able be aware of Hire Purchase system and instalment system.

CO 3: To develop competency of students to solve problem in accounting for Service Sector.

CO 4: To develop competency of students to solve problem in accounting for non-profit organization.

Major Core Subject: Advanced Cost Accounting

Course Outcomes

CO 1: Student will be able the gain knowledge about classification of cost, methods and techniques, and student will be able to calculate the cost of goods.

CO 2: To familiarizes the student for process account.

CO 3: Student will be able to calculate the profit on contract.

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Major Core Subject: Indian Financial System

Course Outcomes

CO 1: Students will be able to understand various components of Formal Financial System

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CO 3: Students will be able to understand the basics of Insurance and components related to it.

CO 4: Students will have the knowledge of process of creating funds in Capital Market.

Elective Subject A: Advanced Statistics

Course Outcomes

CO 1: To impart knowledge of Auditing such as Audit programs, Vouching, Verification, and Valuation.

CO 2: To understand the significance of using computers in the Audit program.

CO 3: To provide hands-on training in Auditing of a Limited Company.

CO 4: To understand the Management Audit and different firms Audit.

Elective Subject B: Advanced Auditing

Course Outcomes

CO 1: Students will develop an understanding of basic Statistical decision making and analyze the significance.

CO 2: Students will be able to understand Statistical quality control and will also be able to draw association of attributes and F test.

CO 3: Students will be able to understand Analysis of time series and will also be able to calculate probability.

CO 4: Student will be able to perform regression analysis, interpolation and also know their usages.

Major Core Subject: Research Methodology

Course Outcomes

CO 1: Formulate a research problem and identify appropriate research design for a specific research problem

CO 2: Construct a data collection tool and identify appropriate processing tools for verification of hypothesis

CO 3: Articulate research findings and be able to present the findings in research report

CO 4: Understand various dimensions related to Intellectual Property Rights.

MCOM (Accounting and Taxation) SEM II COURSE OUTCOMES

Major Core Subject: Advanced Financial Accounting - II

Course Outcomes

CO 1: To understand the concept of corporate restructuring, its accounting methods.

CO 2: To understand the concept of corporate Reconstruction, its accounting methods.

CO 3: To understanding the Consolidation of Financial Statements of Holding Companies & two Subsidiary Companies.

CO 4: To Prepare Statement of Affairs of the Companies in Liquidation

Major Core Subject: Cost Control and Analysis

Course Outcomes

CO 1: To understand the concept of corporate restructuring, its accounting methods.

CO 2: To understand the concept of corporate Reconstruction, its accounting methods.

CO 3: To understanding the Consolidation of Financial Statements of Holding Companies & two Subsidiary Companies.

CO 4: To Prepare Statement of Affairs of the Companies in Liquidation

Major Core Subject: Financial Analysis and Control

Course Outcomes

CO 1: Students will develop an understanding of basic financial analysis.

CO 2: Students will be able to analyze the Balance Sheets to interpret the business's financial situation.

CO 3: Students will be able to use financial analysis and control tools in the future.

CO 4: By providing knowledge of various capital budgeting techniques, students will be able to understand the tools required to manage risks, make wise investment decisions, and achieve financial goals

Elective Subject A: Business Ethics & Corporate Responsibility

Course Outcomes

CO 1: To familiarize the learners with the concept and relevance of Business Ethics in the modern era.

CO 2: To analyse ethical aspect in finance. To get aware about the consequences of unethical behaviour in finance.

CO 3: To trace the historical evaluation of CSR. To analyses the factors affecting the growth of CSR.

CO 4: To analyze the provision for Corporate Social Responsibility in Companies Act 2013.

Elective Subject B: Advanced Financial Management

Course Outcomes

CO 1: Student will understand the use of various tools, techniques and methods of Financial Management.

CO 2: Student will be able to sharpen their critical thinking about working capital management.

CO 3: Student will understand the methods & computation of cash Management.

CO 4: Student will be able to sharpen their decision making about Debtors, Creditors and Inventory Management.

On Job Training

MCOM (Accounting and Taxation) SEM III COURSE OUTCOMES

Major Core Subject: Advanced Management Accounting

CO 1: Students will be able to understand the various concepts in Management Accounting, and able to Interpretation of Ration

CO 2: Students will gain some basic knowledge on preparation of budget and interpretation of financial statements.

CO 3: Students will understand the use of MIS and BEP.

CO 4: Students will be able to sharpen their thinking skills regarding use of working capital management.

Major Core Subject: Income Tax

Course Outcomes

CO 1: Students will be able to understand the various concepts in Income From Profession, and able to Computation of Income From Profession

CO 2: Students will gain some basic knowledge Income head and able to Computation Gross income.

CO 3: Students will understand the Capital Gain, and how to calculate.

CO 4: Students will gain some basic knowledge deduction under section 80, and able to Computation taxable income.

Major Core Subject: Special Areas in Accounting

Course Outcomes

- CO 1: Students will be able understand revenue based accounting standards.
- CO 2: Students will be able understand knowledge of valuation type of Shares and Goodwill.
- CO 3: Students will be able understand knowledge of preparation of final statement of liquidator.
- CO 4: To impart knowledge of accounts and records under students GST.

Elective Subject A: Operation Research

Course Outcomes

- CO 1: Students will develop an understanding of basic linear Programming.
- CO 2: Students will gain some basic knowledge on recent trends in Transportation and Assignment.
- CO 3: Students will understand the use of Replacement and Inventory models
- CO 4: Students will be able to sharpen their thinking skills regarding use of PERT/CPM.

Elective Subject B: Strategic Management

Course Outcomes

CO 1: Students will be able to understand the various concepts in Strategic Management.

CO 2: Students will gain some basic knowledge on recent trends in Strategic Management.

CO 3: Students will understand the use of various tools, techniques and methods of Strategic Management.

CO 4: Students will be able to sharpen their thinking skills regarding use of technology as a strategy in the Digital.

Research Project

MCOM (Accounting and Taxation) SEM IV COURSE OUTCOMES

Major Core Subject: Accounting for Managerial Decisions

Course Outcomes

- CO 1: To understand the concept of management Accounting.
- CO 2: To understand the concept & implementation of Decision making and accounting.
- CO 3: To understanding the Fund Flow Statement.
- CO 4: To understanding the Cash Flow Statement

Major Core Subject: Business Tax Assessment & Planning

Course Outcomes

- CO 1: To understand the concept of management Accounting.
- CO 2: To understand the concept & implementation of Decision making and accounting.
- CO 3: To understanding the Fund Flow Statement.
- CO 4: To understanding the Cash Flow Statement

Major Core Subject: Indirect Tax

Course Outcomes

- CO 1: Students will be able to basic and practical knowledge of Indirect Tax specially of GST.
- CO 2: Students will be able to practical knowledge of GST input and output tax payable.
- CO 3: Students will be able to basic knowledge of GST liabilities of multiple suppliers.

CO 4: Students will be able to basic and practical knowledge of Indirect Tax specially of Customs Duty.

Elective Subject A: Human Resource Accounting

Course Outcomes

- CO 1: Student will be able to understand the values of Human Resources in Organisations.
- CO 2: To acquaint the students with the process and approach of Human Resource Accounting.
- CO 3: To acquaint the students with the process and approach of Human Resource Planning.
- CO 4: To familiarise the students with the process and approach of Human Resource Investment.

Elective Subject B: Tax Assessment Process & Appeals

Course Outcomes

- CO 1: Students will be able to understand the various concepts in Income tax authorities and power.
- CO 2: Students will gain some basic knowledge on filling of income tax returns.
- CO 3: Students will understand the assessment procedure.
- CO 4: Students will gain some basic knowledge of appeals and revision

Research Project

Two Year Masters of Commerce Degree Examination NEP MCOM (Business Administration) PROGRAMME OUTCOMES

Major Subject: Business Administration

Programme Outcomes

PO 1: Develop necessary professional knowledge and skills in in various functional areas of business and commerce

PO 2: Demonstrate the ability to apply various theories of business management to solve business problems

PO 3: Demonstrate effective oral and written business communication

PO 4: Implement traditional and modern strategies and practices of business management, business economics and allied areas.

PO 5: Develop competency in students to make them employable in the corporate world

MCOM (Business Administration) SEM I COURSE OUTCOMES

Major Core Subject: Organisation Behaviour

Course Outcomes

CO 1: Student will be able to gain knowledge about Computer Software Accounting, and will be able to amount of Insurance claim.

CO 2: Student will be able be aware of Hire Purchase system and instalment system.

CO 3: To develop competency of students to solve problem in accounting for Service Sector.

CO 4: To develop competency of students to solve problem in accounting for non-profit organization.

Major Core Subject: Business Law

Course Outcomes

CO 1: Student will be able to gain knowledge about Computer Software Accounting, and will be able to amount of Insurance claim.

CO 2: Student will be able be aware of Hire Purchase system and instalment system.

CO 3: To develop competency of students to solve problem in accounting for Service Sector.

CO 4: To develop competency of students to solve problem in accounting for non-profit organization.

Major Core Subject: Managerial Economics

Course Outcomes

CO 1: To analyze key economic theories and their applications in managerial decision-making.

CO 2: Evaluate market structures and competitive strategies to optimize business performance.

CO 3: Apply economic principles to assess cost, pricing, and production decisions.

CO 4: Examine the impact of economic policies and external factors on business strategies.

Elective Subject A: Fundamentals of Financial Management

Course Outcomes

CO 1: Understand basic financial concepts and their role in managing a business.

CO 2: Analyze financial statements to assess a company's performance and health.

CO 3: Apply financial management techniques to budgeting, forecasting, and investment decisions.

CO 4: Evaluate financial risks and returns to make informed decisions on capital structure and funding.

Elective Subject B: International Business

CO 1: Understand the principles and dynamics of international trade and global business environments.

CO 2: Analyze the impact of international regulations, policies, and economic factors on global business operations.

CO 3: Apply strategies for entering and competing in international markets, including market entry modes and cross-cultural management.

CO 4: Evaluate global business risks and opportunities, including currency exchange, geopolitical factors, and international financial systems..

Major Core Subject: Research Methodology

Course Outcomes

CO 1: Formulate a research problem and identify appropriate research design for a specific research problem

CO 2: Construct a data collection tool and identify appropriate processing tools for verification of hypothesis

CO 3: Articulate research findings and be able to present the findings in research report

CO 4: Understand various dimensions related to Intellectual Property Rights

MCOM (Business Administration) SEM II COURSE OUTCOMES

Major Core Subject: Indian Financial System

Course Outcomes

CO 1: Students will be able to understand various components of Formal Financial System

CO 2: Students will be able to acknowledge the definition of Banking and creation of money banking System.

CO 3: Students will be able to understand the basics of Insurance and components related to it.

CO 4: Students will have the knowledge of process of creating funds in Capital Market.

Major Core Subject: Company Law

Course Outcomes

CO 1: Understand the fundamental principles and legal framework governing company formation and structure.

CO 2: Analyze the roles, responsibilities, and liabilities of company directors and officers.

CO 3: Apply legal principles to company governance, including shareholder rights and corporate compliance.

CO 4: Evaluate procedures related to company financing, mergers, acquisitions, and dissolution.

Major Core Subject: Project Management

Course Outcomes

CO 1: Understand the fundamental concepts and methodologies of project management.

CO 2: Analyze project planning, scheduling, and resource allocation techniques.

CO 3: Apply tools and techniques for effective project execution, monitoring, and control.

CO 4: Evaluate project performance and manage risks to ensure successful project delivery.

Elective Subject A: Advance Financial Management

Course Outcomes

CO 1: Understand advanced financial theories and their application in strategic financial decisionmaking.

CO 2: Analyze complex financial statements and use advanced financial metrics to evaluate business performance.

CO 3: Apply sophisticated financial management techniques for capital budgeting, risk management, and investment analysis.

CO 4: Evaluate and develop financial strategies for mergers, acquisitions, and corporate restructuring.

Elective Subject B: Basics of GST

Course Outcomes

CO 1: Understand the fundamental principles and structure of Goods and Services Tax (GST).

CO 2: Analyze GST registration requirements, compliance, and documentation procedures.

CO 3: Apply GST concepts to calculate tax liability, input tax credits, and file GST returns.

CO 4: to evaluate the impact of GST on business operations and financial reporting.
On Job Training

MCOM (Business Administration) SEM III COURSE OUTCOMES

Major Core Subject: Human Resource Management

Course Outcomes

CO 1: Understand the key principles and functions of human resource management.

CO 2: Analyze methods for effective recruitment, selection, and employee onboarding training.

CO 3: To apply strategies for performance management, training, and development.

CO 4: Evaluate HR practices related to employee relations, compensation, and organizational culture.

Major Core Subject: Service Sector Management

Course Outcomes

CO 1: Understand the unique characteristics and challenges of managing service-oriented businesses.

CO 2: Analyze service quality models and techniques for improving customer satisfaction.

CO 3: Apply strategies for IT service design, delivery, and innovation to enhance operational efficiency.

CO 4: Evaluate service sector performance metrics and develop strategies for growth and competitive advantage.

Major Core Subject: Cooperation & Rural Development

Course Outcomes

CO 1: Understand the structure and functions of cooperatives in India and their role in rural development.

CO 2: Analyze policies and programs related to rural development and their impact on economic and social progress.

CO 3: Apply principles of cooperative management and rural development to enhance community participation and resource utilization.

CO 4: Evaluate the effectiveness of rural development initiatives and cooperative strategies in addressing rural challenges and improving livelihoods.

Elective Subject A: Agricultural Economics

Course Outcomes

CO 1: Understand the principles and scope of agricultural economics in the Indian context.

CO 2: To analyze agricultural policies, market structures, and their impact on agricultural productivity and rural development.

CO 3: Apply economic theories to evaluate agricultural production, pricing, and resource allocation.

CO 4: Assess the challenges and opportunities in Govt. policies in agriculture, including sustainability, technology adoption, and market access.

Elective Subject B: Indian Banking System

Course Outcomes

CO 1: Understand the structure, functions, and regulatory framework of the Indian banking system.

CO 2: To analyze the role of various types of banks, including commercial, cooperative, and development banks, in the Indian economy.

CO 3: Apply concepts related to banking operations and financial products.

CO 4: Evaluate the impact of banking reforms, technology advancements, and regulatory changes on the Indian banking sector.

Research Project

MCOM (Business Administration) SEM IV COURSE OUTCOMES

Major Core Subject: Entrepreneurship Development

Course Outcomes

CO 1: Understand the fundamentals of entrepreneurship and the role of entrepreneurs in the Indian economy.

CO 2: Analyze the challenges and opportunities faced by entrepreneurs in India, including regulatory and financial aspects.

CO 3: Apply strategies for starting and managing new ventures, including business planning, funding, and innovation.

CO 4: Evaluate government policies such as Start-up India and support systems designed to foster entrepreneurship.

Major Core Subject: Corporate Social Responsibility

Course Outcomes

CO 1: Understand the principles and importance of corporate social responsibility (CSR) in modern business practices.

CO 2: Analyze CSR strategies and frameworks, and their impact on stakeholder relationships and corporate reputation.

CO 3: Apply corporate governance principles to ensure effective oversight, accountability, and ethical conduct in CSR initiatives.

CO 4: Evaluate the integration of CSR into corporate governance structures and assess its influence on organizational transparency and compliance.

Major Core Subject: Marketing Management

Course Outcomes

CO 1: Understand the core fundamental concepts and strategies of marketing management.

CO 2: Analyze market segmentation, targeting, and positioning to develop effective marketing plans.

CO 3: Apply marketing techniques and tools to design and implement successful marketing campaigns.

CO 4: Evaluate marketing performance and adapt strategies based on market trends and consumer feedback.

Elective Subject A: International Marketing

Course Outcomes

CO 1: Understand the fundamental concepts of international marketing and the dynamics of global markets.

CO 2: Analyze international market entry strategies, including adaptation versus standardization approaches.

CO 3: Apply international marketing techniques such as franchising, FDI to develop and implement effective global marketing plans.

CO 4: Evaluate the impact of cultural, economic, and regulatory factors on international marketing strategies along with role international banking.

Elective Subject B: Insurance Procedures & Practices

Course Outcomes

CO 1: Understand the fundamental principles and regulations governing the Indian insurance industry.

CO 2: Analyze various types of insurance products and their applications in personal and commercial contexts.

CO 3: Apply IRDA procedures for policy issuance, claims processing, and risk management.

CO 4: Evaluate industry practices, including regulatory compliance and customer service standards, to enhance insurance operations.

Research Project

M. Com (Computer Management) as per NEP 2020

PROGRAMME OUTCOMES (POs)

PSO1. The students will be able to transform complex Business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies.

PSO2. Design and development of solutions by applying computer skills, knowledge of quantitative techniques in computer and management applications in practice.

POS3.The student will be able to develop a product or process by applying knowledge of programming, web, database, human computer interaction and networking and security tools.

PSO4.The student will be able to contribute to research in their chosen field, function and communicate effectively, to perform both individually and in multi-disciplinary team.

PSO5.The student will be able to make decisions related to work that demonstrate intellectual curiosity, a commitment to lifelong learning in students and understanding of being an ethical computing professional with societal and environmental concerns.

Course Outcomes

M. Com (Computer Management) Semester-I

Paper-I

Course code- Python

LO1. Given information on different types of programming languages so that Students will be able to **distinguish** the high-level language and **understand** the benefits of using python for development of application program.

LO2. Given information on control statements of program student will be able to understand the program flow and will able to **implement** control statement and functions for effective code design.

LO3 Given information on advance program structure Students will able to **interpret** multiple data structured elements while developing real life application for business solution.

LO4 Given information on basics of object oriented programming will be able **create and use** different types of objects, classes and File handling operations for redesigning the program structure.

Paper-II Course code-Cloud Computing

LO1. Given information on basics of Cloud Computing, students will be able to **understand** the different paradigms, also able to **define** fundamental terminologies of Cloud Computing.

LO2. Given information on architecture and deployment model, students will be able to **remember** structure and the use of Cloud management with its types.

LO3. Given information on various cloud service models students will be able to **differentiate** and illustrate its Virtualization.

LO4. Given information on service providers, students will be able to describe the cloud service Model and understand the importance of its service providers.

Paper-III

Course code-Advanced Java

LO1. Given information on basics of the use of connectivity(JDBC) and networking which helps for client server application, students will be able to **create** management applications practices emphasized for network based client server application

LO2. Given information is used for creation of enterprise edition work with servlet's and session tracking mechanism; students will be able to **develop** the solution for human computer interaction.

LO3. Given information on event handling and Java Server Pages, students will be able to **design** and **create** the web by using action tags with the help of JSP API

LO4. Given information on Extensions and Standard Tags library students will be able to Apply advance Tags in their web pages and able to **design** and develop the application by using technologies.

M. Com (Computer Management) Semester-II

Paper-I

Course code-ASP.Net

LO1. Given information on **development** and **deployment** cycles of enterprise applications so that Students will be able to understand the ASP.Net frame work to and enhance the web page with the combination of advance web designing tools(CSS3,HTML5) build distributed enterprise application.

LO2. Given information to **understand** server controls like secure protocols and also **examine** the entered data on the web page which helps to handle Master page with cookies.

LO3. Given information to **access** the backend (database) with suitable connectivity controls and **deploy** a secure client server in real life application with customized web page like secure web access methods.

LO4. Given information will **deploy** the web application by application interface control and WCF services so that Students will be able to **create** dynamic web applications using a combination of client-side(JavaScript, HTML, XML, WML) and server-side technologies(ASP.NET, ADO.NET)

Paper-II Course Code-Information Security & Cyber Law

LO1. Given information on information security and threats students will be able to **understand** structure, mechanics and evolution of various crime threats and able to remember the security mechanism.

LO2. Given the information on various security mechanism, students will be able to **define** various security tools used to protect the data.

LO3. Given the information on IT Act 2000 students will be able to **illustrate** different terminologies used bin IT Act 2000.

LO4. Given information on various tools used in security, students will be able to **recognize** which tool is best suited in fields.

Paper-III Course code-Android Programming

LO1. Given information on basics interface and architecture student will be able to develop and grasp of the Androids OS Architecture (using various android views and view groups).

LO2. Given the information on designing different themes for android applications which help students will be to understand the handling the data by using external devices and also for the networking communication application.

LO3. Given the information will help the students to understand the geographical locations on the maps with the help of geo-coding and reverse geo-coding as well as application will enrich with use of graphics and animation.

LO4. Given information will help students to familiarize with android development by selecting tools for including device emulator, profiling tools and IDE as well as Identity, analyse data storage, retrieval use preference, files and content providers .

M. Com (Computer Management) Semester-III

Paper – I Course Code – Advance Database Management System

LO1. Given the information on various types of Database Management System, database architecture and normalization techniques student will be able to **identify** the features provided by database systems and will also be able to **execute** its scope for organization and also able to **Create** Database for organization.

LO2. Given the information on Structured Query Language, student will be able to **analyze** an information storage problem and **derive** an information model expressed in the form of entity relation diagram.

LO3. Analyzing the different types of schema's student will be able to **use** and **implement** the processing through DBMS, to **understand** the role of database administrator and manager.

LO4. Describe the concept of data warehousing and data mining so that student will be able to **formulate** the techniques for analytical processing, so that students will able to handle the backup and recovery techniques.

LO1. Given the information on Management Information System in a digital firm, Business Performance, and Security challenges for E-enterprises student will be able to **describe** the role of information technology / system and **analyse** its impact on firm.

LO2.Given the information on Decision making, Business Intelligence and system engineering student will be able to **understand** the decision making concepts and its importance in business and **Analyse** and **design** the model accordingly.

LO3. Given the information on various processes of MIS, Strategic Design and Business process reengineering student will be able to **Ascertain** and **determines** the class and requirement of information and Implement the Business strategies for various Business Process Re-engineering using different models.

LO4. Given the information on application areas, Support System and ERP Concepts of Management information system, student will be able to **interpret** how to use information technology to solve business problems and **illustrate** the impact of information systems in society.

Paper – III Course Code – Data Communication & Computer Network

LO1. Given information on data communication concepts students will be able to **understand** the basic terminologies used in computer network and able to **categorize** networks according to size, purpose, design issues, and transmission technologies.

LO2 .Given information on components and media used in networking students will be able to **analyze** network performance parameters and transmission impairments.

LO3. Given information on different layers, issues and error control, students will be able to **apply** error control methods including error detection and correction, and sliding windows flow control protocols.

LO4 .Given information on algorithms, diagram subnets, students will be able to **describe** network layer services and its scheduling.

M. Com (Computer Management) Semester –IV

Paper – I

Course Name – Software Engineering

LO1 Given information on basic knowledge of SW engineering methods and practices, Students will able to **find** the appropriate application to ensure good quality software.

LO2 Given information of software engineering tools such that Students will able to specify and **analyse** the function oriented software-designing techniques for adopting recent and advance system.

LO3 Given information on the concept of Unified modelling language, design and developed the software application, so that students will **reanalysing** the existing system for better performance.

LO4 Given information to analyse the existing system, with computer added software techniques so that students will able to **reuse** and **maintenance** the software code for creating real application.

Paper – II Course Name – Mobile Computing

LO1 Given information on mobile computing students will comprehend the fundamentals and advancements in mobile computing, techniques and technology

LO2 Given information on mobile telecommunication system students will be able to understand the architecture, protocols, and operational aspects of cellular systems

LO3. Given information on mobile network layer students will comprehend the protocols and dynamics of mobile network layers, encompassing Mobile IP, routing, and security.

LO4 Given information on mobile transport and application, layer students will understand the characteristics and development environments of major mobile device operating systems their specific constraints and requirements for application development.

Paper – III Course Name – Big Data & Hadoop

LO1 Given information on the basic structure and framework of big data & hadoop Student will able to **apply** computer skills to **design** the database.

LO2 Given information on advance database technologies Student will able to **compare** and **create** database applications used as advance reporting tool.

LO3 Given information on various platforms suitable for database application Student will able to **use** and **implement** advance programming tools while creating robust database application.

LO4 Given information on advance database management system by using Hive, pig, as well as various report tools Students will able to **process** the data for generating reports from the database.

Paper – IV Course Name – Web with Word Press

LO1 Given information on basics of word press student will gain a comprehensive understanding of WordPress setting up a local development environment, installing WordPress, and creating and managing site content using themes and plugins.

LO2 Given information on design and customisation student will be able to explore, install, and customize WordPress themes and templates.

LO3 Given information on content management student will be able to create and manage posts and pages, organizing content, handling media files, and extending site functionality with essential and custom plugins.

LO4 Given information on advance features and SEO student will be able to learn to set up and manage an online store.

KAMLA NEHRU MAHAVIDYALAYA, NAGPUR DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE SESSION 2023 – 2024 (NEP) Course Work Outcome

MASTER OF LIBRARY AND INFORMATION SCIENCE (CBCS) SEMESTER-I

Major

MLI 1T1: FOUNDATIONS OF LIBRARY AND INFORMATION SCIENCE

Learning Outcomes:

1. Develop an understanding of the purpose, role, and significance of libraries in society, including the various types of libraries, their nature, objectives, and services.

2. Acquire knowledge about the historical development of libraries, with a particular focus on the Indian context.

3. Analyze the overall library landscape, especially within the Indian context, and cultivate a greater appreciation for the profession's role in society.

4. Foster the capability to evaluate the present state and emerging trends in the field of Library and Information Science.

5. Explore information policies, professional associations, and legislation relevant to the field, thereby gaining awareness of their importance and impact.

Major

MLI 1T2: KNOWLEDGE ORGANIZATION

Learning Outcomes:

1. Understanding the concept of knowledge, its types, and the structure of universe of knowledge

2. Creating the role of library classification in knowledge organization.

3. To create the ability to apply the knowledge organization in the internet era.

4. Understanding the role of cataloguing in retrieving library material and the need for standardization in cataloguing.

5. To remember the fundamentals of cataloguing and catalogue construction, schemes of classification, and standards for bibliographic record and communication.

Mandatory

MLI 1T3 : RESEARCH METHODOLOGY

Learning Outcomes:

1. Understanding the concept, meaning, need, purpose and value of research in Library and Information Science.

2. Applying the process of research in Library and Information Science.

3. Evaluating the qualitative and quantitative aspects of research and to interpret and infer based on data/information.

4. Recognize current trends in LIS research

Elective Papers (Choose Any One)

MLI 1T4: INFORMATION SOURCES AND SERVICES (Elective-1)

Learning Outcomes:

1. Develop a foundational understanding of the core concept of reference and information sources and services, including their identification, differentiation, and organization.

2. Analyse various categories of reference and information sources, supported by relevant examples.

3. Cultivate the ability to critically evaluate reference sources and reference services, enhancing the skills necessary for effective assessment.

4. Acquire knowledge about information sources and services in the digital and internet era, recognizing the unique characteristics and opportunities they present.

PRACTICAL -

1. MLIIL1: Classification Practice (Part-I)

Learning Outcomes:

- 1. To develop the skill of classification Techniques for the APUPA arrangement of books.
- 2. Applying the knowledge of classification with hands on experience.

2. MLI 1L2: Cataloguing Practice (Part-I)

Learning Outcomes:

1. To develop the skill of cataloguing Techniques for the APUPA arrangement of books.

2. Applying the knowledge of cataloguing with hands on experience.

3. MLI 1L3: Information Sources Practice

Learning Outcomes:

- 1. To develop the skill of information sources Techniques for the APUPA arrangement of books.
- 2. Applying the knowledge of information sources with hands on experience.

MASTER OF LIBRARY AND INFORMATION SCIENCE (CBCS) SEMESTER-II

Major

MLI 2T1: MANAGEMENT OF LIBRARY AND INFORMATION CENTRES

Learning Outcomes:

1. Foster the growth of individuals as information and communication managers who contribute to society.

2. Comprehend the fundamental principles of management as they pertain to library administration and the organization of a library.

3. Emphasize the importance of "Quality" in library procedures and services, as well as familiarize oneself with various housekeeping operations in a library.

4. Apply the concepts of planning, marketing, human resource development, and both budgetary and non-budgetary control in libraries and information centres. Gain an understanding of how to monitor and evaluate library performance.

Major

MLI 2T2: APPLICATIONS OF ICT IN LIBRARIES AND INFORMATION CENTRES

Learning Outcomes:

1. Develop a solid grasp of the basics of computers, including their hardware components, software, input and output devices, memory, and the classification of computers.

2. Analyse the various applications of computers and information technology in libraries, recognizing their significance and impact.

3. Cultivate the skills necessary to design automated systems in libraries and information centres, enabling efficient and effective operations.

4. Gain an understanding of the internet, internet protocols, search engines, and other emerging ICT (Information and Communication Technology) trends relevant to libraries.

Elective Papers (Choose Any One)

MLI 2T3: INFORMATION AND COMMUNICATION (Elective-1)

Learning Outcomes:

1. Develop a comprehensive understanding of the definition, origins, scope,

and objectives of Information Science.

2. Recognize the crucial role of libraries in the communication process, appreciating their significance as facilitators of information exchange.

3. Foster an understanding of the concept of an information society and its implications, including the study of the Right to Information Act, National Knowledge Commission, and NEP 2020 (National Education Policy 2020).

4. Analyse the significance and role of professional library associations, exploring their contributions to the field.

5. Gain insight into the concept of the Information Industry, the commodification of information, and the marketing of information products and services.

6. Evaluate contemporary trends in Library and Information Science, keeping up-to-date with the latest developments and advancements in the field.

PRACTICALS

MLI 2L1: Classification Practice (Part-II)

Learning Outcomes:

1. To develop the skill of classification Techniques for the APUPA arrangement of books.

2. Applying the knowledge of classification with hands on experience.

MLI 2L2: Cataloguing Practice (Part-II)

Learning Outcomes:

- 1. To develop the skill of cataloguing Techniques for the APUPA arrangement of books.
- 2. Applying the knowledge of cataloguing with hands on experience.

MLI2L3: Information Technology Applications to Libraries

Learning Outcomes:

1. To develop the skill of IT Techniques for the libraries.

2. Applying the knowledge of IT with hands on experience.

3. Creating searching abilities and formulation of search strategies for effective information retrieval through network.

MLI 2L4: Internship & Academic Library Visit

Learning Outcomes:

1. To understand the actual working of library practically

2. To gain the knowledge of hands on experience on library automation software.

MASTER OF LIBRARY AND INFORMATION SCIENCE (CBCS) SEMESTER-III

Major

MLI 3T1: INFORMATION STORAGE, RETRIEVAL AND BIBLIOGRAPHICAL CONTROL

Learning Outcomes:

1. Identify the components of an information storage and retrieval system.

- 2. Familiarize with different models and structures of an IR system.
- 3. Understand the theoretical foundations of various IR methods.
- 4. Compare information retrieval systems at national and international levels.
- 5. Examine factors influencing the performance of an IR system.
- 6. Stay updated with current research in the field and on the web.

Major

MLI 3T2: MODERN LIBRARIES

Learning Outcomes:

1. Conceptualize modern libraries in the context of implementing sophisticated web-based tools and techniques.

- 2. Create digital libraries with using various open-source software's.
- 3. Understand and evaluate digital libraries in relation to digital copyright.
- 4. Analyse various institutional repository initiatives at national and international levels.

(Disciplinary Elective Course) (Choose anyone)

MLI 3T3: INDUSTRIAL INFORMATION SYSTEM (Elective-3)

Learning Outcomes:

1. Assess information technology solutions required for product and system development in an industrial environment.

2. Utilize these solutions effectively and apply them to industrial systems.

- 3. Understand the importance of industrial libraries.
- 4. Explore the impact of resource sharing and networking in industrial information systems.
- 5. Evaluate modern trends in industrial information systems.
- 6. Analyse the present scenario at national and international levels.

PRACTICALS

MLI3L1: Information Technology Applications to Libraries

Learning Outcomes:

1. To develop the ability to handle the Information Communication Technology for the libraries.

2. Implementing the Knowledge of Information Communication Technology practically.

3. Developing the searching ability and formulation of search strategies for information searching through advanced Techniques.

MLI3L2: Research Project (Minor)

Learning Outcomes:

1. Students will be able to gain the knowledge of selection to topic, searching literature, research design

- 2. Students will understand how to collect data, coding of data, analyze and interpretation.
- 3. Students will to gain knowledge of drafting report and representation of report.

4. To gain the knowledge of problem identification, review literature and various Research Methodologies.

5. To gain the knowledge of tools and techniques of data collection and hypotheses formulations.

6. To develop the ability to data analysing, report writing and Hypotheses testing.

MLI3L3: Soft skills for Library Professionals

Learning Outcomes:

1. To enhance the ability, critical thinking and problem-solving skills independently.

- 2. To develop the skilful librarians for modern libraries and library profession.
- 3. To create the techno-savvy smart information managers as per market needs

MASTER OF LIBRARY AND INFORMATION SCIENCE (CBCS) SEMESTER-IV

Major

MLI 4T1: SYSTEM ANALYSIS AND BIBLIOMETRICS

Learning Outcomes:

1. Understand systems concepts, system analysis, and system design.

2. Comprehend the role of hardware and software in realizing organizational objectives and automation.

3. Explore the role of systems analysts and software development firms.

4. Recognize the role of system analysis and design in various systems development stages.

Major

MLI 4T2: EMERGING TRENDS IN LIBRARY & INFORMATION CENTRES

Learning Outcomes:

1. Enhance professional competence and skills.

2. Utilize ICT tools for effective user services.

3. Produce need-based instructional materials for users.

4. Explore the application of machine learning, artificial intelligence, and other technologies in serving the library community.

5. Identify new roles for LIS professionals to adapt to the changing LIS environment.

Major

MLI 4T3: INTELLECTUAL PROPERTY RIGHTS

Learning Outcomes:

1. Gain an understanding of intellectual property laws in India.

2. Explore the concept of intellectual property and intellectual property rights at national and international levels.

3. Study copyright, including ownership, assignment, infringement, and remedies

(Disciplinary Elective Course) (Choose anyone)

MLI 4T4: BIOTECHNOLOGY INFORMATION SYSTEM (Elective-2)

Learning Outcomes:

- 1. Understand the concepts and importance of biotechnological libraries in India.
- 2. Analyse biotechnological information systems at national and international levels.
- 3. Develop skills to organize various sources in biotechnological information systems.

PRACTICAL

MLI4L1: Project Work (Major)

Learning Outcomes:

1. To gain the knowledge of problem identification, review literature and various Research Methodologies.

- 2. To gain the knowledge of tools and techniques of data collection and hypotheses formulations.
- 3. To develop the ability to data analysing, report writing and Hypotheses testing.

Kamla Nehru Mahavidyalay Department Of Library & Information Science CBCS: Master of Library and Information Science (MLISc.) <u>2023-24</u>

Program Outcomes

Name of Program: Master of Library and Information Science

Targeted Graduate Attributes: Disciplinary Knowledge, Critical Thinking, Problem Solving, Analytical Reasoning, Communication Skills, Teamwork, Moral and Ethical Awareness

SLINO.

Program Outcomes

1	The student will be able to develop an aptitude to manifest wide and
	expensive knowledge in the field of library and information science.
2	The student will be able to apply the knowledge, skills and values that
	are fundamental to professional competence in the field of Library and
	information services and research
3	The student will be able to think critically and analytically for solving
	various problems pertaining to the management of Library and
	information centres
4	The student will be able to locate, organized, understand, evaluate and
	analyze information using modern and digital technology.
5	The student will be able to express thoughts and ideas effectively in
	writing and orally, communicates with others using appropriate media,
	confidently share one's views and express herself/himself.
6	The student will be able to work effectively and respectfully with
	diverse teams, facilitate cooperative and coordinated work culture.
7	The student will be able to embrace moral and ethical values in all the
	work and avoid unethical behavior such as fabrication, falsification or
	misrepresentation of data or committing plagiarism and will be able to
	understand and follows intellectual property rights.

Kamla Nehru Mahavidyalay Nagpur Department of Library & Information Science MLISc Specific Program Outcome 2023-24

- 1. Understanding the purpose, role and importance of libraries in society, various types of libraries, their nature, objectives and services.
- 2. To remember the fundamentals of cataloguing and catalogue construction and Creating the role of library classification in knowledge organization
- 3. To understand the basic concept of reference and information service and its organization.
- 4. To develop the skill of classification & Cataloguing Techniques for the APUPA arrangement of books.
- 5. Applying the knowledge of IT with hands on experience
- 6. Evaluating the modern trends in Library and Information Science.

- 7. Evaluating the information needs and to know the factors affecting information organization.
- 8. Remembering the process of System Analysis, System Design and Development.
- 9. Creating the ability to design need based information consolidation products for the stakeholders
- 10. Creating an ability to evaluate and formulation of search strategy for information retrieval through online IPR database.

B.A. SOCIOLOGY

Program Outcomes -

To make the students understand the nature of sociology and its nexus with other disciplines. -

To make the students understand the recent concept surfacing in the studies of sociologist and social scientists. –

To equip young minds to understand the sociological perspective so as to enhance sociological understanding of the problem in hand. -

To understand social stratification and social structure, changing nature of social institutions related social dynamics and social problems of

Indian society. - To build the knowledge base and apply it to the different facets of society.

- To examine different sociological concepts and social institutions like gender, religion, caste, class, education and family. –

To make use of sociological concepts in understanding social problems and role of human being in society. –

To sustain the interest of the students in term of making them capable of fitting into the job market.

- To develop a multi-disciplinary interest and a broad perspective among the students.

Course Outcomes –

To understand the importance of Sociology and its relation with other social sciences. -

To understand the recent concept surfacing in the studies of sociologist and social scientist. -

To understand the sociological perspective so as to enhance sociological understanding of the problem in hand. -

To understand the social stratification, social structure, changing nature of social institutions, related social dynamics and social problems of Indian society. -

To understand the various sociological thoughts of founding fathers of Sociology and its relevance to the current scenario. –

To understand the meaning, needs and importance of social control. - To understand effect and importance of various sources of social change. -

To understand the various component of Indian society. -

To understand the various important element and functions of social structure. -

To understand the role of religion, family and education in the society. -

To understand the pattern of social deviance in different societies and measures to control them. -

To understand various concepts such as Law, Society, Community, Association, Institution, Organization and other basic concepts of Sociology.

M.A. Sociology Course Outcome, Program Outcome

Program Outcomes of Sociology

- To enhance the logical and analytical skill to understand the social issues and problems.
- To inculcate research culture among the students
- To contribute subject knowledge to nurture creativity, research and development.
- To provide basic and advanced theoretical as well as methodological knowledge of sociology for application.
- This course has also aim to enhance the skills, capabilities and employment opportunities of the students.

Program Educational Objectives

- The Post Graduate Programme in Sociology is designed to provide advanced sociological knowledge, perspectives and skills to wide cross sections of the learners.
- This course is designed to provide basic and advanced theoretical as well as methodological knowledge of sociology for application.
- This course has also aim to enhance the skills, capabilities and employment opportunities of the students in educational, research institutions and NGOs.
- This course has aim to make student rational, logical and critical and to develop their analytical skill of the social issues and events.
- To enhance the scientific knowledge and attitude about the society.
- To develop and in-built the capacity of the students to communicate effectively and use of sociological knowledge for better society.

Program Outcomes

On successful completion of this program, students would be able to:

- The sociological knowledge provides students scientific outlooks and attitudes to understand the human behavior, social issues and phenomena.
- Acquiring sociological knowledge in the forms of theories and methods would make students good social scientists.
- The sociological knowledge would help to make students, critical and logical.

- After studying this course, students would be also able to qualify the UPSC, MPSC/ UGCNET/JRF/ and other examination of Social Welfare Departments.
- Students would be able to get employment opportunities in the Teaching, Research and NGOs and Private sectors.

Course Objectives

- The Post Graduate Programme in Sociology is designed to provide advanced sociological knowledge, perspectives and skills to wide cross sections of the learners.
- The major aim of this pattern is to provide opportunities to the students going beyond the boundaries of their own discipline and think over the interdisciplinary and multidisciplinary approaches and students have choice to select different types of electives as per his or her choice.
- Thus, this course is designed to provide basic and advanced theoretical as well as methodological knowledge of sociology for application.
- This course has also aim to enhance the skills, capabilities and employment opportunities of the students. This course is designed such way which makes the students able to apply sociological knowledge in the different fields such as; teaching, research, NGOs, Public Policies, social sectors and developmental sectors.
- Thus, this course has not only to provide employment opportunities to the students but also to make them rational, logical and critical. The aim of this programme is not only theoretically oriented to the students alone, but also make them able to analyze the social reality by using scientific knowledge of sociology to analyze the social issues with different theoretical and methodological perspectives.
- Thus, this course has aim to make student rational, logical and critical about the social events and contemporary issues and to enhance the skills and capabilities of the students.

Course Outcomes:

- This course is designed such way that offers multiple opportunities to the learners. After completion of this course, student would get job opportunities in the fields of teachings, research, NGOs, corporate sectors and Governmental sectors.
- This course also helps students to qualify the NET/JRF/SET and Competitive Exams such as MPSC/UPSC/Social Welfare Departments and others etc.
- This course has also relevance in the field of production of knowledge about the human behavior, social issues and phenomena.
- This production of knowledge would be helpful to the policy makers, developmental organizations, researchers, social activist and social scientists.
- This course makes differentiate between common sense knowledge and sociological knowledge and this course provides scientific vocabulary, terms, concepts, methods and perspectives in accessing the social issues, events and problems.
- The sociological knowledge would be useful in the social engineering and social reconstruction of the social structure. The sociology not only provides employment opportunities alone, but also makes the students rational, critical and logical.

Kamla Nehru Mahavidyalaya Department Of History B. A.

PROGRAMME OUTCOME

1. To enable student to understand the background of our historic past, religion, customs, institutions, administration and so on.

2. To make students aware about the Social, Political, Religious and Economic conditions of the people.

3. To make them understand the history of world with comparative approach.

4. To develop analytical sense among the students to understand relationship between the past and the present times and bringing its contemporary relevance.

5. Emphasis on developing critical thinking in historical writing, discussion and interaction among students.

SEMESTER - I

MM-1 (4 Credit)

HISIMM1-HISTORY OF INDIA: (FROM EARLIEST TIMES TO 550 A.D.)

Course Outcome:

- C01. The student will learn literary sources of Ancient India.
- CO2. The students will acquire knowledge on Vedic period and rise of Jainism and Buddhism culture.
- CO3. The student will know the rise of Empires.
- CO4. The student will learn administration, and know about art and architecture.

MM-2(2 Credit)- IDEA OF BHARAT

Course Outcome:

- CO1. The student will understand the concept of Bharatvarsha, its geography and Akhand Bharat.
- CO2. The student will know their cultural roots and ancient Indian philosophy.

Open Elective OE1 (4 Credits) HIS1OE1-INDIAN FREEDOM STRUGGLE: 1885 to 1947 AD

Course Outcome:

CO1. The student will understand the making of Indian constitution and to know the salient features of Indian constitution.

CO2. The student will know the new economic initiatives propagated in independent India.

CO3. The student will critically analyse the international relations of India with its neighbours. CO4. The students will be enabled to analyse development of democratic culture in the princely states.

VSC-1 (2 Credit)

HIS1VSC1- ARCHIVES IN INDIA

Course Outcome:

CO1. The student will understand the meaning and definition of Archive. The student will know the history, uses and importance of Archive.

CO2. The students will come to know the best Museums in India. The student will also know the various government & private Archives.

SEC-1 (2 Credit)

HIS1SEC1-ARCHIVAL SOURCES AND TECHNIQUES

Course Outcomes:

CO1-Develop the ability to preserve and create access for a historic record.

CO2-Recognize the importance of archives in history writing.

VALUE EDUCATION COURSE (VEC) HIS1VEC1-ENVIRONMENTAL STUDIES

COURSE OUTCOMES:

At the end of the course, students shall be able to:

1. Explain the basics of Environmental Science and Atmospheric Science along-with the components of Environment

2. Explicate the importance of Environmental Education.

3. Elucidate the fundamentals of atmospheric science including formation, depletion and effects of ozone layer and acid rain on environment.

4. Describe the various physical and chemical characteristics and properties of Water and Soil

- 5. Understand the Ecology and its allied branches
- 6. Comprehend about Population and Community Ecology
- 7. Study the changes in Population by understanding the concept of Population ecology

MINOR-IKS (2 Credit) HISLIKS1-ANCIENT KNOWLEDGE SYSTEM

Course Outcome:

COI. The students will understand the Ancient Indian wisdom preserved in ancient texts. The

students will know important ethical ideas contained in the Indian traditions.

CO2. The student will be able to investigate certain epistemic ideas in those texts. The learner will able to relate the nature and human relations

M. A.

Program Outcomes (POs):

The Outcomes of M.A (History) program have been classified into Domain specific and Domain independent outcomes as listed in 6(a) and 6(b):

(a) Domain Specific:

1. A critical understanding of historiographical developments from the inception to professionalization of the discipline and acquainting students with trends and basic theories in the subject.

2. A comprehensive understanding of the epistemological and methodological distinctiveness of history as a discipline and construe ability to reflect on the interrelations with other disciplines thus encouraging innovative research in developing historical models.

3. Development of conceptual understanding of the subject that enables the students to critically evaluate scholarly writings in history and extend their ability for analytical thinking. Criticism, evaluation and interpretation.

4. Enable students to understand the finer nuances of the subject and enhance ability. motivation and interest to pursue further research in History and prepare them for competitive exams and subject related professional skills.

5. An ability to understand how emergence of new ideologies in world reflect historical transitions and understand changing political, economic, social policies in different time and space that make today's world.

6. An ability to understand various concepts, thoughts, movements and shifts of power that

Shape history till the present and enlighten students on the crises period and peace processes

That sustained civilizations.

7. An overview of history of the Nation and the World and introduction to landmark events, their analysis and contemporary relevance.

8. Develop research skills and guide to students on the expertise on a particular school of thought/area in historical studies.

(b) Domain Independent:

1. An ability to reflect in-depth historical knowledge and demonstrate awareness of current historical debates.

2. The ability to present structured thoughts and make quality presentation of ideas that show

Updated knowledge of the subject History and develop eminent style of writing.

3. The ability to use a wide range of bibliographical tools (on paper and in electronic form) to locate and critically evaluate appropriate sources and materials for the study of history.

4. The ability to locate and critically evaluate archival, printed or electronic source-material for the investigation of specific historical questions.

5. The ability to formulate and sustain independent historical arguments, to provide appropriate evidence to support them, including quantitative and visual evidence, and to reference the sources of the evidence used.

6. The ability to develop professional skills, inform on specializations in the subject, aid better

Understanding of contemporary society, caution on specific events by study of past events,

Careful predictions, and bring awareness of social responsibility.

7. The ability to identify an area of historical enquiry and engage in independent historical research.

8. The ability to engage in independent and extended research whin a defined area of historical enquiry, to construct and sustain a logical and where possible original argument based on information collected, and to present the findings in research project form, with a recognized historical apparatus.

MHRIT01 HISTORIOGRAPHY

Course Outcome:

COI. The student will understand the meaning; allied and auxiliary subject of history.

CO2. The student will understand Western Historiography.

CO3. The student will come to know the Indian Historiography.

CO4. The student will learn the different approaches to History

MHRIT02

ANCIENT INDIA-I (From earliest time to 12th century)

Course Outcomes:

COI. The student will be able to develop critical understanding.

CO2. The student will understand the various dimensions shaping human life.

CO3. The student will possess a clear insight into the chronological progression of ancient India.

CO4. The student will learn Ancient Polity of whole India.

MHR1T03 MEDIEVAL INDIA-I (1206-1757)

Course Outcome: The student shall be able to

C01. Critically evaluate the literary sources of history.

CO2. Examine the policies and reforms of the Sultans and Mughals.

C03. Know important institutions like revenue, governance, and policies.

CO4. Debate on various theories relating to the decline of kingdoms.

MHR1T04

ARCHIVAL STUDIES

Course Outcome:

CO1. The student will understand the meaning and definition of Archive as well as its history, uses and importance of Archive.

CO2. The students will come to know the best Museums in India and also know the various government & private depositaries.

MHRIT07C

CULTURAL HISTORY OF MAHARASHTRA

Course Outcome: The student will

COI. Understand the diversity of the human existence as influenced by geographical location, race, ethnicity, cultural traditions etc.

CO2. Understand the regional history within a broad framework of Indian culture.

CO3. Understand the different facets of Marathi culture.

CO4. Critically examine the major social, cultural, literary aspects shaping Maharashtra.

MHRIT08

RESEARCH METHODOLOGY

Course Outcome- Students will be able to

COI. The learner will understand the meaning; definition and type of research.

CO2. The student will learn preliminary operations.

CO3. The student will learn the synthetic operations.

CO4. To know the challenges of writing objective history, uses and ethics of history writing.

MHR2T01

ANCIENT INDIA-II (From earliest time to 12th Century)

Course Outcome: The student will able to

CO1. Know the origin and growth of Varna and Caste system.

CO2. To take an overview of the development of art and architecture in India.

CO3. Get familiar with the literary trends during the period.

CO4. Understand the growth of agriculture, industries, trade and urbanization.

MHR2T02

MEDIEVAL INDIA-II (1206-1757)

Course Outcome: The student will able

COL. To understand the origin and growth of Society.

CO2. To take an overview of the development of art and architecture in Medieval India

CO3. To get familiar with the literary trends during the period.

CO4. To understand the growth of agriculture, industries, trade and urbanation.

MHR2T03

INDIA UNDER COMPANY'S RULE (1757-1857)

Course Outcome:

CO1. The students will understand foundation and consolidation of English East India Company rule in India.

CO2. The learner will know the early British policy towards Indian states.

CO3. The student will know the various Acts that brought Indian Colonisation.

CO4. The student will critically examine the social and educational influence of western thinking on Indian orients.

MHR2T04 MUSEOLOGY

Course Outcome:

CO1. The course will equip the student with practical knowledge in Museology along with theory. CO2. The course will enhance the awareness about heritage preservation and its institutional methods.

MHR1T07C

TRENDS AND THEORIES OF HISTORY

Course Outcome:

CO1. The student will know a general outline about how history is written in modern and contemporary times.

CO2. The students will know the various established theories in history subject.

CO3. The student will examine the ideologies of renowned historians of the times.

CO4. The students will understand the various facets in history writing.

MHR3T01

HISTORY OF THE MARATHAS-I (1630-1707)

Course Outcome:

CO1. The student will know the regional history of the country.

CO2. The students will know the various sources of Maratha history.

CO3. It will enable the students to understand the inspirations behind the foundation of the Maratha rule.

CO4. The students will examine the information about the leadership, the socio-economic life, expeditions by the Marathas and the administration of the Marathas.

MHR3T02

INDIA UNDER BRITISH RULE (1858-1947)

Course Outcome:

CO1. The student will able to evaluate the consolidation of British rule in India.

CO2. The student will analyse social-religious reform movements in Modern India.

CO3. The students will come to know about the beginning of nationalism, its growth and different nationalistic ideologies.

CO4. The students will be introduced to the different movements under different leaders

MHR3T03 MODERN WORLD (1900-1950)

Course Outcome:

CO1. The students will be aware of the broader currents which defined the coming of the idea of the modernism.

CO2. The student will know the transitional changes and how world map was redefined.

CO3. The students will understand the rise and development of various ideological structures in world, how it affected international relations and consequential effects.

CO4. The learner will know the world between two world wars.

MHR3T04

CONSTITUTIONAL HISTORY OF INDIA (1773-1947)

Course Outcome:

CO1. The students will understand the constitutional development of India during the British rule. CO2. The students will understand the development of democratic institutions in India.

MHR3T05A

HISTORY OF MEDIEVAL VIDARBHA (1200-1857)

Course Outcome:

COI. The students will know the Gond rule in Vidarbbha.

CO2. The student will examine the various political transitions in Vidarbha.

CO3. The students will come know about the regional political history of the Vidarbha region.

CO4. The learner will know how Nagpur was transferred to British.

MHR4T01 HISTORY OF THE MARATHAS-II (1707-1818)

Course Outcome-

CO1. The student will be able to analyse the administrative system of the Marathas to acquaint the student with the nature of Maratha polity.

CO2. The student will understand the basic components of the Maratha administrative structure.

CO3. The students will know the role played by the Marathas in the context of India, the changing nature of Maratha State.

CO4. The students will understand and analyse the policy of Maratha expansionism under Peshwas and its significance in various spheres.

MHR4T02

INDIA AFTER INDEPENDENCE (1948-2010)

Course Outcome-

CO1. The student will understand the making of Indian constitution and to know the salient features of Indian constitution.

CO2. The student will know the new economic initiatives propagated in independent India.

CO3. The student will critically analyse the International relations of India with its neighbours. CO4. he Students will be enabled to analyse development of democratic culture in the princely states.

MHR4T03

CONTEMPORARY WORLD (1951TO 2010)

Course Outcome:

CO1. The will know the post-World Wars period and understand contemporary world from the historical perspective.

CO2. The student will understand contemporary political transformations, redefining of world map and international dependency.

CO3. The learner will know the transition of changing world.

CO4. The student will critically examine the world politics in contemporary perspective. MHR4T04A HISTORY OF MODERN VIDARBHA (1854-1960)

Course Outcome-

COL. The student will know the regional history of Vidarbha in modern times.

CO2. The students will understand the contribution of Vidarbha to main scale national movements.

CO3. The student will able to examine the development of political and socio-cultural consciousness and emergence and contribution of local organizations.

CO4. The learner will know the various social welfare activities in Vidarbha.

Kamla Nehru Mahavidyalaya Department Of Economics B. A.

PROGRAMME OUTCOME

- 01. Students learn about economic theories and how the basic microeconomic and macroeconomic systems work.
- 02. Students develop the ability to analyze and interpret information, and to solve problems using quantitative and qualitative methods.
- 03. Students learn how to conduct research studies and use econometric tools and methods.
- 04. Students learn how to present arguments convincingly in writing and orally.
- 05. Students learn to assess situations, identify economic problems, and offer solutions.
- 06. Students develop skills that can help them get jobs in accounting, insurance, finance, marketing, and management.
- 07. Students learn how to apply their knowledge of economics to create entrepreneurial initiatives.

Course Outcomes

SEMESTER - I

MM-1 (4 Credit)

Paper I: BECO101MJL - INTRODUCTORY MICROECONOMICS

Course Outcomes:

C01. Use various basic concepts of microeconomics.

CO2. Understand consumer behaviour in different situations and measurement of elasticity and its determination.

CO3. Know different factors of production, production function, law of variable proportion, price and output determination in its determinants.

CO4. Use their knowledge to understand different theories of distribution.

MM-2 (2 Credit)

Paper II: BECO102MJM -RETAIL MARKETING

Course Outcome:

CO1. Equip the students with overall idea and role of Retail marketing.

CO2. The student will get the knowledge and the strategies used in retail marketing.

Open Elective OE1: (4 Credits) BECO125OE - ENTREPRENEURIAL DEVELOPMENT

Course Outcome:

CO1. The student will be able to start own business as Entrepreneur.

- CO2. Enabling the students to find career opportunities in business.
- CO3. To enable the students to gain knowledge and skills needed to run a business successfully.

VSC-1 (2 Credit)

BECO129VEC- PERSONAL FINANCE AND PLANNING

Course Outcome:

- CO1. The student will examine the meaning and appreciate the relevance of financial planning.
- CO2. The students will be able to demonstrate the concept of investment planning and its methods.
- CO3. Examine the scope and ways of personal tax planning.
- CO4. Analyse insurance planning and its relevance.
- CO5. Interpret insight into retirement planning and its relevance.

SEC-1 (2 Credit)

BECO133SEC - STOCK MARKET

Course Outcomes (Cos): After going through the course, learners will be able to:

- 1. Identify the stock market functions
- 2. Identify the practical applicability of different investment tools
- 3. Integrate the analytical skill for the techniques of fundamental and technical analysis
- 4. Develop the analytical skills needed to make informed investment decisions in the stock market

IKS-1 (2 Credit)

BECO136IKS - INDIAN KNOWLEDGE SYSTEM

Course Outcomes (COs): At the end of the course the student should be able to:

CO 1. This course will enlighten the students about the ancient fundamentals about political and economic constituents, which will frame out a basic land of understanding the modern trends. This will help them to understand the upcoming needs in the area of policy making for suates at national and international level.

CO2. This treatise deals with the science of Governance, so it projects out all the dimensions needed to be understood by students about the present socio-economic and political rules and regulations of the state

M.A. I (ECONOMICS)

Program Outcomes (POs):

The Outcomes of M.A (Economics) programme :

- 01. Students learn to explain and understand economic and business phenomena using economic theories and concepts.
- 02. Students learn to use statistical and mathematical methods to solve problems using qualitative and quantitative reasoning.
- 03. Students learn about economic theories and concepts, Including fiscal and monetary policies.
- 04. Students learn to publish research findings and innovations in conferences, seminars, and journals.
- 05. Students learn to become responsible citizens
- 06. Students learn to understand economic issues and apply economics.
- 07. Students learn to apply economic theories and concepts to solve problems.

(CREDIT - 4) MICROECONOMICS THEORY - 1

Learning Outcomes:

1. The knowledge of consumer behavior enables the students in recommending rational buying decisions and will also help to suggest firm to design suitable marketing strategies. 2. Students get equipped with knowledge and skill in suggesting effective decisions under uncertain market situations

3. Students understand the importance of time application and household management

4. The students will develop the skill for converting technical information into economic relationship between input and output.

5. The students will develop skill to identify homogeneity level in production function and be able to estimate production function and shall be able to estimate level of output.

6. The course will help students to give recommendations on allocation of quantities of different factors of production to achieve economies of production and use of learning curves

7. The students will learn about maintain existence of firm in markets and shall be able to recommend to same profit.

(Credit – 4) MACROECONOMICS THEORY - I

Learning Outcomes : -

1. To demonstrate a good understanding of macro-economic principles, concepts and theories.

2. To demonstrate an understanding of implications of Macro-economic decisions and shall be able to form model macro-economic theory.

3. To integrate theoretical knowledge to analyse trade-off in deployment of resources to alternate ends and the implications them on society.

4. To make predictions on the happening of different economic things in the different phases of trade cycle and shall be able to derive suggestions

(CREDIT – 4) STATISTICS FOR ECONOMICS

Learning Outcomes:

1. The students will develop the knowledge to interpret the complex statistical tables in graphs given in publish media

2. The regressions technique shall enable students to predict the future values up to certain time limits.

3. The statistical help in compression and confirm the sample results into population result.

(CREDIT – 2) ECONOMY OF MAHARASHTRA

Course Outcome:

- 1. The students get acquainted with all varied sectors of the economy of Maharashtra.
- 2. Awareness on challenges to be faced and measures to tackle the challenges.

(CREDIT -4) AGRICULTURAL ECONOMICS

Course Outcome:

1. The knowledge of nature of Indian Agriculture will enable students to derive suggestions for planning farm operations, for acquiring farm inputs and marketing strategy for selling farm output.

2. It will develop the skills to students for under technical information into economic relation between inputs and output in agriculture.

3. The students will enable to understand the economies of the production and marketing of agricultural products and shall be enable to draw suggestion for practical use.

4. It will help the students to analyse the implication on agricultural policy of government and shall enable them to make practical suggestions for improvement in traditional Indian agriculture.

5. Students are equipped with the knowledge of the emergence of different organizational structures of the farming in India.

6. It will develop the skill in students for analyzing business phenomenon in agriculture in terms of transactions and cost savings.

(CREDIT – 4)

RESEARCH METHODOLOGY

Course Outcome- Students will be able to

1. To help students to develop a thorough understanding of the fundamental theoretical ideas about the research.

2. To help students develop a thorough understanding of the issues involved in research designs and

data collection. To help students to understand the importance of sampling methods and analysis of data.

3. To train students in learning how to test hypothesis using computer applications and acquire skills for writing research reports.

MA II (ECONOMICS)

(CREDIT – 4)

ECONOMICS OF DEVELOPMENT AND GROWTH - I

Course Outcome: The student will able to

1. To equip the students with theoretical and empirical material for increasing their capability to understand the basic problems faced by developing societies.

2. To develop conceptual clarity on various aspects of development within student community.

3. To enable students to identify the strategic factors in development of less developed countries (LDC's).

4. To make students capable to evolve new strategies for achieving sustainable development and inclusive growth

(CREDIT – 4)

INTERNATIONAL TRADE – TRADE AND POLICY

Course Outcome: The student will able

- 1. To provide a deep understanding about the broad principles and theories which tend to govern the free flow of trade in goods, services and capital-both short term and long- term at global level.
- 2. To prepare the students about the relevance and limitations of the principles, studied in different modules of this syllabus.
- 3. To enable the students to examine the impact of trade policies followed both at national and international level.

(CREDIT – 4) ECONOMICS OF MONEY AND BANKING

Course Outcome:

1. Understand nature, function and significance of the money

2. Understand the determination of the value of the money and functioning of the money market.

3. Understand the role and function of commercial banks and its importance in the economic development.

4. Understand the functioning and impact of the monetary policy in the development of county.

(CREDIT – 2) ECONOMICS OF SUSTAINABLE DEVELOPMENT

Course Outcome:

1. Understand Economics of Sustainable Development

2. Understand the various aspects of Sustainable Development.

3. Understand the availability of natural resources and its importance in the economic development.

4. Understand the strategy and approaches of sustainable development.

(CREDIT – 4) ECONOMICS OF ENVIRONMENT

Course Outcome:

1. Influence of environment on the economy including the quality of manpower. Arouse their feelings to make cleaner environment so as to achieve harmonious development.

2. Understand that environmental problem is not the problem of a single country or region but a global problem and issue,

3. Demonstrate the scientific management of waste materials; realize the role and importance of individuals to keep the environment clean.

4. Explain linkages between Economic development, Population and Environment, Poverty and the Environment.

5. Acquire quantitative skills by working with the mathematical models that show how to allocate environmental goods optimally.
KAMLA NEHRU MAHAVIDALAYA

DEPARTMENT MARATHI

Programme: M. A. Marathi

Programme outcomes: By the end of the programme, the student will gain knowledge about the following-

1) Theories and approaches to language studies and literature studies 2) Marathi literature: study of development and genesis of literature

- 3) Study of various branches and types of ancient, medieval and early literature.
- 4) Prose literature: Ancient, medieval and modern
- 5) Genres in Marathi literature, Study of various trends in and influences on literary study.
- 6) Literary history, Linguistics and applied linguistics of Marathi
- 7) The impact of Western literature on Marathi literature and the study of western literary theories
- 8) New developments in literary studies, Literature for the media, Study of writing for films

Course Outcomes

Course: History of medieval Marathi literature

1) Study of Literature: Concept and format, Introduction to Marathi Language and Maharashtra Culture, Inspiration of medieval literature.

- 2) Study of the formation and forms of medieval Marathi verse.
- 3) Nature and evolution of Saint literature, its social role
- 4) Nature and characteristics of Pandit literature, inspirations behind Panditi literature.
- 5) Study of Shahiri literature, history and nature of Shahiri literature
- 6) Bhakti literature: forms and features

Course: Sahityashastra

- 1) Literature: Elements of Literature & Components of literature
- 2) Indian Literature
- 3) Sound Ideas: Nature and Intuition idea.

4) B. C. Mardherkars thesis and his thesis on the subject of the principal of gratification of ShrechandraMuktibodh

Course: The Marathi Drama

- 1) Emergence and history of the drama
- 2) Literary and aesthetic values in the drama; structure, formats and types of the drama
- 3) Socio-cultural, political and financial problems of that era.

Course: Special Author: V. V. Shirwadkar

- 1) Place and role of the author in Marathi literary history
- 2) Relationship between the author's personality and creation
- 3) The author's contributions during Independence period and post independence period
- 5) Poetry, drama and novels of V. V. Shirvadkar: vision and approaches

Course: History of Modern Marathi Literature

1) Cultural background of modern Marathi literature; impact of political, social, transcendental literature during British raj 2) Enlightenment and awakening in Maharashtra during early British rule, Emergence of Modern Literature.

3) Study of history and contribution of Marathi periodicals, emergence of the essay 4) Literary and critical theories: Gandhianism, Marxism, Ambedkarism, Feminism, rural and tribal

literatures

Course: Modern Marathi Poetry

1) Creation and Nature modern Principles of modern Marathi poerty Expression

- 2) Harpale Shrey Keshosut
- 3) Fulrani- author by Kusumagraj & R. S. Walimbe

Course: Conceptual Literature element

- 1) Concept and Elemental role behind conceptual literature
- 2) Century Socioculture movement

3) Awakening Induction (Mahatma Fule) Author L. R. Nasirabadkar 4) Dr. Babasaheb Ambedkar Exiled India Author Ratnakar Ganvir

Anil AvchatNarendra Dabholkar

Course: Sahityasamiksha

1) Review concept and format summery of the objective and objectives of the subject of the review

2) Method of review of their diversification

3) Method of reviewing idea

Course: Medieval Marathi Poetry

1) Marathi Poetry interpretation of medieval Marathi poetry

2) Dnyaneshwari-Adhyay-1

3) Tukaramdarshan-Author G.B.Sardar

4) Manache Shlok-Saint Ramdas

Course: MarathichaBhasikAbhyas

1) Early Marathi Language origin of Marathi language

2) Language of speech of Marathi Geographical studies of Marathi standard language

3) Linguistic specialties of Marathi boli in vidharbhanagpuriwaradi and zadiboli

Course: Rural Literature

- 1) The concept of rural literature and the concept of homogeneity
- 2) Sources of rural literature, the village and literature
- 3) Interrelationship of rural literary and socio-cultural movements.
- 4) Linguistic forms of rural literature.
- 5) Representative Marathi rural literary works.

Course: Dalit Ambedkarwadisahitya

- 1) Creation of Literature : Inspired and influenced by Ambedkar
- 2) Dalit and Ambedkarist Movements
- 3) Dalit sentiments of Ambedkari literature and AmbedkariAvtar
- 4) The Dalit historical component of different types of literature in Ambedkari literature

Course: Medieval and Modern Marathi Prose

- 1) Prose Literature: Practice of concept and form, The origin of medieval forms.
- 2) The present form of medieval invention: Practice of historical prose types
- 3) Trends and types in modern and medieval Marathi prose
- 4) Marathi prose during independence struggle, its role in social reforms

Course: Linguistics

1) The nature and notions of language; characteristic features of language

2) Introduction to Linguistics Studies, Descriptive linguistics, theoretical postulates of Bloomfield.) Study of the postulates of Noam Chomsky, Linguistic relativism: Comprehension and practice.

3 4) Syntax and the study of semantics.

5) Studies in Sociology of Language; oral languages; Social Relations and Language

6) Language and class; Language and gender; Language and geographical regionalities

Corse: Folk Literature

1) Components - Folklore concept

2) Folklore Inspiration and purpose folklore of social cultural and biological origin other folklore

Content of folklore focus and importance of folklore

3) Expressions of Marathi folk art

Corse: Staggerate feminist literature

1) the concept of pivotal literature, conceptual from of feminist literature

2) Male female comparison Tarabai Shinde

3) Historical composition of various feminist literature

Kamla Nehru Mahavidyalaya Department Of Political Science

PROGRAMME OUTCOME

- 1. To enable students understanding basic ideas, concepts, approaches perspectives, democratic and other systems.
- 2. To make aware student about new ideas and trends in political science.
- **3.** To understand and interrelate the subject with other subjects.
- 4. To develop analytical sense in the students.
- 5. To make students update with changing national and global scenario.
- 6. To inculcate the Constitutional values, make them responsible and sensitized citizens.

SEMESTER - I

MM-1(4 Credit) - Political Theory

Course Outcome:

C01. Understand the nature and relevance of Political Theory

CO2. Understand different concepts i.e. power, authority, rights, liberty, equality and justice

CO3. Understand present situation of concepts

MM-2(2 Credit) – Modern Indian Political Thought-I

Course Outcome:

CO1. Students can know the political ideas, views and concerns of leading Indian thinkers.

CO2. Students can know about Indian political and social thinkers

CO3. . Students take positive inspiration from the thoughts of great thinkers.

CO4. Students will be able for a better understanding about the fundamental concepts of Indian Political thought.

VSC (2 Credit)

UGPO1VSC1- Political Reporting-1

Course Outcome:

CO1. Understand the need, scope and concepts in Political Reporting.

CO2. Identify various sources for Political Reporting.

CO3. Provide an overview of interpreting the political phenomena from the gross roots level to the Parliament.

CO4. Develop insights and enhance skills in a professional manner in the age of mass media.

CO5. Learn skills related to reporting, enlarge job opportunities and make it as a career.

MINOR-IKS (2 Credit) -UGO1IKS1-Indian Cinema and Politics

Course Outcome:

CO1. The students will be able to analyse political concepts and events, public policy, political behaviour and visions of politics and society as presented in films.

CO2. The students can understand how the use of power in general and use of political power in particular is connected with their day to day life.

CO3.It will help develop critical thinking the skills of description, appreciation and interpretation and promote independent thinking.

M.A. ENGLISH PROGRAM OUTCOMES

MA Semester I

English Poetry from Chaucer to the Eighteenth Century

Paper Objectives

1. To introduce England from the late Fourteenth century to endeavoring of blending the spirit of the Renaissance and the Reformation

2. To give an account of the development of poetry and its different forms.

3. To focus on the beginning of English poetry and seek its development in Restoration, Neoclassical, and Pre-romantic period

Learning Outcomes

Students will be able to understand

1. Different forms of poetry developed taking English poetry on the path of modernization

2. The reasons behind the undercurrents of upheavals prevalent leading to the generation of a Progressive

English Drama from the Elizabethan Age to Restoration Period

Paper Objectives

1. To introduce students to the golden age of English drama and its evolution from the Middle Ages.

2. To introduce students to English Comedy from the early times of its origin

3. to make students understand how is comedy technically different from other forms of drama.

Learning Outcomes

1. The students will come to know about the beginning of English drama and what role did the initial contributors play to give this well-developed English theatre.

2. Students will acquire knowledge about the different Genres of drama during this period.

3. The learners will be able to critically examine the form of drama adopted by the predecessors who provided a solid foundation to great Shakespearean dramas and the dramatists who followed in the Restoration Age.

The English Novel I

Paper Objectives

1. To explore the development and evolution of the English novel.

2. To explore the various narrative techniques and literary devices used by British novelists.

3. To appreciate the various socio-economic, political, and cultural events as represented in the novel of the period.

Learning Outcomes

1. The students will be able to understand the socio-economic c, cultural context of the English novels during this period and demonstrate a deep understanding of the cra.

2. The students will be able to identify formal aspects and narrative techniques employed by the novelists and their impact on the reader's experience.

3. The students will be able to situate English novels within the broader literary and cultural landscape, understanding theirs influence on subsequent generations of writers.

The English Prose I

Paper Objectives

1. To cover the origins of English prose and to understand its growth through medieval romances.

2. The understand the transformation of the genre into 'life Writing'.

3. Students will be able to identify different types of narrative techniques and assess mastery in aspects of plot, setting, themes, and characters.

Learning Outcomes

1. Students will be able to Understand different varieties of prose

2. Students will gain the ability to discuss imaginary constructs dealing with many contemporary Travel Literature

Semester II

English Poetry from the Romantic to Postmodern Age

Paper Objectives

1. To introduce the students to the tone and themes of romantic poetry and the note of individuality in Victorian Poetry.

2. To comprehend to students the development of trends in modern English poetry and to discuss modernism and its reflections in the poetry

3. To understand the socio-political changes of the twentieth century

Learning Outcomes

1. Students will develop an understanding of poetic genius through the identification of different forms of Romantic poetry.

2. Students will be able to trace rationality and reason in Victorian poetry.

3. Students will understand the realities that exist in the modern age through their depiction in modern poetry and inculcate humanitarian and democratic feelings in their personalities.

Modern English Drama

Paper Objectives

1. To study dramatists coming in the category of social reformers effectively epitomized through Shavian views and 'Angry Young Man' characters

2. To understand the attempts to revive the poetic drama

3. To bring our implementation of philosophical thoughts which were Absurd and Existential

Learning Outcomes

 Students will learn about moral and social order in contemporary life through bold criticism projected in plays of dramatists who vociferously protested prevalent social institutions
Students will come to know about dramatists who were shaping the force of Poetic drama in the literature

The English Novel II

Paper Objectives

1. To explore the development of the English novel in the first half of the 20th century.

2. To assess the impact of British novels on the literary world and broader society.

3. To explore the various narrative techniques and literary devices employed by the British novelists of the period.

Learning Outcomes

1. The students will be able to appreciate the contribution of the canonical authors works of the period.

2. The students will be able to identify the different aspects of the novels of the period, especially the

narrative techniques employed by the novelists of the period.

3. The students will able to engage in thoughtful discussions and written analyses of the fiction of the time that showcases their critical thinking and ability to express themselves.

American Literature

Paper Objectives

1. To familiarized students with American Transcendentalism which explains the importance of Oneness of All

2. To make the students able to examine the resurgence of American consciousness centered upon the everlasting battle between good and evil

3. To make Students understand the issues of individualism and its monomania.

Learning Outcomes

1. Students will find themselves familiar with Post-War America passing through ups and downs which

are rather universal features of human society

2. The students will be confident to deal with the issues of the relationship between the common man and the corporate world

3. The students through the conflicting issues present in the mind of the central protagonist will learn to support the stance of symbiotic relationship between human being and society.

Semester III

Indian Writing in English

Paper Objectives

1. To help the students to get acquainted with various features and peculiarities of Indian societies,

cultures, and languages.

2. To make grasp and appreciate different literary techniques used by Indian Litterateurs.

3. To help the students in discerning the historical, socio-cultural, and political impacts of various events on the regional literature of India.

Learning Outcomes

 By the end of this paper, the students will develop an understanding of Indian Writings in English and regional literatures in India translated into English as part of Indian Literatures.
The students will get acquainted with a familiar cultural world, and view the prevalence of several cultural worlds within an apparently uniform culture through the study of literary masterpieces.

3. The students will understand and appreciate the major literary trends in the literature of their land and will explore them from the perspective of projects and research.

Literary Criticism and Theory I

Paper Objectives

1. To explain the concept of tragedy and the structure of play established by the great thinkers 2. To bring out the role of emotions in the practice of writing, oratory, and reading

3. To introduce the students to the theory of poetry as established by the great Romantics and Victorians.

Learning Outcomes

1. The students will be able to understand the concept of tragedy and the structure of play propounded by great thinkers.

2. The students will be able to understand the ideas of critical theories established by the Romantics and the Victorians

3. The students will understand the relationship between the text, the author, and the reader.

Cultural Studies

Paper Objectives

1. To help learners to understand major theories and key concepts of Cultural Studies and its interdisciplinary approaches to 'high' and 'popular' culture.

2. To enable learners to apply critical concepts of this interdisciplinary field by studying texts and practices that highlight the complex relationship between culture, art, films, gender and society.

3. To develop higher order thinking in learners by training them to apply theory to everyday situations and practices.

Learning Outcomes

1. Students will learn the key terms, scope and practices of Cultural Studies as a field of inquiry and learn

the methods of interdisciplinary application.

2. Students will develop critical thinking by examining the diverse and sometimes contested meanings about nation, identity, race, gender and class in various cultural sites.

3. Students will be able to analyze and synthesize cultural knowledge with everyday life and practices.

The English Essay

Paper Objectives

1. To provide brief introduction to the prominent English essayists. 2. To introduce students to important literary developments and trends in essay writing.

3. To study major representative essayists in particular periods and trace its gradual evaluation in the history of English literature.

Learning Outcomes: Students will be able to-

1. Understand different varieties of essays.

2. Understand that it is a difficult art and can be acquired only through constant practice.

3. understand how discussion, argumentation, and reasoning along with simplicity are the important traits of a good essay writing.

The History of Language I

Paper Objectives

1. This paper will provide learners with a foundation in the history and development of the English Language to the present.

2. The study of this paper will help learners anticipate how the countless generations have welded and polished the English language and have added the richness to the language.

3. The study of this paper will help the learners understand the contribution of Great writers to the development of the language.

Learning Outcomes

1. The students will be in a position to evaluate the main influences that combined to push Old English

forward as a distinct language.

2. The students can categorize the ways in which cultural, social and historical differences through ages have influenced the development of Modern English and have added richness to the language.

3. The students will be in a position to acknowledge the contribution of great writers to the development of language.

Semester IV

Indian Diaspora Writings

Course Objectives

1. To enable students to understand the historical background of international migration.

2. To understand the linkages between international migration, diaspora, and transnationalism.

3. To establish how immigration, diaspora and transnationalism are studied in the context of Indian diaspora.

Learning Outcomes

1. The students will learn characteristic features of the diaspora writings such as quest for identity, uprooting and re-rooting, insider and outsider syndrome, nostalgia and nagging sense of guilt.

2. The learners will explore how Indian Diaspora writings has helped in establishing a strong network connecting the entire globe.

3. The commonality and inclusiveness of India will be seen from a new point of view.

Literary Criticism and Theory II

Paper Objectives

- 1. To present complex movements in contemporary critical discourses in simple lucid language.
- 2. To draw interdisciplinary approaches and trace cross currents in critical essays.
- 3. To introduce different theories and links between criticism and theory.

Learning Outcomes

- 1. The students will be able to understand the Deconstruction theory
- 2. The students will be able to understand Marxism and its impact on literature
- 3. The students will be able to understand the concept of "Orientalism"

Postcolonial Literature

Paper Objectives

1. To seek a direct correspondence between literary texts and dominant ideas in post-colonial period.

2. To explore new and emerging concerns in the field of postcolonial studies.

3. To explain increasing emphasis on globalization, multiculturalism and neo-colonial politics in contemporary postcolonial literature.

Learning outcomes

1. The students will have prescient information about ideas of literary texts, authors and movements in postcolonial times.

2. The students will understand the impact of Western cultural imperialism brought on by globalization.

3. The students will understand the postcolonial migration and the growth of migrant communities.

The History of Language II

Paper Objectives

1. The study of this paper will help the learners to understand the influence of foreign elements to the

growth and development of English Language.

2. The study of this paper will help the learners to understand the semantics of English language.

3. To help the learners understand the changes that has occurred in English grammar over the ages.

Learning Outcomes

1. The students will appreciate the remarkable ability of English language to form new words by borrowing new words from foreign languages. the semantics of English language and how the language has undergone

2. The students will learn changes in the meaning of the words along with the addition of new words in the process of development.

3. The students can assess the significant ways in which the language continues to evolve to meet the requirement of its users.

B.A. ENGLISH PROGRAM OUTCOMES

COURSE OBJECTIVES:

1. The English Language Major course aims to develop the learner' ability to comfortably use English language skills while listening, speaking, reading, and writing.

2. A systematic implementation of this course can develop the ability to write and speak good English in all situations.

3. The course will enhance the ability to develop speech and writing style and hone the student's ability to use the language tools for effective communication.

4. The course ensures exposure to the learners in good prose texts and poems and introduces the learners to value-based ideas.

5. The course will facilitate the students' enhancement of their language skills, especially in the areas of grammar and pronunciation.

COURSE OUTCOMES:

1. By the end of the course, the students can read and understand any text in English and effectively listen to the inputs given by the teacher in the classroom.

2. A successful delivery of this course can help the students imbibe the rules of language unconsciously and train them to deduce language structure and usage.

3. By the completion of this course, the student's ability to write paragraphs, essays, and letters will

be strengthened.

4. Students will decipher the mechanism of language and use it for success in competitive examinations and job-related speaking and writing tasks.

Ability Enhancement Course (Compulsory English)- Semester-I

Course Outcomes:

The students can interpret, summarize, describe, and narrate in English.

The students will learn comprehension, communication skills and collaboration.

The students will get practical exposure to language learning. lessons prescribed will help in moulding the character of the students.

Ability Enhancement Course (Compulsory English)- Semester- IV

Course Outcomes:

The students will improve in communication skills. They will get practical exposure to language learning.

The students will be encouraged to work in collaboration.

The students will get practical exposure to language learning

The lessons prescribed will help in moulding the character of the students

The students will develop critical thinking on various aspects of life

The students will master vocabulary-building strategies

English (Open Elective) First Semester

Course Outcomes

Learners will be motivated through the Life Sketches of successful sportspersons

Learners will understand the structure of sentences through prescribed grammar Learners will be able to draft an impressive application and resume for a job

Learners will develop confidence in grasping and understanding the English language and its usage

English (Open Elective) Second Semester

Course Outcomes

Learners will be able to apply the basics of the English language. Learners will be able to ascend towards more complex reading and comprehension.

There will be an enhancement in learner's vocabulary skills of the learners Learners will have improved drafting skills

English (Open Elective) Third Semester

Course Outcomes

Learners will be encouraged to nurture aspirations to be successful in their lives by finding a profession of their choice

Learners will develop consciousness for environmental preservation The learners will gain the ability to lift themselves through motivational texts.

English (Open Elective) Fourth Semester

Course Outcomes

Learners will be made aware of civic sense and inspired to inculcate compassion towards others There will be an improvement in learner's reading speed, presentation skills, and understanding of ethics, and values.

Learners will be introduced to the idea of 'Work is Worship' and realize the importance of hard work

Vocational Skill Course (VSC) Semester 1

Poetry - Literary Genre: An Introduction

Learning Objectives:

To teach the learners about English Poetry as a literary genre.

To enable the learners to know about different forms of English Poetry.

To teach the learners about the Origin and Development of English Prose.

Learning Outcomes:

The learners will learn about English Poetry as an art form.

The learners will get to know the different narrative techniques employed.

The course will help learners appreciate the application of different poetic devices.

Bachelor of Arts Vocational Skill Course (VSC Semester 2 Prose - Literary Genre: An Introduction

Learning Objectives:

To enable the learners of this course to know about English Prose as a literary genre. To enable the learners of this course to know about different forms of English Prose. To enable the learners of this course to know about the Origin and Development of English Prose.

Learning Outcomes:

The learners will get to know about English Prose as an art form. The learners will get to know the different narrative techniques employed. The course will help learners get jobs as editors, content writers.

Vocational Skill Course (VSC) Semester 3 Drama - Literary Genre: An Introduction

Learning Objectives:

To enable the learners to know about drama as a literary genre and its elements To teach learners about the Origin and Development of English Drama and Theatre.

Learning Outcomes:

The learners will get to know the different devices employed in drama. The course will help learners get jobs as actors, art consultants, arts administrators, arts educators, broadcast technicians, casting directors, and producers

Vocational Skill Course (VSC) Semester 5 Novel - Literary Genre: An Introduction

Course Objectives-

- 1. The students should learn about the types of novels, characters and plots.
- 2. The students should understand the concept of setting and themes.
- 3. The students should understand the importance of conflict and tone in literature.

Learning outcomes

- 1. The students will be able to distinguish between the different types of fiction.
- 2. The students will be able to classify characters and analyse plots.
- 3. The students will be able to identify settings and themes and determine conflict and tone.

Indian Knowledge System- Semester- I

Course Outcomes:

- 1. To facilitate the students with the concepts of Indian traditional knowledge
- 2. To make the students understand the importance of the roots of the Indian Knowledge System.

3. To acquaint students with the facets of traditional knowledge & their relevance in their to-day life.

4. To help students develop analytical skills and learn to approach knowledge from divperspectives with scholarly agility.

5. To promote all aspects of Indian Knowledge Systems for research and societal applicat 6. To foster interdisciplinary research resulting in a harmonious blend of various knowle systems as part of modern education.

Skill Enhancement Courses

Program Outcome

The course comprises of significant elements such as vocabulary enhancement, visual communication, dialogue writing, drafting advertisements and journalistic reports etc. and intends to train the students in tasks like professional documentation,

The program will strengthen the areas like vocabulary enrichment, drafting, and editing Program will develop fine nuances of journalistic skills, professional language skills, media skills for the digital age, etc.

This course will develop competence in professional writing among the learners and hone their basic life skills.

By the end of the program, the learner would have cultivated imaginative capacities as expected of a professional.

This program is planned to equip the learners with the required language skills which can eventually make them job ready.

Course Outcome

The learners will attain professional language skills and the ability to precisely use language. The course will extend an interactive and participative learning experience to the students. The course will act as a foundation for developing professionalism in terms of learners' use of language.

Skill Enhancement Course (English) Semester II

Course Outcome

By the end of this course, the undergraduate students will develop the basics required for technical communication and drafting skills at primary and advanced levels The course will help hone the learners' drafting skills and make them professionally efficient.

The learners will be able to draft personal and official letters and develop the skills to describe what they see.

Skill Enhancement Course (English) Semester IV

Course Outcome

The students will be able to understand the concepts of print media, social media, and digital journalism.

The learners will be encouraged to search for and understand the field of journalistic writing. The course will enhance the learner's language proficiency at the undergraduate level and develop writing skills using Journalistic English.

The students will inculcate professional LSRW from the perspective of journalism.

Department of Home-Economics

Programme Outcomes of Bachelor of Arts

Cognitive Skills: Our students, studying a combination of subjects offered by the institution develop a sharp consciousness of history, society, culture and the political legacy of our country. The cognitive skills acquired therefore, will help the students to develop outlook regarding contemporary society, local, national and international. The programme helps make our students aware of our sociological, cultural and religious diversity and harmony.

Employment Skills: Employability remains at the very core of the programme. Upon completion of the degree, our students will be employable in the fields of journalism, hospitality, law, advertisement, theatre, education, tourism, horticulture and various other industries. The programme emphasizes on developing reading, writing and comprehension skills which make the students fit and eligible for jobs in the government and non-government sectors.

Affective and Behavioural Values: Humanities play a great role in inculcating values in the students. Our students are highly aware of environment, hygiene, and other aspects of social responsibility.

Department of Home-Economics

Course Outcomes of Home-Economics-

- 1) Given the knowledge of field of Home- Economics and its contribution in Nation building. Students will be able to work in the field of Home-Economics.
- 2) Given the detailed information of family Resources the students will be able to prepare themselves in the field of FRM & its management.
- 3) Given the information about principles of Arts and Design students will be able to make use of Principles of Arts and design,
- 4) Given knowledge of Flower arrangements/ bouquets/ flower decorations students will able to prepare work with event management organizers and start their self-employment.
- 5) Given the knowledge of House planning Kitchen plans students will able to prepared house plans kitchen plans.

- 6) After completion of this course learners will earn by skills of kitchen garden.
- 7) By given the knowledge of Indian traditional embroidery the learns will develop interest in learning traditional embroideries of India.

Kamla Nehru Mahavidyalay INDIAN MUSIC B.A. MUSIC <u>2024-25</u> <u>COURSE OUTCOMES</u> <u>B.A. MUSIC MAJOR</u>

<u>B.A.1st Year</u> <u>Name of Program:</u> B.A. Semester-1 Practical (INDIAN MUSIC)

- 1) Students will be able to perform Alankars
- 2) Students will be able to perform Sargam Geet & Lakshan Geet
- 3) Students will be able to perform Chhota Khyal /Raja Khanikar& outline of Bada Khyal & Masitkhani gat
- 4) Students will be able to perform express prescribed Taals & Taali
- 5) Students will be able to perform light songs based on the prescribed Ragas.
- 6) Students will get knowledge about relation of Classical Music & Light Music.

Name of Program: B.A. Semester-1 Theory (INDIAN MUSIC)

- 1) Students will get basic knowledge of Swar, Alankar, Rag & Tal.
- 2) Students will get basic knowledge of terminologies regarding classical Music.
- 3) Students will get basic knowledge of Tanpura, Tabla, Harmonium & Electric Tanpura.
- 4) Students will get be able to read & write notation of compositions in Pt Bhatkhande system.

Name of Program: B.A. Semester-2 Practical (INDIAN MUSIC)

- 1) Students will be able to perform Alankars
- 2) Students will be able to perform Sargam Geet & Lakshan Geet
- 3) Students will be able to perform Chhota Khyal /Raja Khanikar& outline of Bada Khyal & Masitkhani gat
- 4) Students will be able to perform express prescribed Taals & Taali
- 5) Students will be able to perform light songs based on the prescribed Ragas.
- 6) Students will get knowledge about relation of Classical Music & Light Music.

Name of Program: B.A. Semester-2 Theory (INDIAN MUSIC)

- 1) Students will get knowledge of Thaat system.
- 2) Students will get knowledge of prescribed Rag & Taals.
- 3) Students will get knowledge of terminology regarding Music
- 4) Students will get acquainted with the contribution of great Musicians.

B.A.2nd Year

Name of Program: B.A. Semester-3 Practical (INDIAN MUSIC)

- 1) Students will be able to perform Alankars in Vikrut Swaras.
- 2) Students will be able to perform Sargam Geet & Lakshan Geet.
- 3) Students will be able to perform Chhota Khyal /Raja Khanikar& outline of Bada Khyal & Masitkhani gat
- 4) Students will be able to express prescribed Taals on Taali with Dugun & Chougun.
- 5) Students will be able to perform light songs based on the prescribed Ragas.
- Students will get knowledge about relation of Classical Music & Light Music.

Name of Program: B.A. Semester-3 Theory (INDIAN MUSIC)

- 1) Students will get basic knowledge of Raga & notation of Songs.
- 2) Students will get knowledge of Europian Musical scales.
- 3) Students will get acquainted with the contribution of great musicians.
- 4) Students will get acquainted with the songs from different provinces of India.

Name of Program: B.A. Semester-4 Practical (INDIAN MUSIC)

- 1) Students will be able to perform Alankars
- 2) Students will be able to perform Sargam Geet & Lakshan Geet
- 3) Students will be able to perform Chhota Khyal /Raja Khanikar& outline of Bada Khyal & Masitkhani gat
- 4) Students will be able to perform express prescribed Taals on Taali
- 5) Students will be able to perform light songs based on the prescribed Ragas.
- 6) Students will get knowledge about relation of Classical Music & Light Music.

Name of Program: B.A. Semester-4 Theory (INDIAN MUSIC)

- 1) Students will get basic knowledge of Raga & notation of Songs.
- 2) Students will get knowledge of Europian Musical scales.
- 3) Students will get acquainted with the contribution of great musicians.

4) Students will get acquainted with the folk songs from different provinces of India

B.A. MUSIC MINOR

Name of Program: B.A. Semester-2 Practical (INDIAN MUSIC)

- 1) Students will be able to perform Alankars
- 2) Students will be able to perform Sargam Geet & Lakshan Geet

3) Students will be able to perform Chhota Khyal /Raja Khanikar& outline of Bada Khyal & Masitkhani gat

4) Students will be able to perform express prescribed Taals & Taali

Name of Program: B.A. Semester-2 Theory (INDIAN MUSIC)

- 1) Students will get knowledge of Thaat system.
- 2) Students will get knowledge of prescribed Rag & Taals.
- 3) Students will get knowledge of terminology regarding Music
- 4) Students will get acquainted with the contribution of great Musicians.

Name of Program: B.A. Semester-3 Practical (INDIAN MUSIC)

1) Students will be able to perform Alankars in Vikrut Swaras.

2) Students will be able to perform Sargam Geet & Lakshan Geet.

3) Students will be able to perform Chhota Khyal /Raja Khanikar& outline of Bada Khyal & Masitkhani gat

4) Students will be able to express prescribed Taals on Taali with Dugun & Chougun.

Name of Program: B.A. Semester-3 Theory (INDIAN MUSIC)

- 1) Students will get basic knowledge of Raga & notation of Songs.
- 2) Students will get knowledge of Europian Musical scales.

3) Students will get acquainted with the contribution of great musicians.

4) Students will get acquainted with the folk songs from different province of India

Name of Program: B.A. Semester-4 Practical (INDIAN MUSIC)

- 1) Students will be able to perform Alankars
- 2) Students will be able to perform Sargam Geet & Lakshan Geet
- 3) Students will be able to perform Chhota Khyal /Raja Khanikar& outline of Bada Khyal & Masitkhani gat

4) Students will be able to perform express prescribed Taals on Taali

Name of Program: B.A. Semester-4 Theory (INDIAN MUSIC)

- 1) Students will get basic knowledge of Raga & notation of Songs.
- 2) Students will get knowledge of Europian Musical scales.

3) Students will get acquainted with the contribution of great musicians.

4) Students will get acquainted with the folk songs from different provinces of India

Kamla Nehru Mahavidyalay INDIAN MUSIC B.A. MUSIC <u>2024-25</u> <u>PROGRAM OUTCOMES</u>

- 1) To prepare the participants/beneficiaries for effective learning music
- 2) To enable participants listening, reading, singing skills.
- 3) To develop skills to sing and performing the participants.
- 4) To provide personality development training through singing role play, group presentation, etc.

M.C.A. (Master in Computer Applications) (2Years) (CBCS)

PROGRAMME OUTCOMES (POs)

POI Computational Knowledge: The students will be able to apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualisation of computing models from defined problems and requirements

PO2 Problem Analysis: The students will be able to think critically for Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines

PO3 Design /Development of Solutions: The students will be able to design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

PO4 Conduct Investigations of Complex Computing Problems: The students will be able to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions, maintenance and its implementation

PO5 Modern Tool Usage: The students will be able to create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.

PO6 Professional Ethics: The students will be able to understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice.

PO7 Project management and finance: The students will be able to demonstrate knowledge and understanding of the computing and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Course Outcomes (COs)

M.C.A. - Semester I

Course Name: Advanced Java Programming

CO1 Facilitates in understanding the concepts of object oriented programming. Skill Enhancing through concepts like multithreading, abstraction , platform independence.

CO2 Effective to implement platform independence, Applet programming.

CO3 JDBC Architecture and RMI programming

CO4 Design Programs for JAVA Beans and Servlets.

Course Name: Data Communication and Network

CO1 To understand and master the fundamentals of data communications through the knowledge of data transmission concepts, media used for data communication

CO2 To know the different layer of OSI reference model

CO3 To know the different network security algorithms

CO4 To know the intrusion detection techniques and Authentication.

Course Name: Open source Web Programming using PHP

CO1 To become familiar with client server architecture and able to develop a web application using various technologies.

CO2 To understand and develop a web-based application using a framework concept CO3 To gain the skills and project-based experience needed for entry into web application and development careers

CO4 Web page development using PHP

Course Name: Advanced DBMS and Administration

CO1 Can explore efficient method for handling multiple types of data

CO2 Have a detailed view of handling paralleland distributed database

CO3 Ability to normalize the database & understand the internal data structure

CO4 Deep visualization of realistic data into physical structure

Course Name: Software Engineering

CO1 To Get detailed knowledge of role of software in daily basis

CO2 Student will be identifying different models and find out the best

CO3 Test the developed software for high performance and maintainability

CO4 Study the software measure parameters for software quality

Course Name:1P1 Practical-1

CO1 Design and program stand-alone Java Applications

CO2 Useful in designing web and desktop applications

CO3 Analyse And Setup Protocol Designing Issues For Communication Networks

CO4 Web development using PHP

Course Name:1P2 Practical-2

CO1 Facilitates in creation of Data Structures and effective management of Database

CO2 Ability to normalize the database & understand the internal data structure

CO3 To implement Software prototyping for better software development

CO4 To acquire skills to think about problems and solution using appropriate method.

M.C.A. - Semester II

Course Name:C# and ASP .NET

CO1 To study simple C# program structure

CO2 To write C# program for classes, arrays, struct, array of objects

CO3 To understand ASP.NET structure

CO4 Error handling, Component based programming

Course Name: Cloud Computing

CO1 To become familiar with Cloud Computing and its ecosystem and learn basics of virtualization and its importance.

CO2 To evaluate in-depth analysis of Cloud Computing capabilities and give technical overview of Cloud Programming and Services.

CO3 To understand security issues in cloud computing and exposed to Ubiquitous Cloud and Internet of Things

CO4 To understand emerging trends in cloud computing.

Course Name: Computer Graphics

CO1 Provides user interfaces, data visualization, television commercials, motion pictures

CO2 Hardware devices and algorithms which are necessary for improving the effectiveness, realism, and speed of picture generation

CO3 Three dimensional graphic algorithm are incorporated in various streams to better simulate complex interactions

CO4 3-d transformations, b-spline surfaces, curves, and hidden surfaces can be explored

Course Name: CE1-1 (Elective) Computer Architecture and Organization

CO1 To explore the fundamentals of Computer Architecture and Organization

CO2 To understand the design of control unit

CO3 To study the concepts of memory organization and to understand various memory technologies

CO4 To understand the concepts of input output processing to interface various I/O devices.

Course Name: CE1-2 (Elective) Operation Research

CO1 Understand LPP

CO2 Understand Transportation problem, assignment problem

CO3 Study of decision theory, CPM/PERT

CO4 Study of queuing Theory

Course Name: CE1-3 (Elective) Cyber Forensics

CO1 Understand the different types of vulnerability scanning

CO2 To know the different network defence tools and web application tools

CO3 To understand the different types of cybercrimes and laws

CO4 To understand the different tools for cyber crime investigation

Course Name: Android Programming

CO1 Able to develop apps based on different types of menus

CO2 Make decision to solve a problem using package, library and threads Handling Errors and Exceptions

CO3 Ability to design and develop database applications

CO4 Able to design and develop mobile applications works with internet applications

Course Name: 2P1 Practical-1

CO1 To write C# program for classes, arrays, struct, array of objects

CO2 To write ASP.NET Programs and Component based programming

CO3 Study the common elements in user interfaces, data visualization, television commercials, motion pictures, and many other applications

CO4 Explore the algorithms necessary for basic transformation with respect to computer graphics

Course Name: 2P2 Practical-2

CO1 Would gain the knowledge about inside of computer

CO2 Transportation problem, LPP problem, Inventory problem

CO3 To develop apps based on different types of menus

CO4 Design and develop mobile applications works with internet applications

Course Name: Project

CO1 Select the topic for software development

CO2 Analysis and design of proposed system

CO3 Apply the known language for project programs

CO4 Combine the small program to make the integrated software

M.C.A. - Semester III

Course Name: Big Data Analytics

CO1 To know the structuring the big data, technology for handling the big data, Hadoop, Map Reduce.

CO2 To understand the big data technology foundation, Storing data in databases and data warehouses.

CO3 To get a basic understanding of R and the various ways to create scripts and programs in and understand some of the key constructs in R for data handling.

CO4 To understand and appreciate how to summarize large volumes of data effectively by appropriate use of charts of different types.

Course Name: Data Mining

Co1 To introduce the students, the basic concepts and techniques of Data mining and Warehousing and data pre-processing.

CO2 Understand association mining algorithms for discovery of frequent item patterns in large data sets and their Visualizations

CO3 Understand classification analysis algorithms for discovery and generation of rules in large data sets and their Visualizations

CO4 Understand basic and advanced clustering analysis algorithms and Visualizations in Data Mining

Course Name: Python Programming

CO1 Understand the data types and structures in python

CO2 Ability to understand object oriented programing concepts and write programs in python. Handling Errors and Exceptions

CO3 Ability to design and develop database applications

CO4 Web development using Python

Course Name: CE2-1 (Elective)

Artificial Intelligence

CO1 Understand the various underlying concepts in Artificial Intelligence . Acquire the knowledge of search techniques used in Artificial Intelligence

CO2 Acquire the concepts of knowledge representation

CO3 Analyze and design a real-world problem for implementation and understand the dynamic behaviour of a system.

CO4 To understand NLP and Distributed reasoning system

Course Name: CE2-2 (Elective)

Mobile Computing

CO1 Helps to understand the fundamental requirements for initiating an online business

CO2 Helps in process of initiating and funding a start-up, e-Business or large projects

CO3 Necessary to describe the issue and methods of transforming an organization into an ebusiness

CO4 Provides deeper knowledge of mobile handheld devices, wireless mediums ,palm OS, MANNET

Course Name: CE2-3 (Elective)

Machine Learning

CO1 To understand the different machine learning methods H

CO2 To understand the Multilayer Perceptron, Back Propagation algorithm, Support Vector Machine

CO3 To understand the machine learning with trees, different classifier

CO4 To understand the concept of dimensionality reduction, Graphical Methods

Course Name: Soft Computing

CO1 To know the soft computing methodology, heuristic search techniques

CO2 To understand the Neural Network structure, different types of leaning methods

CO3 To understand the different methods of unsupervised learning

CO4 To understand the concept of Fuzzification and de fuzzification

Course Name: 3P1 Practical-1

CO1 Programs in R for data analysis and visualization

- CO2 Programming on classification, association and clustering algorithm
- CO3 Programming in python to design and develop database applications
- CO4 Programming in python for Web development

Course Name: 3P2 Practical-2

- CO1 Programming for AI search techniques
- CO2 Programs on Mobile Computing
- CO3 Programs on Neural Network
- CO4 Programs on Fuzzification and defuzzification

M.C.A. - Semester IV

Course Name: Project Work

- CO1 To use the working knowledge in industry.
- CO2 To develop software in industry for various clients
- CO3 To gain awareness about ethical aspects and development work.
- CO4 Ability to plan and use adequate methods for software development

Bachelor of Science Cosmetic Technology

Program Outcomes (U.G.)

General Outcomes (U.G.)

- > It gives technical, entrepreneurial and communication skills to the students.
- Students can apply for the vacancies in Sales, Marketing, Research and Development, Production and Quality Control, Beauty experts as well as in Administration and Management of Cosmetic Industries.
- Graduate students of the Cosmetic Technology have high demand in various cosmetic and pharmaceutical companies and sectors in India and abroad.
- Student can apply for all Government competitive exams including MPSC, UPSC, Banking Sector, Railway Department, etc. where graduation is necessary.
- Students can apply for higher education in the fields of M.B.A., G.R.E. etc.

Specific Programme Outcomes

- The course gives extensive training in Cosmetic formulation, Manufacturing, Analysis and Marketing.
- It provides Formulators, Chemists, Heads of research and development at the forefront of cosmetic product development, with concise comprehensive information on the latest raw materials, laboratory procedures, and testing methods available worldwide.
- Further education in Master of Cosmetic Technology Degree and Doctoral Research is an option for becoming Research scientist or for applying in educational field as professor.
- One can also start-up with the own formulation setup / Spa centre /Beauty Salon/ Cosmetic industry/ Perfume industry/ Colour industry/ Extraction industry etc.

Kamla Nehru Mahavidyalaya Department of Cosmetic Technology Session: 2024-25

Master of Science (Cosmetic Technology)

I. Master of Science Cosmetic Technology Semester I

Paper - 1 Formulation & Development (FD)

• Learn about the mechanisms and various techniques of preparing and developing advance formulations of cosmetic products like soaps, colour cosmetic, astringents and tonics, face packs etc.

Paper – 2 Quality Assurance Technique (QAT)

• Learn the importance of quality control in cosmetic preparations, its guidelines, ISO significance, validation of cosmetic manufacturing stability study of cosmetic and evaluation of raw material by proper analytical method using BIS standers.

Paper – 3 Elective – I Principles of Cosmetic Technology (PCT)

• Encompasses all the fundamental physical properties and concepts of cosmetic with their methods of determination and their effects on cosmetic products.

Paper -3 Elective – II Concepts In Cosmetic Technology (CCT)

• Covers all the concepts of cosmetics with respect to physical properties, methods of determination and their effects on cosmetic products.

Paper -4 Research Methodology (RM)

• To understand the basics of statistics and research hypothesis and application thereof in practice.

II. Master of Science Cosmetic Technology Semester II

Paper -1 Formulation & Development (FD)

• This subject aims to study all sort of sophisticated cosmetic preparations which include hair serum, deodorants, shaving and eye preparation, its formulation and development, study of various machineries used in plants, its process evaluation, plant location, site, factory building and scale-up of product to intermediate and large scale production.

Paper -2 Concepts and Principles in Cosmetics Technology (CPCT)

• This subject teaches all the fundamental physical properties and concepts of cosmetic ingredients with their methods of determination and their effect on cosmetic products.

Paper -3 Elective – I Statistics and Qualitative Techniques (SQT)

• This subject teaches to understand the concept of statistical measurement and application of hypothesis.

Paper -3 Elective –II Statistical Evaluation & Analysis (SEA)

• To understand the statistical evaluation and analysis and its application in research.

Paper – 4 Natural Products (NP)

• Study of Natural ingredients for example herbs and other materials of natural sources and their logical applications in cosmetic industries.

III. Master of Science Cosmetic Technology Semester III

Paper -1 Advance Cosmetic Technology

• Teaches all the fundamentals of drug delivery systems, microencapsulation with its formulation and evaluation.

Paper-2 Perfumes & Colours in Cosmetics (PCC)

• This subject aims to study all sort of perfume, its creation, matching of perfume, evaluation of perfumes with details study of colours, classification of colours and its incorporation in various cosmetic formulations.

Paper-3 Elective I – Quality Assurance Technique for Skin Cosmetics (QATSC)

• This subject teaches D& C Act with specifications for cosmetic packaging, skin testing & instrumentation with IPR benefits.

Paper-3 Elective II- Quality Assurance Technique for Hair Cosmetics (QATHC)

• This subject teaches D& C Act with specifications for cosmetic packaging, hair testing & instrumentation with IPR benefits.

Paper-4 Research Designing and Planning (RDP)

• This subject aims to teach data management, analysis, presentation and designing of Research project report.

IV. Master of Science Cosmetic Technology Semester IV

Paper-1 Cosmetics Microbiology (CM)

• Students will be able to understand preservative efficacy, microbial assay of raw materials and finished products, total microbial count, isolation and identification of microorganisms as per BIS, microbial contamination and considerations in cosmetic product formulation, validation of microbial testing methods, cosmetic preservation and its regulation.

Paper-2 Cosmetics Validation (CV)

• Students will be able to understand the raw material selection, specification creation for raw materials, packaging materials, finished products, claim substantiation and validation, and plant selection.

Paper 3 Elective I- Skin Care Cosmetics (SCC)

• Students will be able to understand the phytochemical screening of natural products, study of different natural & synthetic actives, and standardization of actives in skin care herbs.

Paper3 Elective II- Hair Care cosmetics (HCC)

• Students will be able to understand the different methods of extraction, study of natural ingredients used in hair care, and standardization of actives in hair care.

Research Project

• Students will be able to carry out experimental project work on a related research topic of the subject/ course and they will learn to submit the project report (typed and Properly bound) comprising of introduction, material and methods, results, discussion, summary, conclusion and references along with the declaration by the candidate.

Kamla Nehru Mahavidyalaya Department of Cosmetic Technology Session 2024-25

Bachelor of Science Cosmetic Technology

Course Outcomes (U.G.)

I. Bachelor of Science Cosmetic Technology Semester I

1. Cosmetic Chemistry

• Impart the knowledge of various basic processes for evaluation of impurities in cosmetics.

2. Natural Cosmetic Agents

• Introduction of Natural ingredients for example herbs and other materials of natural sources.

3. Physical Chemistry

• As the course is completely based on chemical processes. Chemistry subject inparts knowledge of ingredients and properties as well as basic physical properties.

4. Organic Chemistry

• As the course is completely based on chemical processes. Chemistry subject inparts knowledge of ingredients and properties as well as basic physical properties.

5. Dermatherapy and Beauty Culture

• Impart knowledge of the primary techniques of Dermatherapy and application of Beauty products.

6. Anatomy & Physiology

• Teaches basic knowledge of Anatomy and Physiology of body specially skin and its appendages like Hair and Nails which are important for application of cosmetics.

7. English Communication skills

• Teaches writing of letter, bio data and Job application, Advertisement and dialogue writing, speech, also teaches listening skills, interview techniques and personality development.

8. Environmental Science

At the end of the course, students shall be able to:

- Explain the basics of Environmental Science and Atmospheric Science along-with the components of Environment
- Explicate the importance of Environmental Education.
- Elucidate the fundamentals of atmospheric science including formation, depletion and effects of ozone layer and acid rain on environment.
- Describe the various physical and chemical characteristics and properties of Water and Soil Understand the Ecology and its allied branches
- Comprehend about Population and Community Ecology
- Study the changes in Population by understanding the concept of Population ecology

9. Indian Knowledge System (Ancient History of Cosmetic)

• Teaches history of cosmetics in India, historical perspective on the usage of perfumes and scented articles in ancient period, natural cosmetics in ancient India and history of Ayurvedic ingredients in cosmetics.

II. Bachelor of Science Cosmetic Technology Semester II

1. Cosmetic Chemistry

• Impart the knowledge of various basic processes for evaluation of impurities in cosmetics.

2. Instrumental Methods of Analysis

• Introduces the instruments used for analysis of raw material and finished cosmetic products.

3. Physical Chemistry

• As the course is completely based on chemical processes. Chemistry subject inparts knowledge of ingredients and properties as well as basic physical properties.

4. Organic Chemistry

• As the course is completely based on chemical processes. Chemistry subject inparts knowledge of ingredients and properties as well as basic physical properties.

5. Dermatherapy and Beauty Culture

• Impart knowledge of the primary techniques of Dermatherapy and application of Beauty products.

6. Anatomy & Physiology

• Teaches basic knowledge of Anatomy and Physiology of body especially skin and its appendages like Hair and Nails which are important for application of cosmetics.

7. Fundamentals of Mathematics & Statistics

• To understand the basics regarding Mathematics and statistics.

8. Constitution of India

• Teaches about Historical Background of the Indian Constitution, Socialism, Fundamental Rights and Introduction of the Constitutional Institutions and Authorities

9. Indian Knowledge System (Modern History of Cosmetic)

• Teaches evaluation of different cosmetic products and also history of skin and hair care products along with their treatments and significance.

III. Bachelor of Science Cosmetic Technology Semester III

1. Cosmetic Technology

• Learn about the preparation of advanced cosmetic products like soaps, colour cosmetic, astringents and tonics, face packs etc.

2. Cosmetic Chemistry

• Impart the knowledge of various basic processes for evaluation of impurities in cosmetics.

3. Minor 1: Natural Cosmetic Agents

• Introduction of Natural ingredients for example herbs and other materials of natural sources.

4. Minor 2: Instrumental Methods of Analysis

• Introduces the instruments used for analysis of raw material and finished cosmetic products.

5. Introductory Pharmacology & Toxicology
• Introduces pharmacological and toxicological aspects of cosmetics, routes of administration and mechanism of actives/ drug action as well as toxicological aspects.

6. Dermatherapy & Beauty Culture

• Impart knowledge of the application of various cosmetic products systematically with precautions.

7. Drug & Cosmetic Laws

• Teaches regulation, rules and laws schedules related to cosmetics that is Drug and Cosmetic Act.

IV. Bachelor of Science Cosmetic Technology Semester IV

1. Cosmetic Technology

• Learn about the preparation of advanced cosmetic products like soaps, colour cosmetic, astringents and tonics, face packs etc.

2. Cosmetic Engineering

• Advanced unit operations and manufacturing processes involving various equipments and engineering aspects of manufacturing processes are taught.

3. Minor 3: Cosmetic Technology

• Learn about the preparation of advanced cosmetic products like soaps, colour cosmetic, astringents and tonics, face packs etc.

4. Minor 4: Cosmetic Chemistry

• Impart the knowledge of various basic processes for evaluation of impurities in cosmetics.

5. Introductory Pharmacology & Toxicology

• Introduces pharmacological and toxicological aspects of cosmetics, routes of administration and mechanism of actives/ drug action as well as toxicological aspects.

6. Dermatherapy & Beauty Culture

• Impart a knowledge of the application of various cosmetic products systematically with precautions.

7. Sanskrit

V. Bachelor of Science Cosmetic Technology Semester V

1. Cosmetic Technology

• To understand the cosmetic ingredients with respect to their functions and uses, choose the cosmetic ingredients in the cosmetic formulation as per its function, designing of new functional cosmetic products.

2. Perfumes

• Teach students about to different perfumes, different extraction techniques, natural perfume and synthetic perfumes.

3. Principles of Cosmeceutics

• To understand the Principles of Surface Active Agents, Interfacial Phenomenon, Emulsion and solubility, distribution phenomenon, colloidal dispersion, Rheology, micromeritics and complexation along with evaluation of different properties of powders, globule size of emulsion, and suspension stability.

4. Minor 5: Cosmetic Technology

• Learn about the preparation of advanced cosmetic products like soaps, colour cosmetic, astringents and tonics, face packs etc.

5. Minor 6: Cosmetic Engineering

• Advanced unit operations and manufacturing processes involving various equipments and engineering aspects of manufacturing processes are taught.

6. Pharmacology and Interactions

• To understand the anatomy and physiology of skin, hair, nails, sweat gland and sebaceous gland, analysis of various disorders of skin, hair, nails, sweat gland and sebaceous gland also determination of side effects and the cause of cosmetic ingredients and products coming in contact with various body parts like skin, hairs and nails.

7. Cosmetic Validation

• Students will be able to understand the raw material selection, specification creation for raw materials, packaging materials, finished products, claim substantiation and validation, and plant selection.

VI. Bachelor of Science Cosmetic Technology Semester VI

1. Perfumes

• Teaches students about to different perfumes, different extraction techniques, natural perfume and synthetic perfumes.

2. Cosmetic Technology

• To understand the cosmetic ingredients with respect to their functions and uses, choose the cosmetic ingredients in the cosmetic formulation as per its function, designing of new functional cosmetic products.

3. Principles of Cosmeceutics

• To understand the Principles of Surface Active Agents, Interfacial Phenomenon, Emulsion and solubility, distribution phenomenon, colloidal dispersion, Rheology, micromeritics and complexation along with evaluation of different properties of powders, globule size of emulsion, and suspension stability.

4. Cosmetic Engineering

• To understand theories of size reduction, size separation, Filtration and methods for quality air, calibration of orifice meter, venturimeter, Mixing, Distillation, Evaporation Azeotropes and Drying.

5. Minor 7: Cosmetic Technology

• To understand the cosmetic ingredients with respect to their functions and uses, choose the cosmetic ingredients in the cosmetic formulation as per its function, designing of new functional cosmetic products.

6. Pharmacology & Interaction

• To understand the anatomy and physiology of skin, hair, nails, sweat gland and sebaceous gland, analysis of various disorders of skin, hair, nails, sweat gland and sebaceous gland also determination of side effects and the cause of cosmetic ingredients and products coming in contact with various body parts like skin, hairs and nails.

VII. Bachelor of Science Cosmetic Technology Semester VII

1.Perfumes & Colours

• To understand the formulation and processing of alcoholic fragrance solutions, emulsified and solid fragrances, solubilized perfumes, Aerosols and its technology. They understand formulation of different cosmetic preparations by understanding the knowledge behind revision, adaptation and incorporation of perfumes in various skin, oral, eye, nail and hair care formulations, preparation of colour solutions, regulations related to colours, determination of colours and colour matching of marketed products.

2.Cosmetic Technology

• To understand the cosmetic formulations with respect to their functions and applications by choosing new cosmetic ingredients in the cosmetic formulation as per its functions and design the product its analysis

3.Plant Design

• To understand design considerations, heat exchangers and pressure vessels. Students will learn machine elements, selection of plant location and different factors affecting factory buildings, drawing of design of pressure vessels, heat exchangers, machinery elements, nut and bolts.

4. Quality Assurance Techniques

• Student will be able to understand the importance of Quality control in cosmetic preparations

and guidelines for hygienic manufacturing of cosmetics, significance and importance of ISO, Validation in cosmetic manufacturing, Microbial analysis, microbial testing of raw materials and finished products. They learn the importance of stability testing and how to perform accelerated stability study as per BIS guideline and evaluate the components or active ingredients present in various finished products like Shampoo, hair dyes, depilatories, skin creams, sun screen preparations, tooth paste, tooth powders, lipstick etc.

5. Herbal Cosmetics

• To understand role of herbs in cosmetic products, formulation of cosmetic product with herbal ingredient which gives desired effects, evaluation of effect of herbal product and to compare herbal products with synthetic products.

6.Elective-1

A. Personnel Management in Cosmetic Industries

• To understand Personnel Management, Planning and Staffing Policy, Selection, recruitment, placement, Different management development programmes, Evaluation of salesman's performance

B. Production Management in Cosmetic Industries

• Production Management, Production planning and control, Materials Management, Maintenance Management, Entrepreneurial Development and Small scale industries

7. Research Methodology

- To enable the students to know about the information needs of Cosmetics.
- To introduce the concept of Scientific Research and the methods of conducting Scientific Enquiry and
- To introduce the Statistical Tools of Data Analysis.

VIII. Bachelor of Science Cosmetic Technology Semester VIII

1. Perfumes & Colours

• To understand the formulation and processing of alcoholic fragrance solutions, emulsified and solid fragrances, solubilized perfumes, Aerosols and its technology. They understand formulation of different cosmetic preparations by understanding the knowledge behind revision, adaptation and incorporation of perfumes in various skin, oral, eye, nail and hair care formulations, preparation of colour solutions, regulations related to colours, determination of colours and colour matching of marketed products.

2. Cosmetic Technology

• To understand the cosmetic formulations with respect to their functions and applications by choosing new cosmetic ingredients in the cosmetic formulation as per its functions and design the product its analysis

3. Plant Design

• To understand design considerations, heat exchangers and pressure vessels. Students will

learn machine elements, selection of plant location and different factors affecting factory buildings, drawing of design of pressure vessels, heat exchangers, machinery elements, nut and bolts.

5. Quality Assurance Techniques

• Student will be able to understand the importance of Quality control in cosmetic preparations and guidelines for hygienic manufacturing of cosmetics, significance and importance of ISO, Validation in cosmetic manufacturing, Microbial analysis, microbial testing of raw materials and finished products. They learn the importance of stability testing and how to perform accelerated stability study as per BIS guideline and evaluate the components or active ingredients present in various finished products like Shampoo, hair dyes, depilatories, skin creams, sun screen preparations, tooth paste, tooth powders, lipstick etc.

6. Herbal Cosmetics

• To understand role of herbs in cosmetic products, formulation of cosmetic product with herbal ingredient which gives desired effects, evaluation of effect of herbal product and to compare herbal products with synthetic products.

7. Elective-2

A. Marketing Management of Cosmetics

- To understand Marketing Management
- To understand International Marketing and E-commerce activities
- To understand Concept of product, product line and mix

B. Financial Management of Cosmetics

- To know the various sources of finance
- To understand the various uses for finance
- To familiarize oneself with the techniques used in financial management.
 - 8.

Project (Review /Research)

• Students will be able to carry out Review/experimental project work on a related research topic of the subject/ course and they will learn to submit the project report (typed and properly bound) with required content.

Kamla Nehru Mahavidyalaya Department of Cosmetic Technology Session 2024-25

Master of Science Cosmetic Technology

Program Outcome

The Two year Post graduate degree course leading to **Master of Science Cosmetic Technology** (permanently run on non-grant basis), affiliated to RTM Nagpur University Nagpur and recognized by University Grants Commission, New Delhi.

Program Outcome:

- 1) Being a professional course, the main aim is to develop professional, creative and skilled students for Cosmetic industry.
- To develop the students who can work in all the streams of profession in the Cosmetic industry like Quality Control and Evaluation, Research and Development, Manufacturing, Packaging, Techno-Marketing of Cosmetics etc.
- 3) To use the technology for the betterment of society and self-employment as well.
- 4) The students study the regulatory affairs and Intellectual Property Rights to understand their responsibility towards citizens and society.
- 5) Students also study Research Methodology to carry out the research in scientific manner.
- 6) The Two year curriculum develops professionalism, leadership qualities and administrative capabilities in the student.
- 7) After the Post-graduation the students may pursue Research leading to Ph.D. programmeas well as Post Ph. D Programme. This enables the students to work at higher position in the Academics and Industries.
- 8) As the course contents are modified and updated frequently this course is also at par with many educational institutions catering to similar courses abroad enabling our students getting admitted there for higher studies.
- This course imparts qualities of understanding safety of health care products like cosmetics and inculcate the ability towards social responsibility, research and nation building.

Kamla Nehru Mahavidyalaya Department of Biotechnology Bachelor of Science (Honors/Research) (Biotechnology: Major_NEP 2020)

Course Outcomes (COs)

B.Sc. Sem-I

(DSC Theory & Practical)

- Describe at conceptual level the microbial cell suitability for execution of biotechnological principles.
- Diagrammatically demonstrate structure of various categories of microorganisms routinely utilized for biotechnological purposes.
- Conceptualize handling of microbes for biotechnology applications.
- Establish correlation of macromolecular organization and function at cellular level.
- Design basic strategy for associating changes in DNA with cellular functioning.
- Establish enzymatic correlation for execution of DNA manipulations
- Select technical methods for analysis of manipulated Biomolecules

Open Elective-I Courses (Biotechnology for human welfare)

- Understand the biotechnological applications in the industry
- Appreciate application of biotechnology in environmental management
- Describe application of biotechnology to forensic science
- Comprehend contributions of biotechnology to biomedical fields, such as diagnostics, genomics and therapeutics
- Understand the biotechnological applications in the agriculture and livestock management

Open Elective Courses-II (Fermented foods)

- Understand the importance of fermented foods, probiotics, prebiotics and nutraceuticals.
- Make the students aware of the different types of beverages.
- Understand the importance of fermented meat and fish products.
- Understand the importance of fermented dairy and vegetable products.

Vocational Skill Courses (Basic transformation techniques)

- Get an insight about the principles of bacterial/yeast cell transformation techniques.
- Learn handling and development of genetically engineered organisms in the Laboratory.
- Design strategies to screen genetically modified organisms.

• Work around the working principles behind various screening strategies.

B.Sc. Sem-II

Open Elective-I Courses (Applications of biotechnology in agriculture)

- Understand the biotechnological applications in agriculture
- Comprehend the pros and cons of GM crops and their plant products
- Appreciate the biotechnological applications for effective pest control and crop
- improvements
- Understand the importance of molecular markers in agriculture

Open Elective-II Courses (Bioethics & Biosafety)

- Give an insight about the morals and principles while working in the field of biology.
- Make the students aware of the issues arising per while handling and developing genetically engineered organisms and laboratory animals.
- Understand the risks involved and the regulations to be followed when experimenting with biological samples.
- Develop a perception about the practices to be followed in a biotechnology laboratory and the management of the laboratory waste.

Vocational Skill Courses (Dairy technology)

- learn various methods of isolation, detection and identification of spoilage microorganisms in milk.
- Understand the application of principle of effect of temperature on spoilage of milk products.
- Develop technician level human resource for dairy industry.
- Develop young entrepreneurs for self-employment through dairy technology and associated activities.
- Impart knowledge and technical proficiency in processing of milk, testing and quality control of milk and milk products

Skill Enhancement Courses (Wine technology)

- Demonstrate an understanding of the basic concepts of wine chemistry and wine
- microbiology
- Students will be able to learn wine production
- Students will be able to check quality of grapes and wine
- Students will be able to evaluate wine quality using chemical and sensory techniques

B.Sc.- Biotechnology

Program Outcomes (POs)

After completion of Biotechnology program students will able **PO1.** To get acquainted to strong theoretical and practical background in fundamental concepts

related to scientific phenomena and their importance in day to day life **PO2.** To get insights of multiple important technical areas of Biotechnology. **PO3.** Generate know how of tools and techniques related to biotechnology and their application

in different sector along with better understanding of their limitations. **PO4.** To develop the capability of research mindset, to reciprocate the ideas through written

and oral form to generate their leadership & scientific qualities. **PO5.** To demonstrate professional and ethical attitude with enormous responsibility to serve the society.

Program Specific Outcomes (PSOs)

PSO1.Comprehending fundamental concepts in modern biology to meet the emerging trends

PSO2.Handling microbial and biotechnological systems

PSO3.Acquire hands on real time experience in industries

Master of Biotechnology

Course Outcomes (P.G.)

Semester I

- 1. Comprehend and correlate the structure and function relationship of cells, sub cellular organelles, Cellular communication and cell cycle.
- 2. Realize the basic concepts of Enzymology and Enzymatic Kinetics.
- 3. Gain Familiarity with the concept of Enzymes Engineering and immobilization.
- 4. Develop Proficiency in the fundamental molecular principles of genetic and basic of genetic mapping
- 5. Evaluate and address the ethical and challenges in clinical trials, including the use of human in scientific experiments and the role of ethical committees.
- 6. Appreciate and recognise the methods to arrive at research objectives.

7. Apply the Principles of Biostatistics in Biotechnology research for Validated depiction of research data.

Semester II

- 1. Gain Insight into the structure and classification concepts for bacteria and archea
- 2. Develop proficiency in principles of bacterial physiology and growth requirements
- 3. Acquire knowledge of the fundamental concepts of DNA Replication, Mutations and Repair
- 4. Evaluate the Principle differences in the transcription mechanism of prokaryotic and eukaryotic systems
- 5. Develop knowledge of Bio-processing methods and immobilization techniques
- 6. Appreciate the importance of Downstream processing and Evaluate the production of primary and secondary Metabolite.

Programme Outcomes

- 1. The course will inculcate the attitude about application of knowledge and techniques of Biotechnology
- 2. One can start R & D Labs, Quality control Labs for testing and development of biotechnology process generated product.
- 3. Acquire know how of biotechnological process for Industrial and research application and thus can develop products having societal benefit
- 4. Develop ability of compilation and interpretation of biological data using computer software related to Bioinformatics

Kamla Nehru Mahavidyalaya Department of Environmental Science Session 2024-2025 Bachelor of Environmental Science

General Outcomes (U.G.)

- > Environmental Science provides a scientific basis for management of earth systems.
- > It focuses on the interaction between human activities, resources and the environment.
- ➤ As human population grows and technology advances, pressures on earth's natural systems are becoming increasingly intense and complex.
- Environmental Science is an exciting field where science is used to best serve society.
- The Environmental Studies major prepares students for careers as leaders in understanding and addressing complex environmental issues from a problem-oriented, interdisciplinary perspective.
- The Environmental Studies minor supplements other majors to facilitate students understanding of complex environmental issues from a problem-oriented, interdisciplinary perspective.
- Students Understand key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
- Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- Reflect critically about their roles and identities as citizens, consumers and environmental factors in a complex, interconnected world.

Specific Programme Outcomes (B.Sc. Environmental Science)

- Recognize the history, structure, function, interactions, and trends of key environmental systems: climate, earth, life, socio-political.
- Assemble a logical chain of reasoning ranging from observation to inference and action, not only to identify and characterize a problem, but also to find solutions.
- > Design an independent scientific inquiry, from methods to interpretation.
- Locate, organize, analyze, integrate, synthesize, and evaluate complex information from multiple and disparate sources.
- > Apply appropriate analytical and quantitative approaches.
- Organize, visualize, and statistically analyze environmental data, and interpret relationships, trends and make predictions about future changes.

Kamla Nehru Mahavidyalaya Department of Environmental Science Session 2024-2025 Masters of Environmental Science

General Outcomes (P.G.)

- > Environmental Science provides a scientific basis for management of earth systems.
- > It focuses on the interaction between human activities, resources, and the environment.
- As human population grows and technology advances, pressures on earth's natural systems are becoming increasingly intense and complex.
- > Environmental Science is an exciting field where science is used to best serve society.
- Master core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Master core concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
- Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
- The Environmental Science minor supplements other majors to facilitate students' understanding of complex environmental issues from a problem-oriented, interdisciplinary perspective.
- Students understand core concepts and methods from ecological and physical sciences and their application in environmental problem-solving.
- Appreciate key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.

- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- > Appreciate that one can apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

Specific Programme Outcomes (M.Sc. Environmental Science)

- Handle uncertain, complex, real-world problems in the lab, field, community, and workplace. Observe analytically and integrate diverse information from variable sources outside of the classroom
- Think critically, creatively, resourcefully, and strategically, including identifying steps needed to reach goals, manage projects, evaluate progress, and adapt approaches, developing both self reliance, and civic-mindedness.
- Develop spatial literacy, understand the role of maps and 2-3 dimensional spatial systems; effectively process, reason, problem solve and communicate issues within a spacial context.
- Utilize advances in environmental sciences and technology to resolve issues and anticipate implications.
- Clearly communicate complex analyses, interpretations and significance through variable media (oral presentation, poster, proposal, research article, report), to audiences ranging from scientific to policy, and the general public.
- Collaborate in teams, with peers and mentors, and work with others in diverse group settings, developing flexibility and leadership skills.

Bachelor of Science NEP (Honors/Research) (ELECTRONICS - Major) Program Outcome

Program Outcome

Here are some programs outcomes that students can expect to achieve

- Understanding of basic electronic principles: Students will have a basic understanding of electronic principles, such as Ohm's law, Kirchhoff's laws, and the properties of various electronic components.
- Ability to design and analyze electronic circuits: Students will be able to design and analyze electronic circuits using techniques such as circuit simulation, bread board, and soldering.
- Knowledge of analog and digital systems: Students will have a strong foundation in both analog and digital electronic systems, including analog and digital signals, filters, amplifiers, and logic circuits.
- Familiarity with electronic devices: Students will be familiar with a range of electronic devices such as transistors, diodes, and operational amplifiers.
- Awareness of safety and environmental issues: Students will be aware of safety issues related to electronics, such as the proper handling of electronic components and the use of safety equipment. They will also be aware of environmental issues related to electronics, such as the disposal of electronic waste.
- Ability to work with teams: Students will be able to work effectively as part of a team, collaborating with others on projects and assignments.
- Effective communication: Students will be able to communicate effectively about electronics topics, both orally and in writing.

Overall, electronics minor courses aim to provide students with a strong foundation in electronic principles and systems, preparing them for further study or careers in electronics-relatedfields.

Bachelor of Science NEP (Honors/Research) (ELECTRONICS - Major) COURSE OUTCOME

B.Sc. SEM-I (ELECTRONICS - Major) Paper – 1: Semiconductor Devices and Circuits

Course outcome:

At the end of this course students will demonstrate the ability to

- 1. Understand the fundamentals of semiconductor components such as diode, BJT, FET and MOSFET.
- 2. Plot V-I characteristics of electronic components to observe its performance parameters.
- 3. Understand the simple applications of circuit made using these semiconductor components.
- 4. Analyze and solve circuits of electronic devices

Paper – 2: Digital Electronics

Course outcome:

At the end of this course students will demonstrate the ability to

- 1. Understand number systems conversions and apply the principles of Boolean algebra to manipulate, minimize and design logic circuits using logic gates.
- 2. Demonstrate knowledge of various combinational logic circuits like code converters, multiplexers, adders.
- 3. Demonstrate knowledge of sequential logic circuits elements like latches, flip-flops and use them in the design and analysis of counters, registers.
- 4. Demonstrate knowledge of design and analysis of complex combinational and simple finite state machine and similar circuits.

Electronics BoS: Semester -1: OE1: Basic Electronics Components and Instruments (BGO1T01)

Course outcome:

At the end of this course students will have ability to

- 1. Identify various electronic components understand their role
- 2. Make series and parallel combinations of components.
- 3. Understand working & replacement

OE2: Communication and Broad Casting (BGO1T02)

Course outcome:

At the end of this course students will have ability to

- 1 Historical understanding about evolution of Electronics Communication Technology
- 2 Appreciate transformation and Geo-reach concept in Broad casting
- 3 Define purpose of present day communication & Broad Cast Technology, Entertainment, information Education, Alerts, Agricultural
- 4 Conversant with modern digital systems

Semester – 2; Paper – 1: Network Analysis

Course outcome:

At the end of this course students will demonstrate the ability to

- 1. Understand basics electrical circuits with nodal and mesh analysis.
- 2. Apply network theorems for the analysis of electrical circuits.
- 3. Apply Laplace Transform for steady state and transient analysis.

Semester – 2; Paper – 2: Programming in C

Course Outcome:

At the end of this course students will demonstrate the ability to

- 1. To formulate simple algorithms and translate the algorithms to programs (in C language), test and execute the programs and correct syntax and logical errors.
- 2. To implement conditional branching, iteration, and recursion, to decompose a problem into functions and synthesize a complete program using divide and conquer approach.
- 3. To use arrays to solve various matrix operation, searching, sorting and Pointers, Structures for the formulation of algorithm and Programs. **Program outcomes for MSc Electronics**

1. Advanced knowledge: -

- Implementation of graduate level knowledge of electronics in higher postgraduate level
- Understanding of electronic systems, devices, and semiconductor materials in detail
- Specialized knowledge in virtual instrumentation, IoT, python programming, VLSI design, nanotechnology, network analysis, digital signal processing, ANN, mobile communication and biomedical electronics.

2. Research and development skill

- > Ability to design, develop, and test electronic systems and components
- Experience with simulation software, laboratory equipment, and prototyping

3. Analytical and problem-solving skills:

- > Ability to analyze complex electronic systems and identify solutions
- > Expertise in troubleshooting and debugging electronic systems

4. Project management skills:

- Ability to lead and manage projects, including budgeting, scheduling, and team management
- On job training (OJT)

5. Communication skills:

- > Effective communication of technical ideas and research findings
- > Ability to write technical reports, papers, and patents

6. Career paths:

- Senior electronics engineer
- Technical lead or team manager
- > Research and development engineer
- Electronics consultant

7. Specialized skills:

Expertise in areas like:

- Embedded systems and IoT
- > Digital signal processing and machine learning
- > RF and microwave engineering
- Electronic materials and nanotechnology

8. Interdisciplinary skills:

- > Ability to work with cross-functional teams (e.g., mechanical, software engineering)
- Understanding of the intersection of electronics with other fields (e.g., biology, physics)

9. Preparation for further education:

- > Foundation for pursuing a Ph.D. in Electronics or related fields
- Preparation for certifications like Chartered Engineer (CEng) or Professional Engineer (PE)

These outcomes prepare graduates for advanced roles in electronics research, development and industry, as well as for further education and research.

M. Sc. Semester I (Electronics)

Paper I (MEL1T01): Fundamentals of Semiconductor Devices

Course Outcomes:

On successful completion of this subject, student should be able to

- Understand semiconductor devices and their operations
- Distinguish among various types of semiconductor devices based on their phenomena
- Understand the importance of optoelectronic devices in the world of visualization
- Study basic concepts of inorganic and organic semiconductor materials for electronic device application in modern electronic industry
- Emphasis on nano-electronic applications such as Schottky barrier transistors, flexibleElectronics
- Gain the basic understanding of VLSI and display devices

Paper II (MEL1T02): Analog and Digital Systems Course Outcomes:

On successful completion of this subject, student should be able to

- Learn to design analog and digital systems, from specifications and simulation to construction and debugging.
- Learn techniques and tools for programmable logic design.
- Understand the limitations and difficulties in modern analog and digital design aspects, including wiring constraints, high-speed etc.
- Design, construct, test and debug a moderate-scale digital circuits
- Be Familiar with the state-of-the-art system on chip (SoC) design methods using FPGAs and ASIC design chips.

Semester I M. Sc. (Electronics)

Paper III (MEL1T03.c): Programming in Python and Micro Python (Elective)

Course Outcomes:

On successful completion of this subject, student should be able to

- Explore the fundamentals of python language
- Apply the concepts of control structures, arrays, functions and file handling for effective programming
- Develop programming skills by writing various python programs
- Desing various applications based on python programming.
- Develop micorpyhton programming concepts to be used in the designing of the embedded system, IoT.

M.Sc. Semester-I (Electronics Science) Paper IV (MELT104) RESEARCH METHODOLOGY

Course Outcomes

- Students who complete this course will be able to understand and comprehend the basics in research methodology and applying them in research/project work.
- This course will help them to select an appropriate research design.
- With the help of this course, students will be able to take up and implement a research project/ study.
- The course will also enable them to collect the data, edit it properly and analyze it accordingly. Thus, it will facilitate students' prosperity in higher education.
- The students will develop skills in qualitative and quantitative data analysis and presentation.
- Students will be able to demonstrate the ability to choose methods appropriate to research objectives.

Semester II M. Sc. (Electronics)

Paper V (MEL2T05): Measurements and Instrumentation

Course Outcomes:

On successful completion of this subject, student should be able to

- Acquire knowledge on Basic functional elements of instrumentation
- Understand the concepts of Fundamentals of electrical and electronic instrument
- Comprehend various measurement techniques
- Acquire knowledge on Various storage and display devices
- Understand the concepts Various transducers and the data acquisition systems
- Model and analyses electrical and electronic Instruments and understand the operational features of display Devices and Data Acquisition System.
- Assess and apply graphical programming structures and data types to display and log data.
- Generate data acquisition applications that utilize GUIs and Virtual Instruments.

Semester II M. Sc. (Electronics) Paper VI (MEL2T06): Embedded System Design & Applications

Course Outcomes

After successful completion of the course the students will be able to:

- Explore the fundamentals of microcontrollers and assembly language programming.
- Understand the general concepts of embedded systems.
- Interface various I/O devices with the microcontroller.
- Deal with the advanced microcontrollers.
- Design and develop the embedded systems based project

VII (MEL2T07.b): Internet of Things (Elective)

Course Outcomes:

Students after successful completion of the course will be able to:

- Understand the concepts of Internet of Things
- Analyze basic protocols in wireless sensor network
- Design IoT applications in different domain and be able to analyze their performance
- Implement basic IoT (and/or WSN) applications on embedded platform
- Understand and explain common wireless sensor node architectures.
- Carry out simple analysis and planning of WSNs.
- Demonstrate knowledge of MAC protocols developed for WSN.
- Demonstrate knowledge of routing protocols developed for WSN

M. Sc. Semester III (Electronics)

Paper VIII (MEL3T08): Industrial ProcessControl

Course Outcomes

On successful completion of this subject students should be able to:

- Explore the fundamentals of Industrial process control and instrumentation
- Apply various controller principles in the instrument design
- Develop the design concepts of various controllers
- Design various control systems
- Design PLC based systems

M. Sc. Semester III (Electronics) Paper IX (MEL3T09) VLSI Design

Course Outcomes:

Upon completion of this course, the students will be able to

- Acquire qualitative knowledge about the fabrication process of integrated circuits using MOS transistors.
- Draw the layout of any logic circuit which helps to understand and estimate parasitic effect of any logic circuit
- Design building blocks of data path systems, memories and simple logic circuits using PLA, PAL, FPGA and CPLD.
- Understand different types of faults that can occur in a system and learn the concept of testingand adding extra hardware to improve testability of system.

M. Sc. Semester III (Electronics) Paper X (MEL3T10): Digital Signal Processing

Course Outcomes:

On successful completion of this subject, student should be able to

• realize the importance of digital signal processing in different applications

• gain knowledge of the basic elements of digital signal processing and its requirement

• get familiar with the types of signals, systems, digital filters and digital transformation methods.

• get familiar with the types of operations that can be performed on the signals in digital signal processing.

• assimilate the concepts, choice of filter and steps for designing digital filters and its application

• ingest the importance and requirement of transformation in designing digital filters.

• assimilate the important aspects of DSP of noise and echo cancellation and encoding in wireless communication

• identify the types of DSP processors required in designing digital filters.

• acquire the knowledge of DSP and have knowledge to use it in different fields of application

M. Sc. Semester III (Electronics)

Paper XI (MEL3T11.a): Artificial Neural Networks (Elective)

Course Outcomes:

On successful completion of this subject students should be able to:

- Explore the concepts of various artificial neural networks
- Design various neural network models
- □ Apply artificial neural network models to real time applications

M. Sc. Semester IV (Electronics)

Paper XII (MEL4T12): Electromagnetic Fields and Antennas

Course Outcomes:

On successful completion of this subject, student should be able to

- □ Understand the design, working and characterization of antenna
- □ Understand the basics of electromagnetic fields and Maxwell's unified equations
- □ To design experimental methods for antenna characterization

M. Sc. Semester IV (Electronics)

Paper XIII (MEL4T13): Digital Communication

Course Outcome:

On successful completion of this subject, student should be able to

- □ Acquire knowledge of the importance of signals and spectra
- $\hfill\square$ Become familiar with the basics of digital communication
- Design systems based on digital modulation techniques
- □ Understand different information coding

M. Sc. Semester IV (Electronics)

Paper XIV (MEL4T14): Microwave and Optical Communication

Course Outcomes:

On successful completion of this subject, student should be able to

- □ Assimilate the knowledge of the microwave components, generators and measurement techniques
- □ Become familiar with the basics of optical communication
- Design experimental method for microwave measurements
- Design experimental method for optical measurements

M. Sc. Semester IV (Electronics) Paper IV (MEL4T15.b): Mobile Communication (Elective)

Course Outcomes:

On successful completion of this subject, student should be able to

- □ Understand the new trends in mobile/wireless communications networks.
- □ Understand the different communication protocols and its frame structure
- □ Have an in-depth knowledge of optimization of cellular capacity
- □ Identify the issues in transport and application layers.
- □ Apply the concept of GSM in real time applications

M. Sc. Semester IV (Electronics) Paper IV (MEL4T15.b): Mobile Communication (Elective)

Course Outcomes:

On successful completion of this subject, student should be able to

- □ Understand the new trends in mobile/wireless communications networks.
- □ Understand the different communication protocols and its frame structure
- □ Have an in-depth knowledge of optimization of cellular capacity
- □ Identify the issues in transport and application layers.
- □ Apply the concept of GSM in real time applications

Bachelor of Science B. Sc. (Honors/Research) (Computer Science - Major)

PROGRAMME OUTCOMES (POs)

1. Discipline knowledge: Acquiring knowledge on basics of Computer Science and ability to apply to design principles in the development of solutions for problems of varying complexity

2. Problem Solving: Improved reasoning with strong mathematical ability to Identify, formulate and analyze problems related to computer science and exhibiting a sound knowledge on data structures and algorithms.

3. Design and Development of Solutions: Ability to design and development of algorithmic solutions to real world problems.

4. Programming a computer: Exhibiting strong skills required to program a computer for various issues and problems of day-to-day scientific applications.

5. Application Systems Knowledge: Possessing a minimum knowledge to practice existing computer application software.

6. Communication: Must have a reasonably good communication knowledge both in oral and writing.

7. Ethics on Profession, Environment and Society: Exhibiting professional ethics to maintain the internality in a working environment and also have concern on societal impacts due to computer based solutions for problems.

8. Lifelong Learning: Should become an independent learner. So, learn to learn ability.

9. Motivation to take up Higher Studies: Inspiration to continue educations towards advanced studies on Computer Science.

B.Sc. Sem-I (Computer Science - Major)

Course Outcomes: After completing this course satisfactorily, a student will be able to:

SC-DSC (Paper I)

1. Write simple algorithms for arithmetic and logical problems.

- 2. Write the C code for a given problem
- 3. Perform input and output operations using programs in C

4. Write programs that perform operations on arrays, strings, structures, unions, functions and file handling.

SC-DSC (Paper II)

Course Outcomes: After completing this course satisfactorily, a student will be able to:

1.Confidently operate computers to carry out computational tasks

2. Understand working of Hardware and Software and the importance of operating systems.

3. Understand number systems, peripheral devices, networking, multimedia and internet concepts.

OFFICE AUTOMATION (BVS1P01)

Course Outcomes: After completing this course satisfactorily, a student will be able to:

1. understand functionality of Operating Systems and its applications.

- 2. Working with the user interface.
- 3. prepare documents, letters and do necessary formatting of the document.
- 4. Worksheet creation, inserting and editing data in cells.
- 5. Opening/saving a presentation and printing of slides and handouts.

BVE1T01: ENVIRONMENTAL SCIENCE

COURSE OUTCOMES: At the end of the course, students shall be able to:

- 1. Explain the basics of Environmental Science and Atmospheric Science along-with the components of Environment
- 2. Explicate the importance of Environmental Education.
- 3. Elucidate the fundamentals of atmospheric science including formation, depletion and effects of ozone layer and acid rain on environment.
- 4. Describe the various physical and chemical characteristics and properties of Water and Soil
- 5. Understand the Ecology and its allied branches
- 6. Comprehend about Population and Community Ecology
- 7. Study the changes in Population by understanding the concept of Population ecology

SEM1: VEDIC MATHEMATICS (BIK1T01)

Course Outcomes: This course will enable the students to

- 1. Improve speed and accuracy in numerical calculations
- 2. Acquire IQ skills and high-end technical knowledge
- 3. gain test taking skills & creativity of calculations

B.Sc. Sem -II (Computer Science - Major)

SC-DSC (Paper I)

Course Outcomes: After completion of this course, students will be able to:

- 1. Realize the need and features of OOP and idealize how C++ differs from C.
- 2. Infer knowledge on various types of overloading.
- 3. Choose suitable inheritance while proposing solution for the given problem.
- 4. Handle pointers and effective memory management.
- 5. Illustrate application of pointers in virtual functions.

SC-DSC (Paper II)

Course Outcome:

1. Describe the various OS functionalities, structures and layers.

2. Usage of system calls related to OS management and interpreting different stages of various process states.

3. Design CPU scheduling algorithms to meet and validate the scheduling criteria.

4. Apply and explore the communication between inter process and synchronization techniques.

5. Implement memory placement strategies, replacement algorithms related to main memory and virtual memory techniques.

6. Differentiate the file systems; file allocation, access techniques along with virtualization concepts and designing of OS with protection and security enabled capabilities.

BVS2P03 COMPUTER ANIMATION

Course Outcome: After completion of this course, students will be able to:

1. Get knowledge about various terms like, images, text, fonts, file formats. Understanding these things is very necessary.

2. produce traditional style animation as well as puppet animation and the knowledge of the principles of animation to be built upon in subsequent courses leading up to the Portfolio course.

3. apply skills learned in this class in other areas including motion graphics, stop motion and basic traditional animation

SEM2: INDIAN ASTRONOMY (BIK2T02)

Course Outcomes: This course will enable the students to understand that

1. It is possible to create a map of the intellectual growth of a culture using astronomy as a probe.

2. The growth of Indian astronomy occurs in distinct stages analogous to phase transitions of the evolution of cultures

3. Indian Astronomy therefore provides an excellent window to the past dramatic transitions.

M. Sc. (Computer Science) Choice Based Credit System as per NEP 2020

PROGRAMME OUTCOMES (POs)

- 1. The ability to apply application theoretical foundation of Computer Science and problem-solving skills through programming techniques for complex real time problems using appropriate data structures and algorithms.
- 2. The ability to design/develop hardware and software interfaces along with database management to meet the needs of industry.
- 3. The ability to demonstrate personal, organizational and entrepreneurship skills through critical thinking, engage themselves in life-long learning by following innovations in business, science & technology
- 4. Ethics on Profession. Environment and Society: Exhibiting professional ethics to maintain the internality in a working environment and also have concern on societal impacts due to computer-based solutions for problems.

Course Outcomes: M. Sc. (Computer Science) Semester I

MCS1TOI Paper I: ARTIFICIAL INTELLIGENCE

Course Outcomes:

- 1. Evaluate Artificial Intelligence (At) methods and describe their foundations.
- 2. Apply basic principles of AI in solutions that require for problem solving.
- 3. Demonstrate knowledge of reasoning and knowledge representation in, perception, knowledge representation and learning.
- 4. Analyses and illustrate how search algorithm and planning play viral role in problem solving.

MCS1TO2 Paper II: COMPILER CONSTRUNCTION

Course Outcomes:

- 1. Demonstrate the knowledge of Lexical Analysis
- 2. Derive an appropriate model of code generation.

Elective 1: MCS1T03 Paper III: COMPUTER ARCHITECTURE AND ORGANIZATION

Course Outcomes:

- 1. Provide fundamentals on machine instructions and addressing modes.
- 2. Comprehend the various algorithms for computer arithmetic.
- 3. Analyse the performance of various memory modules in memory hierarchy.
- 4. Compare and contrast the features of I/O devices and parallel processors.
- 5. Outline the evaluation of memory organization.
- 6. Analyse the performance of Arithmetic logic unit, memory and CPU.

MCS1TO4 Paper IV: RESEARCH METHODOLOGY

Course Outcomes:

1. The basic concept of research and its methodologies, Identify appropriate research topics.

Select and define appropriate research problem and parameters.

- 2. Prepare a project (to undertake a project)
- 3. Organize and conduct research in a more appropriate manner, writing research report and thesis.

Semester II MCS2TO5 Paper I: CLOUD COMPUTING

Course Outcomes:

- 1. Analyse the trade-offs between deploying applications in the cloud and over the local
- 2. Infrastructure.
- 3. Compare the advantages and disadvantages of various cloud computing platforms.
- 4. Program data intensive parallel applications in the cloud.
- 5. Analyse the performance. scalability, and availability, of the underlying cloud
- 6. Technologies and software.
- 7. Identify security and privacy issues in cloud computing.

Semester II MC32T06 PAPER II: MACHINE LEARNING

Course Outcomes:

- 1. Understand the concepts of various machine learning strategies
- 2. Handle computational data and learn ANN learning models.
- 3. Solve real world applications by selecting suitable learning model.
- 4. Boost the performance of the model by combining results from different approaches.

M. Sc. (Computer Science) Semester II Elective 2: MCS2T07 Paper III: NEURAL NETWORK Course Outcomes:

- 1. Ability to understand the concepts of Neural Networks.
- 2. Ability to select the learning Networks in modelling real world systems

Semester III MCS3TO8 Paper I: ADVANCED SOFTWARE ENGINEERING Course Outcomes:

- 1. To demonstrate an understanding of advanced knowledge of the practice of software engineering, design, validation, test and deployment
- 2. Use modern engineering principles, processes, and technologies to solve difficult engineering issues and tasks.
- 3. Demonstrate leadership and the ability to participate in teamwork in an environment with different disciplines of engineering, science and business.
- 4. identify the proper ethical. Financial, and environmental effects of their work.

MC53TO9 Paper II: NETWOR SECURITY

Course Outcomes:

- 1. Classify the symmetric encryption techniques.
- 2. Illustrate various public key cryptographic techniques.
- 3. Evaluate the authentication and hash algorithms.
- 4. Basic concepts of system level security.

Semester III MCS3T10 Paper III: DIGITAL IMAGE PROCESSING

Course Outcomes:

- 1. Know and understand the basics and the fundamentals of digital image processing., digitization, sampling. Quantization. and 2D-transforms.
- 2. Operate on images using the techniques of smoothing, sharping and enhancer rent. understand the restoration concepts and filtering techniques.

Semester III Elective 3; MCS3T11 Paper IV: COMPUTER GRAPHICS

Course Outcomes:

- 1. Students can animate scenes entertainment.
- 2. Will be able to work in computer aided design for content presentation.
- 3. Better analogy data with pictorial representation

Semester IV MCS4T12 Paper I: BIG DATA ANALYTICS Course Outcomes:

- 1. Classify and categorize different types of Data Analytics.
- 2. Frame Business Architecture.
- 3. Understand the use of information and communication Technology.
- 4. Differentiate Between Traditional Data Analysis and Big Data Analytics
- 5. Evaluate different Enterprise Technologies and Big Data Business intelligence.

Course Outcomes:

- 1. Implement fundamental images processing techniques required for computer vision.
- 2. Develop computer vision applications.

Semester IV MCS4T14 Paper III: DEEP LEARNING

Course Outcomes:

- 1.Solve various deep learning problems.
- 2. Apply auto encoders for unsupervised learning problems.
- 3. Implement Convolutional Neural Networks to image classification problems
- 4. Apply recurrent neural networks to sequence learning problems.

Semester IV Elective 4: MCS4T15 Paper IV: DESIGN AND ANALYSIS OF ALGORITHM

Course Outcomes:

- 1. Produce through proofs of an algorithm's soundness.
- 2. Demonstrate about important algorithms and data structures.
- 3. Use key analytical techniques and concepts for algorithmic design.
- 4. Combine effective design algorithms in typical engineering design scenarios.

Kamla Nehru Mahavidyalaya, Nagpur Department of Mathematics 2024-25 PROGRAM: B. Sc. Mathematics

Program Outcome:

PO1: Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO2: Problem Solving: Solve problems from the disciplines of concern using the knowledge, skills and attitudes acquired from mathematics/ sciences/social sciences/humanities.

PO3: Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

PO4: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in wide variety of settings.

PO5: Ethics: Understand multiple value systems including your own, the moral dimensions of your decisions, and accept responsibility for them.

PO6: Environment and sustainability: Understand the impact of technology and business practices in societal and environmental contexts, and sustainable development.

PO7: Self-directed and life-long learning: Demonstrate the ability to engage in independent and life-long learning in the broadest context sociotechnological changes.

PO8: Design/Development of Solutions: Design solutions for complex science problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO9: Computational Thinking: Understand data-based reasoning through translation of data into abstract concepts using computing technology-based tools.

PO10: Effective Citizenship: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO11: Global Perspective: Understand the economic, social and ecological connections that link the world's nations and people.

PO12: Aesthetic Engagement: Demonstrate and master the ability to engage with the arts and draw meaning and value from artistic expression that integrates the intuitive dimensions of participation in the arts with broader social, cultural and theoretical frameworks

B.Sc. Semester I (MATHEMATICS)

Course Title: Algebra and Trigonometry

Course Outcomes:

CO1: Foundational Knowledge: Students will be able to update their basics of Set Theory, Matrices, Theory of equations and Complex variables and its applied aspects.

CO2: Elementary Skills: Students will be able to understand the importance of hyperbolic functions and their relationships with trigonometric functions.

CO3: Basic Analytic skills: The main outcome of the course is to equip students with necessary basic analytic skills for problem solving.

CO4: Application: By applying the principles of basic tools through the course curriculum, students can solve a variety of practical problems in science and engineering.

PRACTICAL: BMT1P01: Algebra and Trigonometry

Course Outcomes:

CO1: Students will be able to learn implications of equivalence relations in determining equivalence classes.

CO2: Students will understand properties of divisibility through problem solving.

CO3: Students will be able to perform different operations on the given congruence.

CO4: Solution of linear congruence will be studied by students.

CO5: Students will be able to perform matrix operations to determine invertible matrices, row canonical and normal form of the matrices.

CO6: Students will be able to apply matrix operations to solve system of linear equations.

CO7: Students will be able to find roots of a cubic and biquadratic equation.

CO8: Students will be able to apply De Moivre's theorem to find nth roots of a complex number find

Course Title: Differential Calculus

Course Outcomes:

CO1: Foundational Knowledge: Students will be able to update their basic knowledge of Maxima and Minima of functions of single variables and their application.

CO2: Elementary Skills: Students will undergo problem solving training by learning Indeterminate forms and L' Hospital's Rule and their applicability. CO3: New Concepts learning: Students will be able to learn new concept of

functions of two variables, Taylor series, and maxima and minima of such functions.

CO4: Analytic Skills: The problem-solving skills will bring forth the importance of Jacobian in understanding the existence of inverse transformation and other aspects of independence of pair of functions.

CO5: Application: By applying the principles of basic tools through the course curriculum, students can solve a variety of practical problems in science and engineering.

PRACTICAL: BMT1P02: Differential Calculus

Course Outcomes:

CO1: Students will be able to make out the maximum or minimum nature of the functions by applying different conditions on the functions.

CO2: Working on Geometric interpretation of Mean value theorems through graphs of a function will make students grasp the subject admirably.

CO3: Students will learn application of Leibnitz, Maclaurin's and Taylor's theorems.

CO4: Students will be able to apply L'Hospital's Rule to solve the problems CO5: Solving problems when functions involved are homogeneous

CO6: Students will able to solve Jacobians and learn properties due to Jacobian.

CO7: Analysing Maxima and Minima of functions of two variables.

PRACTICAL: Sage Math Software System

Course Title: SAGE MATH SOFTWARE SYSTEM Course Outcomes:

Students will be able

1) to explore topics in Calculus, Applied Linear Algebra and Numerical Method along with several applications

2) to learn an alternative software as against the commercial products Magma, Maple, Mathematica and MATLAB

3) to learn the most recent algorithms and tools for many domains of mathematics

4) to use as wonderful scientific and graphical calculator.

BVE1T01: ENVIRONMENTAL SCIENCE

COURSE OUTCOMES:

At the end of the course, students shall be able to:

1. Explain the basics of Environmental Science and Atmospheric Science along-with the components of Environment

2. Explicate the importance of Environmental Education.

3. Elucidate the fundamentals of atmospheric science including formation, depletion and effects of ozone layer and acid rain on environment.

4. Describe the various physical and chemical characteristics and properties of Water and Soil

5. Understand the Ecology and its allied branches

6. Comprehend about Population and Community Ecology

7. Study the changes in Population by understanding the concept of Population ecology.

Indian Knowledge System (IKS)

SEM1: VEDIC MATHEMATICS (BIK1T01)

Course Outcomes: This course will enable the students to

1. Improve speed and accuracy in numerical calculations

2. Acquire IQ skills and high-end technical knowledge

3. gain test taking skills & creativity of calculations.

B.Sc. SEM II

Course Title: Integral Calculus and Ordinary Differential Equations Course Outcomes:

CO1: Foundational knowledge: Students to update their knowledge of improper integrals, Beta and Gamma functions and their applicability.

CO2: Basic skills: Students will be able to understand the importance of varied methods of solving differential equations of first and second order.

CO3: Analytical skills: The main objective of the course is to equip students with necessary analytic skills due to integrability and solutions of differential equations.

CO4: Application: By applying the principles of basic tools through the course curriculum, students can solve a variety of practical problems in science and engineering.

B.Sc Sem 2:PRACTICAL: BMT2P03: Integral Calculus and Ordinary Differential Equations

CO1: Students will be able to solve problems using reduction formulae, Beta and Gamma functions.

CO2: Application of double integration in solving problems on area of a region. CO3: Students will able to solve problems by changing the order of integration

CO4: Students will learn application of triple integration

CO5: Students will be able to apply integrating factor in solving non exact differential equations

CO6: Students will be able to solve Euler's Equidimensional Eqs

CO7: Students will able to use concept of Wronskian in solving problems by method of variation of parameters.

B.Sc Sem 2

Course Title: Vector Analysis

Course Outcomes:

CO1: Foundational knowledge: To impart foundational knowledge of vector algebra and vector differentiation.

CO2: Basic skills: To inculcate in students foundational base of gradient of a scalar function, divergence and curl.

CO3: Concept learning: New concept of vector integration shall be introduced and problems of work done by force shall be solved.

CO4: Application of Vector Theorems: To solve variety of practical problems in science and engineering by applying Greens theorem, divergence theorem, Stokes' theorem.

CO5: Application: The course curriculum is so prepared that it has wide application in physics, and in other Science and Engineering subjects.

B.Sc Sem 2 PRACTICAL: BMT2P04: Vector Analysis

Course Outcomes:

CO1: Students will be able to update themselves with foundational knowledge of vector algebra and vector differentiation by solving examples.

CO2: The basic skills required in science will be ingrained in students through foundational base of gradient of a scalar function, divergence and curl by solving examples.

CO3: New concept of vector integration shall be learnt by students and problems of work done by force shall be solved by them.

CO4: Students will be able to solve variety of practical problems in science and engineering by applying Greens theorem, divergence theorem, Stokes' theorem.

CO5: The course curriculum is so prepared that it has wide application in physics, and in other Science and Engineering subjects, and this will help students immensely in their future.

Vocational Skill Enhancement Course (VSC)

SEMESTER - II

VSC -02 : Maxima Software System

PRACTICAL: Course Outcomes:

Students will be able

1. to develop skills to deliver practical knowledge in its application

2. to explore topics in Calculus, ordinary differential equations, systems of linear equations, polynomials, sets, lists, vectors, matrices

3. to provide algorithms and tools for many domains of mathematics

4. to use as wonderful scientific and graphical calculator.

B.Sc Sem 2 Indian Knowledge System (IKS) INDIAN ASTRONOMY (BIK2T02)

Course Outcomes: This course will enable the students to understand that It is possible to create a map of the intellectual growth of a culture using astronomy as a probe.

2. The growth of Indian astronomy occurs in distinct stages analogous to phase transitions of the evolution of cultures

3. Indian Astronomy therefore provides an excellent window to the past dramatic transitions.

PROGRAM: M. Sc. Mathematics Program Outcome

PO1: Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO2: Problem Solving: Solve problems from the disciplines of concern using the knowledge, skills and attitudes acquired from mathematics/ sciences/social sciences/humanities.

PO3: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in wide variety of settings. PO4: Ethics: Understand multiple value systems including your own, the moral dimensions of your decisions, and accept responsibility for them. PO5: Selfdirected and life-long learning: Demonstrate the ability to engage in independent and life-long learning in the broadest context socio-technological changes.

PO6: Design/Development of Solutions: Design solutions for complex science problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. PO7: Computational Thinking: Understand data-based reasoning through translation of data into abstract concepts using computing technology-based tools.

PO8: Aesthetic Engagement: Demonstrate and master the ability to engage with the arts and draw meaning and value from artistic expression that integrates the intuitive dimensions of participation in the arts with broader social, cultural and theoretical frameworks.

M.Sc. Semester I (MATHEMATICS) M1: ALGEBRA Course Outcomes

CO1: Foundational Knowledge: Students will be able to update their basics of Group Theory, Discuss on various topic of group in algebra.

CO2: Elementary Skills: Students will be able to understand the importance of Solvable and Nilpotent, Alternating groups.

CO3: Basic Analytic skills: The main outcome of the course is to equip students with necessary basic analytic skills for problem solving on Sylow theorems.

CO4: Application: By applying the principles of basic theorems of Algebra through the course curriculum, students can solve a variety of logical problems in science and engineering.

M.Sc. Semester I (MATHEMATICS) M2: TOPOLOGY Course Outcomes: CO1: Foundational Knowledge: Students will learn the basic concepts of topological space, metric spaces, product topology, closed sets, limit points and continuous function. Students will also get to know about interrelating these concepts with one another.
CO2: Elementary Skills: Students will study about the connectedness of topological spaces. They will get to know about connectedness on real line with standard examples

CO3: Basic Analytic skills: Students will study about covering spaces and relate it with compactness of the spaces. Students will gain analytical skill to relate compactness on real line, limit point compactness and local compactness. CO4: Application: Students will be able to think critically and apply the knowledge of topological spaces in the study of analysis and will be able to prove the standard results regarding countability and separation axioms.

M.Sc. Semester I (MATHEMATICS) M3: ORDINARY DIFFERENTIAL EQUATION

Course Outcomes:

CO1: Foundational Knowledge: Students will be able to study basic notions in Differential Equations and use the results in developing advanced mathematics.

CO2: Elementary Skills: Students will able to solve problems modeled using linear differential equations having ordinary points and regular singular points and solve them by method of power series.

CO3: Basic Analytic skills: The main outcome of the course is to equip students to develop techniques to solve differential equations that would help students sharpen their understanding of the Mathematical solutions with their characteristics.

CO4: Application: By applying the principles of basic tools through the course curriculum, students can solve a variety of practical problems involving ordinary differential equations in science and engineering.

M.Sc. Semester I (MATHEMATICS)

PRACTICAL - I COMPUTATION WITH C /C++Course Outcomes:

Upon successful completion, students will have the knowledge and skills to: CO1. Execute C /C++ programs involving logical statements.

CO2. Operate Mathematical operations and Logical operators in determining the general output of the problem.

CO3. Determine roots of a cubic equation in general perspective.

CO4. Understand in depth nuances of programming that would help them gain confidence and avail them job opportunities.

M.Sc. Semester I (MATHEMATICS) (ELECTIVE - I) M4: INTEGRAL EQUATIONS (Option - A)

Course Outcomes:

CO1: Foundational Knowledge: The new concept of 'Integral Equations' will be introduced to students in which they will study different types of integral equations and various methods to solve them. Also, they will be taught integral transforms such as Hilbert transform.

CO2: Elementary Skills: Students will be able to understand integral equations with different types of kernel and will be able to recognize their solving methods.

CO3: Basic Analytic skills: The main outcome of the course is to teach student about integral equations and solving them using various transforms such as Laplace transform, Fourier transform, Hilbert transform, etc.

CO4: Application: By applying the solving techniques, students can solve Fredholm Integral equations, Volterra Integral equations, Non-linear Integral equations and Integrodifferential equations.

M.Sc. Semester I (MATHEMATICS) (ELECTIVE – I) M4: FUZZY MATHEMATICS (Option -B)

Course Outcomes:

Upon successful completion, students will have the knowledge and skills to: CO4. Interpret problems involving uncertainty and its quantification.

CO5. Understand fuggy numbers and fuggy arithmetic

CO5. Understand fuzzy numbers and fuzzy arithmetic.

CO6. Implement fuzzy logic in various problems involving uncertainty.

CO7. Understand fuzzy systems and fuzzy control.

Semester I (MATHEMATICS)

M5: RESEARCH METHODOLOGY IN MATHEMATICS

Course Learning Outcomes:

Upon successful completion, students will have the knowledge and skills to: CO1. Recall and describe the fundamental concepts and principles of mathematics. Understand the research approaches and their significance in various fields and the different types of research designs and their characteristics.

CO2. Apply research methods and approaches to investigate mathematical phenomena.

CO3. Analyze the effectiveness and clarity of scientific communication and presentations.

CO4. Describe the roles and dynamics within a group process, including teamwork and collaboration.

CO5. Explain the concept of sponsored research and its implications for research ethics.

CO6. Explain the basic principles of intellectual property rights (IPR) and their relevance in research.

M.Sc. Semester I: PRACTICAL ON RESEARCH METHODOLOGY

Course Outcomes: Upon successful completion, students will have the knowledge and skills to: CO1: Demonstrate installation and compilation of free Miktex software and Tex studio.

CO2: Implement their knowledge of Latex in preparing Tex documents which can be converted into .pdf or .dvi files

CO3: Prepare question papers of the examination

CO4: Develop research article as per the learnings from research methodology.

M.Sc. Semester II (MATHEMATICS) M6: REAL ANALYSIS Course Outcomes:

CO1: Foundational Knowledge: Students will be able to update their basics knowledge in sequence, series, limit, continuity and differentiability.

CO2: Elementary Skills: Students will be able to understand the importance of uniform convergence and topological manifold.

CO3: Basic Analytic skills: The main outcome of the course is to equip students with necessary basic analytic skills for problem solving with functions of several variables.

CO4: Application: By applying the principles of basic tools through the course curriculum, students can solve a variety of practical problems involving Manifold, sub-manifold and differentiable manifold.

M.Sc. Semester II (MATHEMATICS) M7: DIFFERENTIAL GEOMETRY Course Outcomes:

CO1: Foundational Knowledge: Students will be introduced to the fundamentals of Differential Geometry primarily by focusing on the theory of curves and surfaces in three dimensional space.

CO2: Elementary Skills: Students will be study about the curves and their global properties. Students will get to know about Geodesic curve and its existence conditions.

CO3: Basic Analytic skills: Students will get the knowledge of fundamental quadratic forms of a surface, intrinsic and extrinsic geometry of surface, problem of Metrization and Triangulation.

CO4: Application: By applying various definitions, theorems and formulas, students can solve different problems based on curved surfaces and their curvatures. It can be further used to analyse shapes and data on non-flat surfaces.

M.Sc. Semester II (MATHEMATICS) M8: ADVANCE NUMERICAL METHODS CO1: Foundational Knowledge: Students will learn the basic methods and tools of numerical methods in root finding for linear and non-linear equations. They will learn about Newton's method, Muller's method and System of nonlinear equations. CO2: Elementary Skills: Students will develop skills in analysing the methods of interpolation for a given data using polynomial interpolation, Newton's divided difference, forward differences and Hermite interpolation.

CO3: Basic Analytic skills: Students will develop skills to approximate a function using appropriate theorems and numerical methods as a solution to the problems.

CO4: Application: Students will be able to think critically to use Trapezoidal rule, Simpson's rule and Newton cotes integration formula for solving Mathematics modelling problems. They will be able to compare results of the problems by different methods.

MSc Semester- II: PRACTICAL: 2 NUMERICAL SOLUTIONS WITH COMPUTER PROGRAMMING (MATLAB / R PROGRAMMING / PYTHON, etc.)

CO1: Learn about the application of numerical method.

CO2: Understand Newton's method, Muller's method and solve System of linear and non-linear equations.

CO3: Find the errors in the solution so obtained by various methods.

CO4: Derive Numerical integration using Trapezoidal rule, Simpson's rule, Newton-Cotes formulae.

CO5: Apply approximate numerical methods to solve the problems with more accuracy.

CO6: Learn how to obtain solution of ordinary and partial differential equations numerically.

CO7: Compare different methods in numerical analysis efficiently

M.Sc. Semester II (MATHEMATICS) (Elective-II) M9: CLASSICAL MECHANICS (Option A)

CO1: Foundational Knowledge: Students will be able to update their basics of variational principle.

CO2: Elementary Skills: Students will be able to understand the importance of Lagrange's equation of motion.

CO3: Basic Analytic skills: The main outcome of the course is to equip students with necessary basic analytic skills for problem solving using Lagrange's and Hamilton's equations of motion.

CO4: Application: By applying the course curriculum, students can solve a variety of practical problems in research.

M.Sc. Semester II (MATHEMATICS)

(Elective-II) M9: OPERATION RESEARCH Course Outcomes:

CO1: Foundational Knowledge: Students will be able to update their basics of computational procedures of Linear Programming Problem.

CO2: Elementary Skills: Students will be able to understand the importance of efficient computational procedures. Revised simplex method is a modification of the simplex method and students would know that it is economical on computer as it computes only relevant information. CO3: Basic Analytic skills: The main outcome of the course is to equip students with necessary basic analytic skills for problem solving using a modified computational procedure.

CO4: Application: By applying the Revised simplex method and Network techniques through the course curriculum, students can solve a variety of practical problems in business, research and development, production & investment Marketing and engineering.

M.Sc. Semester II (MATHEMATICS)

PRACTICAL - 3 ON JOB TRAINING / FIELD PROJECT

Course Outcomes: On completion of course, Students will be able to:

CO1: Acquire hands on training

CO2: Know different aspects of the Institute/Industry involved in it

CO3: Learn how to work in Team set up

CO4: Develop aspiration to work up the ladder in the Institute/ Industry.

M.Sc. Semester III (MATHEMATICS) Paper -M10: Complex Analysis Course Outcomes:

CO1: Foundational Knowledge: Students will be able to learn about complex number. They will get the knowledge about complex number in polar coordinate as well.

CO2: Elementary Skills: Students will be able to learn the Mobius Transformation, they come to know about the Analytic Function and Elementary Properties, Power Series.

CO3: Basic Analytic skills: The Objective of this Course is to study the topic like Cauchy-Riemann Equations, Poles and Residues, Mobius Transformation.

CO4: Application: By applying the principles of basic tools through the course curriculum, Student can solve variety of practical problems.

Paper II - M11: Functional Analysis

CO1: Foundational Knowledge: Students will be able to update their basics knowledge in spaces, subspace, sequences, continuity and Normed space

CO2: Elementary Skills: Students will able to understand the importance of uniform convergence, inner product space, orthogonal sets and orthonormal sets.

CO3: Basic Analytic skills: The main outcome of the course is to equip students with necessary basic analytical skills and to help sharpen the student's understanding of the mathematical structure of the subject.

CO4: Application: By applying the principles of basic tools through the course curriculum, students can solve a variety of practical problems in science and engineering.

Course Outcomes: Paper III- M12: Advance Mathematical Methods

CO1: Application in Engineering: By applying the principles of basic formulae of Fourier series through the course curriculum, students can solve a variety of logical problems in science and engineering.

CO2: Application in physics to Solve Boundary value Problem: Students will be able to understand the importance of Laplace Transform to solve physical and Electrical Problem.

CO3: Application to Solve Boundary Value Problem: The main outcome of the course is to equip students with necessary basic analytic skills for problem solving on Partial Differential Equation.

CO4: Application in Engineering: By applying the principles of basic formulae of Z-Transform through the course curriculum, students can solve a variety of logical problems in science and Electrical engineering.

Syllabus for Practical-4 MMT3P04: Python Programming Course Outcomes: CO1: Students describe basic properties of Fourier series, Laplace Transform and Z-transform using python programming.

CO2: Students implement their knowledge in solving various problems on related concepts and develop the proof of countably sub additive property.

CO4: Students determine questions related to Fourier series, Laplace Transform and Z-transform.

CO5: Students will understand its significance and relevance to various mathematical disciplines and its applications in other fields.

CO6: They will develop teamwork and communication skills while learning from each other's approaches and insight.

Paper - M13 (A): General Theory of Relativity MMT3T13Course Outcomes:

CO1: Foundational Knowledge: Students will be able to update their basics of Tensors and learn different types of tensors with their applications.

CO2: Elementary Skills: Students will be able to understand the approximation theories of Newton's equations to Poisson equations and vice-versa

CO3: Basic Analytic skills: The main outcome of the course is to equip students with necessary basic analytic skills for problem solving.

CO4: Application: By applying the principles of basic tools, like Christoffel symbols, through the course curriculum, students can solve a variety of practical problems in cosmology.

Paper-M13(B): Fluid Dynamics MMT3T13 Course Outcomes:

CO1: Foundational Knowledge: Students will develop a profound understanding of the basic ideas of fluid velocity, streamlines, vortex motion, rotational and irrotational flows. Students will also get know about interrelating these concepts with one another and draw distinction between local and particle rates of change

CO2: Elementary Skills: Students will learn about Sinks, Sources and doublets, Milne Thomson Circle theorem and Blasius theorem. They will get to know about two- and three-dimensional inviscid fluid flows

CO3: Basic Analytic skills: Students will study and understand inviscid fluid flow and use the continuity equation to determine whether an inviscid flow is incompressible. Students will gain analytical skill and analyse properties of various fluid flows.

CO4: Application: Students will get a deep understanding of fluid flow behaviours and will be able to think critically and apply the knowledge in the study of analysis of fluid motion. This course will also make the students able to prove the results related to Fluids Dynamics.

M.Sc. Semester IV (MATHEMATICS)

Paper - M14: Dynamical System MMT4T14 Course Outcomes:

CO1: Foundational Knowledge: Students will learn the basic concepts related to Dynamical System. They will also gain the knowledge about The Flow of a Differential Equation and understand their global dynamics.

CO2: Elementary Skills: Students will study about the nonlinear phenomena in physical systems by using a basic knowledge. They will be Capable of determining fixed points and their stability and solve the mathematical problems.

CO3: Basic Analytic skills: Students will study about limits sets, flow boxes, Poincare Bendixson Theorem and its application . Students will gain analytical skill to describe the time evolution of systems which arise from biology and others subjects.

CO4: Application: Students will be able to think critically about how autonomous and non autonomous Differential equation are differentiated. They will be apply the knowledge of Dynamical systems in the study of analysis using mathematical Concepts and techniques.

Paper - M15: Measure and Integration Theory MMT4T15 Course Outcomes:

CO1: Foundational Knowledge: Students will be able to understand the fundamental concept of measure and Lebesgue measure. Students should be able to understand the construction of the Lebesgue integral and know its key properties.

CO2: Elementary Skills: Students will be able to investigate fundamental concepts of measure and integration theory and apply the definition and properties of Lebesgue Measure and measurable sets.

CO3: Basic Analytic skills: The main outcome of the course is to equip students with necessary basic analytic skills for problem solving with various types of measurable sets, measurable functions, and solution to a problem of the Lebesgue integral of the bounded measurable functions, unbounded measurable function and integral of a non-negative functions.

CO4: Application: By applying the principles of basic tools through the course curriculum, students can solve a variety of practical problems involving borel measurability sets, measurable functions, Riemann and Lebesgue integral.

Paper - M16: Partial Differential Equations MMT4T16 Course Outcomes:

CO1: Foundational Knowledge: Students will be able to classify partial differential equations upon their linearity and find corresponding integral surfaces.

CO2: Elementary Skills: Students will be able to solve linear partial differential equations of both first and second order.

CO3: Basic Analytic skills: Students will be able to classify partial differential equations and transform second order partial differential equations into canonical form.

CO4: Application: Students will be able to solve boundary value problems for Laplace's equation, the heat equation, the wave equation by separation of variables, in Cartesian, polar, spherical and cylindrical coordinates.

Paper - M17:(A) Cosmology MMT4T17Course Outcomes:

CO1: Foundational Knowledge: Student will be able to update their basis knowledge about cosmology studies. How the history of universe led to the stars, galaxies, and other features we can observe today.

CO2: Elementary Skills: Student will able to study of cosmology. Cosmology is the study of outer space or the universe came to be, what its structure is like, and what the future may hold.

CO3: Basic Analytic Skills: The main outcome of the course is to equip student to develop techniques to solve cosmological problem to find the new model.

CO4: Application: Cosmology helps to understand how the universe began and how it has evolved over the nature of the universe.

Paper – M17 (B): Number Theory MMT4T17Course Outcomes:

CO1: Foundational Knowledge: Student will be able to update their basis of divisibility and modular arithmetic.

CO2: Elementary Skills: Student will able to handle theory of congruence, understand Mobius inversion formula, Euler's theorem.

CO3: Basic Analytic Skills : The main outcome of the course is to equip student to develop techniques to solve congruence problem for degree one and some special cases of degree two, using Chinese remainder theorem

CO4: Application: Number theory is applied in Cryptography, Device authentication, Coding, websites for Ecommerce, Security system, many more

KAMLA NEHRU MAHAVIDYALAYA DEPARTMENT OF BOTANY Bachelor of Science in Botany (NEP) PROGRAMME OUTCOMES

- The student is capable to demonstrate comprehensive knowledge and understanding of one or more branches of Botany, and of critical and clear thought about the plant world.
- The student develops the ability to analyse and contemplate on the various aspects of plants.
- The student gets the hands-on experience in the routinely used laboratory techniques an equipment.
- The student develops the professional skills like identification of plants/algae/fungi, laboratory technician, scientific writing, data analysis, techniques in plant tissue culture, environmental impact assessment etc.
- Students will be able to describe, identified, classified and differentiate the plants of different taxonomic ranks. They could differentiate morphological and anatomical features of different plant parts.
- They could understand and analyze the different evolutionary trends among different plant groups.
- They could describe, analyze the different aspect of Applied Botany. They could understand the practices of Floriculture, Horticulture, etc. and acquainted themselves with economic benefit of these practices as well as explain it to others.
- The student is capable to write report and present the scientific data in form of figures, images and tables.
- The student is capable to undertake field tours for floristic, environmental and other exploratory surveys.
- Students will be able to perform different experiments which could help them to prove their hypotheses. They could able to analyze the data with help of different statistical tools. Students will develop capabilities which help them to design and investigate the scientific research work. They could able to draft a scientific write up and could argue, defend his findings based on standard practices of research in Life Science
- A life-long inquisitiveness about plants and ways to put them at work for enhancing the quality of life is instilled in the student.
- The student is capable to derive benefits from the traditional knowledge of India.
- The student develops the qualities of a responsible global citizen and is able to work in team.

KAMLA NEHRU MAHAVIDYALAYA DEPARTMENT OF BOTANY Bachelor of Science in Botany (NEP) COURSE OUTCOMES B.Sc. Botany (NEP-2020) - Semester I

BOTANY I

Microorganisms- Viruses, Prokaryotes, Algae and Fungi. (BBO1T01)

- Students able to understand about the general characteristics features, structure and nature of virus.
- Students came to know about structure of TMV, Structure and multiplication of T. Bacteriophage. Students came to know about economic importance of virus.
- Students learned about the cell structure, reproduction and economic importance of bacteria.
- Students learned about the ultra cell structure, reproduction and economic importance in cyanobacteria group.
- Students learned about the general characteristics, economic importance and classification of Algae.
- Students learned about the life history of *Oedogonium*, *Chara*, and *Ectocarpus*.
- Students learned about general characteristics, economic importance and Classification of Fungi.
- Students learned or life history Albugo, Rhizopus and Agaricus.

BOTANY II

Cryptogams- Bryophyta, Paleobotany and Pteridophyta. (BBO1T02)

- Students learned about the general characters, classification and economic importance of Bryophyta.
- Students learned about life history of Riccia and Funaria.
- Students learned about general characters, classification and economic importance of Pteridophytes
- Students learned about life history of Rhynia, Selaginella and Pteris
- Students learned about the concept of Apospory, Apogamy, Heterospory and seed habit in Pteridophytes. Students got idea about stellar system in pteridophytes.
- Students learned about Geological time scale,types of fossil Impression, Compression and Petrifaction.
- Students learned about contributions of Birbal Sahani.

B.Sc. Botany (NEP-2020) - Semester II BOTANY III

Spermatophyte- Gymnosperm and Angiosperm Morphology (BBO2T03)

- Students learned about general characters and economic importance of Gymnosperms.
- Students learned about the life cycle of Cycas.
- Students learned about different types of Root and Root modification
- Students earned about different aspects of stem morphology like shape, texture, nature, branching patterns of stem and modifications in stem
- Students learned about different types of leaves.
- Students learned about different aspects of lesf morphology like Phyllotaxy, venation and also about modifications of leaf.

- Students learned about different types of inflorescence in plants.
- Students learned about the flower structure and different whorls in the flower.
- Students learned about different aspects of flower parts calyx, corolla, Androecium and Gynoecium.
- Students gain the Knowledge about different types of fruits like simple, aggregate and composite etc.

BOTANY IV

Cell Biology and Genetics (Mendelism) (BBO2T04)

- Students learned about brief account of cell, its types and structural organization.
- Students learned about structure and functions of different cell oraganelles.
- Students learned chromosomal morphology and its molecular organizations, sex chromosomes.
- Students learned about the mechanism and significance of cell division.
- Students learned about mendelism, interaction of genes and also about the concept of linkage and crossing over.

KAMLA NEHRU MAHAVIDYALAYA DEPARTMENT OF BOTANY Master of Science in Botany (NEP) PROGRAMME OUTCOMES

1 The student is capable to demonstrate comprehensive knowledge and understanding of one or more branches of Botany, and ofcritical and clear thought about the plant world.

2 The student develops the ability to analyse and contemplate on the various aspects of plants.

3 The student is capable to undertake supervised research, identifying the problem, survey the literature, design & execute the experiments, generate the data and draw conclusions.

4 The student gets the hands-on experience in the routinely used laboratory techniques an equipment.

5 The student develops the professional skills like identification of plants/algae/fungi, laboratory technician, scientific writing, dataanalysis, techniques in plant tissue culture, environmental impact assessment etc.

6 The student is capable to write report and present the scientific data in form of figures, images and tables.

7 The student is capable to undertake field tours for floristic, environmental and other exploratory surveys.

8 A life-long inquisitiveness about plants and ways to put them at work for enhancing the quality of life is instilled in the student.

9 The student is capable to derive benefits from the traditional knowledge of India.

10 The student develops the qualities of a responsible global citizen and is able to work in team.

KAMLA NEHRU MAHAVIDYALAYA DEPARTMENT OF BOTANY Master of Science in Botany (NEP) COURSE OUTCOMES

Mandatory Paper 1 (MBO1T01): Microbiology, Algae and Fungi Outcomes

The diversity among the microbes is revealed to the student in the class, laboratory and field. The student appreciates the variability among the algae and fungi and also acknowledges their economic importance.

The student is able to trace the phylogenetic relationship among the algae and fungi. The student is conversed with the common diseases of plants and their control measures.

Mandatory Paper 2 (MBOITO2): Bryophytes and Pteridophytes Outcomes

The student acknowledges the diversity among lower plants in the class.

The student develops an insight to correlate the structural variations with the phylogenetic relationship among plants.

The student understands the importance of lower plants in the ecosystem and daily life.

Elective Paper 3 (MBO1T03): Palaeobotany and Gymnosperms Outcomes

The student is sensitised about the paleoclimate, fossil flora and the process of fossilisation.

The student acknowledges the diversity among the Gymnosperms in the class. The student develops an insight to correlate the structural variations in the extinct and extant plants with the phylogenetic relationships.

Research Methodology Paper 4 (MBO1T04)

Outcomes

• The students are acquainted with the process of selection of a research problem and techniques and tools to be employed in completing a research project.

• The students are capable of Analysis and Interpretation of Data and Paper Writing.

• The students are acquainted with the skills of qualitative and quantitative data analysis and presentation.

• The students will be abreast with the employability skills required for various academic research & industrial units.

Mandatory Lab 1 (MBO1L1): Microbiology, Algae, Fungi Plant pathology, Bryophytes, Pteridophytes

The diversity among the microbes and lower plants is revealed to the student in the laboratory and field.

The student appreciates the variability among the microbes and lower plants and also acknowledges their economic importance.

The student is conversed with the common diseases of plants and their control measures.

Mandatory Lab 2 (MBO1L2): Palaeobotany, Gymnosperms, Cytology, Genetics, Cell biology and Research Methodology

Outcomes

The student is sensitised about the fossil flora.

The student acknowledges the diversity among the Gymnosperms the laboratory and field.

The student is equipped with techniques to prepare stains and study chromosomes and to analyse the data to decipher underlying genetical phenomenon.

The student is equipped with the techniques to isolate and quantify DNA.

The student is conversant with the technique to evaluate the effect of stress on plants. **Semester II**

Mandatory Paper 5 (MBO2T01): Cytology and Genetics Outcomes

The student interprets the observations in nature in the light of laws of genetics and/or underlying cytological aspects.

The student employs the knowledge of Genetics and induced mutations for crop improvement.

Mandatory Paper 6 (MBO2TO2): Plant Physiology and Biochemistry Outcomes

The student realises the role and mechanism of physical and chemical factors affecting theplant life.

The student learns about the diversity of the biological molecules.

The student develops strategies to mitigate the adverse effect of environmental stresses on plants.

Elective Paper 7 (MBO2T3): Cell biology

Outcomes

The student is acquainted with the details of the structure and role of the cell organelles.

The student is acquainted with the structure of DNA and the mechanisms involved in its replication and protecting its structure.

The student is equipped with the effect of stress on plants.

The student is able to devise the strategies to mitigate the adverse effect of the stress on the plants.

Mandatory Lab 3 (MBO2L2): Plant physiology, Molecular biology, Plant Biotechnology.

Outcomes

The student learns to prepare buffers, solutions and carries-out the experiment. The student is trained in routinely used molecular techniques.

The student learns to handle the equipment in the laboratory.

The student is able to present the data and interpret the results.

Mandatory Lab 4 (MBO2L3): Plant development & reproduction, Taxonomy, Ecology

Outcomes

The student studies the morphology, anatomy and embryology of the local plants. The student learns the biostatistical computations.

The student is acquainted with the techniques and equipment to study the ecosystem and to describe & identify the plant.

The student becomes familiar with the local flora and prepares the field report.

Semester III

Mandatory Paper: DSC: MBO3T08: Plant Development & Reproduction Outcomes

The student discovers the variation in Angiosperms at morphological and anatomical level.

The student understands the mechanisms leading to development of the plant organ. The student realizes the interplay of genetic and environmental cues in plant development.

The student admires the alternatives to sexual reproduction and is able to put them for practical application.

The student understands the role of cell death in plant development.

Mandatory Paper: DSC: MBO3T09: ANGIOSPERMS-1

Outcomes

Comprehend the basic concepts and use scientific terminology accurately.

Know the relationship and evolutionary processes and patterns in the major plant groups.

Handle, analyze and identify plant materials in the laboratory, herbarium collections and in the field through effective oral and written communication and use dichotomous keys in floristic manual.

The student explores various characters, which can be used to classify the plants.

Mandatory Paper: DSC: MBO3T10: Plant Ecology and Conservation Biology Outcomes

The student acknowledges the role of each factor involved in the development and maintenance of the ecosystem.

The student realizes the ways leading to sustainable development.

The student is skilled with the techniques to study the ecosystem and the methods to conserve biodiversity.

The student will comprehend the process of carbon sequestration as greenhouse mitigation policy

Elective Paper: DSE: MBO3TH: Molecular biology and Plant Biotechnology-1

Outcomes

The student is able to isolate, clone, express & characterize the desired gene in the host.

The student is informed about the techniques to manipulate the gene and chromosome as desired.

The student compares the nucleotide and protein sequences and deduces their structural and functional features.

The student deduces the phylogenetic relationship between organisms.

Lab-5: DSC: MBO3P05: Molecular Biology & Plant Biotechnology Outcomes

The student is trained in the lab techniques used in a specialized branch of Botany. The student presents the data in various forms and prepares the report.

M.Sc. Botany (NEP-2020)

Semester IV

Mandatory Paper: DSC: MBO4T12: Angiosperm-II

Outcomes

Understand the basic principles of plant systematics, including identification, nomencl and classification.

The student traces the phylogeny of angiosperms with the probable ancestors and devele insight to correlate the characters and interpret to decipher the evolutionary riddles.

The student realizes the floristic wealth of the world and appreciates the comme importance of plants

The student correlates the geographical factors with the development of vegetation distribution of plants.

Mandatory Paper: DSC: MBO4T13: Molecular Biology Outcomes

The student appreciates the significance of gene expression, cell cycle and signal transduction in the life of a plant and other organisms.

The student takes a stance to employ the knowledge of the mechanism and regulation of gene expression, cell cycle and signal transduction to mitigate the stress and apply it for the benefit of humans using appropriate tools.

The student is equipped with skill to map the genes in viruses, bacteria and eukaryotes.

Mandatory Paper: DSC: MBTO4T14: Plant Biotechnology & Plant Breeding Outcomes:

Learn gene cloning, recombinant DNA technology etc.

The student is equipped with skills to isolate the gene, identify its function and transfer it to the suitable host.

The student develops the expertise to in vitro cultivation of plants. culture the plants in vitro.

Learn and apply bioinformatic tools for analysis of bioinformation data.

The student is skilled with the basic know-how required for crop improvement.

Elective Paper: DSE: MBO4T15: Molecular Biology and Plant Biotechnology-II Outcomes

The student is ready to explore the arena of genetic intervention for crop improvement and environment protection.

The student is equipped with the technical know-how of plant tissue culture for crop improvement and plant conservation.

KAMLA NEHRU MAHAVIDYALAYA, NAGPUR DEPARTMENT OF ZOOLOGY

Program Outcomes and Course Outcomes of B.Sc. Zoology

Programme Outcomes (POs)

• Students will be able to describe, identified, classified and differentiate the animals of Different taxonomic ranks. They could differentiate morphological, anatomical, and Histological features of different organs and organ-systems of different animal groups. They could understand and analyze the different evolutionary trends among different Animal groups.

• Students could describe different component of environment and ecosystems could Understand and explain the significance of consequences of deterioration of ecosystem And biodiversity. They could estimate and evaluate the different physic-chemical Parameters of waters like DO, dissolved CO2, pH, hardness etc. to deduce its status.

• Students could able to describe, sketch and differentiate different cell organelles of Animal cell and could examine normal and abnormal cellular physiology. Students could demonstrate cells organelles and a cellular component in tissues as well as able to Estimate protein, lipid and carbohydrates in tissues.

• They could able to describe, interpret inheritance pattern in animals. They could differentiate varied mechanisms controlling inheritance in animals.

• They could describe, analyse the different aspect of Applied Zoology. They could understand the practices of apiculture, sericulture, fisheries etc. and acquainted Themselves with economic benefit of these practices as well as explain it to others.

• Students understand, analyze, and interpret the innate and learned behaviour of different Animal groups.

• Students will be able to perform different experiments which could help them to prove their hypotheses. They could able to analyse the data with help of different statistical tools. Students will develop capabilities which help them to design and investigate the scientific research work. They could able to draft a scientific write up and could argue, defend his findings based on standard practices of research in Life Science.

B.Sc. Sem. I. DSC: BZO1T01

Life and Diversity of Animals – Nonchordates (Protozoa to Annelida)

Course Outcomes

• Students will able to understand about early phyla viz., Protozoa, Porifera, Coelenterata, Platyhelminthes, Aschelminthes and Annelida.

• Students could able to identify, classify and analyse different animals belonging to Phylum Protozoa to Annelida on the basis of levels or grades of organization, Symmetry, coelom etc. up to class.

• Students will learn, analyse, and describe a representative animal belonging to phylum Protozoa to Annelida

• Students could elucidate and explain uniqueness of phylum Protozoa to Annelida And they could able to demonstrate peculiar tissues, organs of animals belonging to These phyla.

DSC: BZO1T02

Environmental Biology

Course Outcomes

• Students will able to describe and explain atmosphere, hydrosphere, lithosphere and Energy resources.

• Students could describe, elucidate different types and components of ecosystems. They could identify, describe and explain different biotic components and could Explain and analyse their role in ecosystem.

• Students will describe, explain and aware about the significance and need of Biodiversity conservation. They also understand, describe and explain legislations passed to conserve the biodiversity and acquainted themselves to nearby National Parks and Wildlife Sanctuaries.

- They will elucidate and differentiate causes of different types and hazards of Pollution.
- Students will estimate the different physico-chemical parameters of water to Analyse.

GE/OE for B.Sc. I Human anatomy and physiology (BGO1T02)

Course outcomes: After completion of the course, students will able to-

- Learn, describe and explain structure and Histology of human digestive system.
- Learn, describe and explain structure and Physiology of excretion and muscle.
- Learn, describe and explain structure and Physiology of respiration and circulation.
- Learn, describe and explain structure and Physiology of nervous system.

GE/OE for B.Sc. I Reproductive Biology (BGO1T02)

Course outcomes: After completion of the course, students will able to-

- Understand, describe and explain the male reproductive system.
- Understand, describe and explain the female reproductive system.
- Understand, describe and explain menstrual cycle.
- Understand, describe and explain spermatogenesis, oogenesis and fertilization.

B.Sc. Sem. I

VSC course: Vermicomposting BVS1P01

Course outcomes: After completion of this course, student will -

- Get acquainted with hand on training of vermicomposting.
- Get acquainted with hand on training of vermiwash.
- Able to understand and learn about the vermicompost marketing.
- Able to do internship in any commercial vermicompost or vermiwash unit.

B.Sc. Sem. I (Zoology) – SEC Course: Bee Keeping (BVS1P02)

Course outcomes: After completion of course, students will

- Able to identify queen, drones and workers of honey bee.
- Able to handle artificial bee hive.

- Understand the economic importance of honey bee.
- Identify and recognized enemies of honey bee.
- Able to do internship in commercial bee keeping unit.

BVE1T01: ENVIRONMENTAL SCIENCE

Course Outcomes

At the end of the course, students shall be able to:

- Explain the basics of Environmental Science and Atmospheric Science along-with the Components of Environment
- Explicate the importance of Environmental Education.
- Elucidate the fundamentals of atmospheric science including formation, depletion and Effects of ozone layer and acid rain on environment.
- Describe the various physical and chemical characteristics and properties of Water and Soil
- Understand the Ecology and its allied branches
- Comprehend about Population and Community Ecology
- Study the changes in Population by understanding the concept of Population ecology.

SEM1: VEDIC MATHEMATICS (BIK1T01)

Course Outcomes: This course will enable the students to

- 1. Improve speed and accuracy in numerical calculations
- 2. Acquire IQ skills and high-end technical knowledge
- 3. gain test taking skills & creativity of calculations

SEM II

Life and Diversity of Animals – Non-Chordates: Life and Diversity of Animals (Arthropoda to Hemichordata)

Course Outcomes:

- Students will learn, identify, explain and analyze the taxonomic position of animals Belonging to phylum Arthropoda to Hemichordata
- 2. They could describe, explain and analyze phylogeny to understand the course of Evolution in animals from phylum Arthropoda to Hemichordata
- 3. They will able to describe, explain and differentiate various morphological, anatomical Structures and functions of animals of phyla from Arthropoda to Hemichordata.
- Students will able to understand , describe, explain and differentiate the larval forms and Development of the invertebrates from phylum Arthropoda to Hemichordata
- Students will able to describe, explain and analyze the ecological and economic Importance of invertebrates.
- 6. Students will understand, able to describe, explain and analyze the ecological role of Invertebrates in the biodiversity.

DSC: BZO1T04

Cell Biology: Course Outcomes

• Students will able to describe, sketch, analyse, and explain the structure and function of the cell organelles.

• Students could describe, sketch, analyse, and explain the structure and function of Nucleus and chromatin structure, its location.

• Students will able to describe, sketch, analyse, and explain the basic principle of life. They could also demonstrate and explain how a cell divides leading to the growth of an Organism.

• Students could describe, sketch, analyse, and explain how a cell communicates with its Neighbouring cells.

• Students will able to describe, sketch, analyse, and explain the abnormality in structural and functional aspects of cells.

• Students will able handle and use microscopes and oculometer to elucidate and Measure and explain the minor details of tissues.

• Students will able to demonstrate osmosis. They could also demonstrate and explain Mitochondria, salivary gland chromosome and Barr body in cell.

GE/OE for B.Sc. II Industrial Entomology BGO2T03

Course outcomes: After completion of the course, students will able to-

- Understand, describe and explain the Mulberry sericulture
- Understand, describe and explain Tasar sericulture.
- Understand, describe and explain Eri sericulture
- Understand, describe and explain lac culture.
- Understand, describe and explain agricultural and medical pests.
- Understand, describe and explain apiculture.

GE/OE for B.Sc. II Fish Farming BGO2T04

Course outcomes: After completion of the course, students will able to-

- Understand, describe and explain suitable aquaculture fish on specific criteria.
- Understand, describe and explain construction and management of fish pond.
- Understand, describe and explain breeding techniques.
- Comprehend the status of freshwater resources.
- Evaluate economically important freshwater biological resources for their commercial Utilization.

• Adjudge different types of rearing process and steps along with procedure involve in Preparation and management of nursery and rearing pond of fish culture.

- Understand, describe and explain the marketing of fish.
- Understand, describe and explain various diseases in fishes.

B.Sc. II VSC course: Culture of Indian Major Carps BVS1P03

Course outcomes: After completion of this course, student will-

- Able to sketch, describe, Identify and classify the Indian major carps.
- Design the layout of the various types of ponds for the rearing of various stages of IMC.
- Get acquainted with hands on training of various breeding techniques.
- Get acquainted with hands on training of rearing of fry to fingerlings.
- Able to understand the different types of crafts and gears used in fish harvesting (Catching).
- Get hands on training of handling of various crafts used in fish harvesting (Catching).
- Able to do internship and work in any commercial breeding centre.

B.Sc. Sem. II SEC

Course Name: Lac culture (BVS2P04)

Course outcomes: After completion of the course, students will able to-

• Identify, recognized, describe and explain male and female Lac insect and different stages of Its life cycle.

- Identify, recognized, describe and explain various host plants of Lac insect.
- Handle different tools and materials involved in Lac culture.
- Separate Lac from sticks; dry and wash the crude Lac.
- Process the crude lac to Shellac.
- To do internship and work in commercial Lac cultivation unit.

SEM2: INDIAN ASTRONOMY (BIK2T02)

Course Outcomes: This course will enable the students to understand that

- 1. It is possible to create a map of the intellectual growth of a culture Using astronomy as a probe.
- 2. The growth of Indian astronomy occurs in distinct stages analogous to Phase transitions of the evolution of cultures
- 3. Indian Astronomy therefore provides an excellent window to the Past dramatic transitions.

4. KAMLA NEHRU MAHAVIDYALAYA, NAGPUR

5. DEPARTMENT OF ZOOLOGY

6. SESSION: 2023-2024

7. Program Outcomes and Course Outcomes of M.Sc. Zoology

8.

9. Program Outcomes (POs)

- 10. PO 1- M.Sc. program produces post-graduates who have great readiness in playing active role cither in government or non-government organization by designing processes/strategies that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 11. PO 2-Students developed analytical and creative thinking from the conducive research environments and interacting with scholars/ faculties that will help in identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual. organizational, and personal) from different perspectives.
- 12. PO 3- To use research-based knowledge and research methods including review research literature, accession of primary literature, identify relevant works for a particular topic, design of experiments, analysis, evaluation and interpretation of scientific data, and synthesis of the information to provide valid conclusions in real situations.
- 13. PO 4- To empower students to create, select, and apply appropriate techniques, resources, and ICT tools for understanding of the science.
- 14. PO 5- Apply ethical principles and commit to professional ethics and responsibilities norms of the work/research practice. Also, to promote learning and research aptitude a attitude to serve the society.
- 15. PO 6- Students are encouraged to develop an analytical mind as they ask questions, tak part in topic-based quiz and debates, and are made aware of recent study and research relevant topics.
- 16. PO 7- To enhance the ability of writing research project activities, problem-solving. design and carry research project.
- 17. PO 8- M.Sc. program produces post-graduates who have great confidence which allow them to have a positive and realistic perception of themselves and their abilities in th scientific and social environment.
- 18. PO 9- Students acquiring skill-based education will make them self-employable and can generate employment.
- 19. PO 10- Students are encouraged to develop analytical and critical thinking minds which will help to develop scientific temperament in the community.

20. Program Specific Outcomes (PSOs)

21. PSO 1-Students will acquire techniques and skills to implement the knowledge in the design and execution of research in different branches of Zoology. This will help in careers related to teaching, research in Zoology; as well as in having innovative ideas and

necessary training to initiate unique start-ups and entrepreneurship in the realm of life sciences.

- 22. PSO 2- To learn and apply the ethics in animal handling, during laboratory practices and experimentation.
- 23. PSO 3- In addition to the curriculum, the students will also gain skill-based learning practical knowledge to facilitate experiments in the subject Zoology.
- 24. PSO 4- Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. Demonstrate knowledge and understanding of Zoology and management principles and apply these to one's own work, as a member and leader in a team.
- 25. PSO 5- To acquired knowledge across a broad range of Zoology including recent trends which will help to solve the scientific problem logically in the context of biological process. Thus, leading to self-directed learning and evaluation.
- 26. PSO 6- Perform laboratory procedures as per standard protocols in various areas of Zoology including Animal Diversity, Cell Biology, Genetics, Molecular Biology, Physiology, Developmental Biology, Comparative Endocrinology, Immunology, Mammalian Reproductive Physiology, Fish and Fisheries and Entomology.
- 27. PSO 7- Understand the applications of zoological science in Apiculture, Sericulture, Lac culture, Fish and Fisheries, Mammalian Reproductive Physiology and Animal Physiology.
- 28. PSO 8- Develop knowledge and understanding of living organisms at several levels of Zoological and Biological organization from molecular level, through cells and ultimately the whole organisms and its impact on ecosystems.
- 29. PSO 9- To develop interest and elective modules by selecting specialization in various aspects and understanding the methods of zoological research.
- 30. PSO 10- The M. Sc. Program will lead the students to impart a scientific temperament which will help them to add new scientific knowledge/information in the field of Zoology research.

Course Outcomes (COs) M.Sc. Zoology Semester-I MZOIT01 Paper- Biology of Non-Chordata

Course Outcomes (COs)

Students will be able to identify, classify, describe, discuss and explain invertebrate specimen in the field as well as maintain and organize museum specimen. Develop a skill to demonstrate and explain different anatomical systems, physiological body processes and diversity of invertebrates, animal architecture and functions. Create the awareness of the economic importance, significance and explain structural and functional relationship between invertebrate phyla. Assess and evaluate a taxonomic status of primitive members of arthropods and molluscs. Describe and analyze the sea star's body plan, elucidate the origins and evolutionary significance of echinoderm larval forms, comprehend the mechanism of movements based on fluid filled cavities in invertebrates and identify and classify minor invertebrate specimen. Perform the whole mount preparations of given invertebrate material.

MZO1T02- Cell Biology and Genetics

Course Outcomes (COs)

31. Students will be able to describe and explain the structure and function of plasma membrane through fluid mosaic model, types of membrane proteins, transport and organization of cytoskeleton, cell organelles and endomembrane system. Differentiate and illustrate the mechanism of Cell division, cell cycle regulation, types of cell signaling, signal transduction pathways and various receptors involved in cell signaling. Describe and differentiate the types and functions of cellular communication, cell adherence molecule and extracellular matrix interaction. Differentiate Mendelian, non-Mendelian inheritance and solve the problems of inheritance based on probability. Explain, differentiate and compare codominance, incomplete dominance, gene interactions, linkage, crossing over, sex limited and sex influenced characters. * Illustrate and differentiate the mode of inheritance of polygenic and monogenic traits, role of genetic and environmental factors of inheritance, inbreeding and its consequences and deduce coefficient of inbreeding and consanguinity. Explain, distinguish and describe the mutation and its types, structural and numerical alterations of chromosomes as well as the extra chromosomal inheritance, maternal inheritance, microbial genetics, genetic mapping and human genetics by using pedigree analysis and types of genetic disorders they could demonstrate metaphase chromosome Barr body and polythene chromosome.

MZO1T03-Digestive and Excretory Physiology

Course Outcomes (COs)

The students will be able to differentiate and compare the types, anatomical structures, secretory and endocrine cells present in the histological structure, mechanism of secretion along with the neural and chemical control secretion of different digestive glands such as the salivary gland, stomach, pancreas, liver and intestine etc. along with movement of GIT. Demonstrate the effects of various factors on the activity of digestive enzymes. Describe, explain and compare gut brain axis, mechanism of digestion of various biomolecules such as carbohydrates, proteins and lipids and disorders associated with the GIT. Describe, explain and compare the anatomy of kidney, types and ultrastructure of nephron, mechanism of urine formation, concentration and dilution of urine and normal and abnormal constituents of urine

along with micturition. Determine the regulation of urine and body fluid concentration and volume along with water, electrolyte and acid base balance. Describe, explain and compare mechanism of ADH, RAAS system, renal clearance, physiology of nitrogen excretion and causes, symptoms and treatments of renal failure. They will be able to qualitatively demonstrate the presence of various normal and abnormal constituents of urine. Further, they will demonstrate the presence of normal and abnormal urine crystals.

MZOIT04-Research Methodology

Course Outcomes (COS)

Students will be able to learn, describe and imbibe animal ethics in research, as well as various guidelines provided by IAEC and CCSEA. Students will be able to compare the model organisms used in biological science. They will able to discuss and determine the animal facilities to laboratories, transportation, hygiene, environment, maintenance, ethical, legal and policy issues. Encourage students to pursue their interests in research and to investigate selecting appropriate methodology of scientific research. Students could design the experiments properly. They will be able to write scientific reports, research proposals, patents, review articles, and will be aware of major funding agencies. Improve the knowledge of computer skills. They will be able to use basic computer programmes such as MS-Office, Coral Draw, and Photoshop. Students will analyze and use statistics to analyze data in biological research. They will able acquainted with Al and its use in Life Science as well as to apply various statistical tools like central tendency, dispersion, skewness, and kurtosis measures to analyze results in the research work. They also learn measures of relationship tests of hypothesis testing of significance and know about statistical software. Students will also able to learn and acquainted with IPR and Patent registration.

M.Sc. Zoology Semester II

MZ02T05- Biology of Chordata

Course Outcomes (COs)

Students will be able to describe and recognize unique characters, life functions. connecting link between non-chordates and chordates and the diversity of urochordates, cephalochordates, cyclostomes and fish. Describe the structural, physiological and evolutionary correlation of different vertebrates; elaborate how kidneys represented successful evolutionary responses to the surrounding environmental pressures. List some migratory bird species, conduct bird tracking and watching activity. Facilitate students to explore the world of cetaceans and the marine environment. Gain a better understanding of the forces that drive evolution, speciation and the diversity of life on our planet. Identify, describe and differentiate

the basic structure and functions of the central and peripheral nervous systems and define learning and memory. Compare and contrast the organization and evolution of the vertebrate circulatory system and heart. Describe specialized sensory organs of vertebrates and relate their role to their habitat. Comprehend the gradual development and evolutionary history of man. Identify, classify, describe and explain vertebrate specimen in the field as well as maintain and organize museum specimen. Develop a skill to demonstrate and explain different anatomical systems of vertebrate, and perform whole mount preparations of given vertebrate materials, different steps of microtomy and staining procedure. They could use, handle and maintain the instruments like microtome and oven. Students will able to identify, demonstrate, explain and compare the histological structure and functions of internal organs of vertebrates.

MZO2T06 - Advanced Developmental Biology

Course Outcomes (COS)

Students will be able to differentiate and explain the basic developmental concept of insects, cast differentiation in insects, amphibian metamorphosis and aves with its hormonal control and regeneration process in vertebrates. Illustrate and classify the type, structure, function and hormones of the placenta, analyze the cell differentiation, organ formation, cell death, and multiple physiological levels of aging. They will be able to analyze the process of advanced cattle breeding with the help of MOET, cloning techniques, acquire knowledge about embryonic sexing to diagnose the genetic disorder, the economic and clinical significance embryonic stem cells. Comprehend birth control method that uses the body's immune response and classical contraceptive techniques to prevent pregnancy. Explain different anti-androgen and anti-spermiogenic compounds and also discuss transgenic animals that elevated the potential of biological research for human welfare.

MZO2T07 - Brain and Muscle Physiology

Course Outcomes (COs)

Students will be able to differentiate and classify the various morphological differentiation and analysis of the mammalian brain, brain stem and cerebellum. Elaborate on the physiology and mechanism of learning, memory and sleep. Classify and illustrate the ultrastructure of neurons and synapses, functional and bioelectrical properties of the neurons, molecular mechanism of synaptic transmission and mechanism of neurotropins and growth factors affecting the neuronal growth. Classify and analyze the biosynthesis, storage, release and mechanism of the action of various neurotransmitters and neuropeptides. Differentiate between the structure and physiology of various organs involved in photoreception and phonoreception. Analyze the various causes, symptoms, mechanism of pathogenesis, diagnosis and treatment of neurodegenerative disorders. Explain and describe the classification, ultrastructure, properties and structural proteins of muscle. Illustrate the molecular mechanism of muscular contraction, ultrastructure of the neuromuscular junction and types, causes, symptoms and treatment of various neuromuscular disorders. They could able to demonstrate and estimate liver and muscle glycogen, protein and lipid.

32.

MZO3T08- Parasitology and Immunology

Course Outcomes (COS)

Students will be able to illustrate and differentiate life cycle, mode of transmission, infection and treatment of various bacterial infection and viral infections such as covid, dengue, hepatitis. Describe, explain, classify and differentiate organs of immune system, innate immunity, adaptive immunity, antigen, antibodies, toxin anti-toxin and their cellular target. Demonstrate antigen-antibody interaction with the help of ODD. Illustrate the maturation, activation, differentiation of T and B cell, inheritance of MHC molecules and various pathways of complement system. Classify, describe and differentiate various types of cytokines, hypersensitivity, autoimmunity and immunodeficiency diseases. Explain and describe activation and migration of leucocyte, mast cell, transplantation, tumor immunology, various infectious diseases and vaccines. Illustrate and differentiate working principle and significance of immunotechniques such as RIA and ELISA

MZO3T09 - Wild Life and Avian Biology

Course Outcomes (COs)

Students will explain, describe and analyze importance of wildlife and its conservation, international conservation bodies, predator-prey relationship, population dynamics of ungulates and carnivores. They could also explain, describe and analyze morphology, morphometry of birds, bird diversity, techniques of bird counting, bird breeding population and breeding group maps, bird hotspots, bird sanctuaries and role of birds in ecosystem.

MZO3T10- Comparative Endocrinology Course Outcomes (COs)

Students will be able to identify, classify, differentiate, describe and explain different types of cells and organs of neuroendocrine system of invertebrates. Illustrate the role of hormones in the regulation of various physiological processes in invertebrates such as metamorphosis, reproduction and color change mechanisms. Describe, explain, and differentiate the hypothalamo-hypophysial system, structure, hormones, functions and feedback mechanisms of pituitary, thyroid, parathyroid, pancreas, gastro-intestinal tract and adrenal gland. Comprehend the role of hormones in pharmaceuticals, including contraception, sex hormones, cancer, immune system and immune regulating hormones (IRH). Raise awareness about the

significance of pharmaceutical applications. Students could demonstrate compare the preparation of histological slides of endocrine glands.

MZO3T11-Blood and Cardiac Physiology

Course Outcomes (COs)

The students will be able to illustrate the structure, properties and function of cardiac muscle along with the anatomy, histology, nerve innervation and valves of the heart. They will further be able to classify and compare the pacemakers and conducting fibers present in the heart, and illustrate various types, causes, symptoms, diagnosis, and factors affecting blood pressure and treatment. Illustrate and compare the mechanism of the cardiac cycle, heart sound, working principle of ECG, cardiac output. haemodynamic, haemorrhage, cardiac murmur, circulatory shock and cardiac failure. Describe, explain and compare the cellular composition and functions of blood glucose and lipids along with blood coagulation. Compare and illustrate the transport of gases by blood, diagnosis, symptoms and treatment of bleeding disorders and blood cancer. Illustrate the mechanism of formation, composition, transport and functions of lymph. Differentiate, describe and explain anemia and polycythemia, platelets and Blood substitute. Students will be able to demonstrate the components of the blood such as RBCs, WBCs, DLCs, Hb etc. along with the blood group.

MZO4T12- Biotechnique, Biostatistics, Toxicology and Bioinformatics Course Outcomes (COS)

Students will be able to elaborate, discuss and describe sterilization, animal cells, tissue culture, primary culture, cell lines, cell quantification, and growth kinetics and cryopreservation technique. Describe, demonstrate and explain the principle and working mechanism of sedimentation, centrifugation. TLC, gas chromatography and electrophoretic technique. Illustrate and explain the biostatistical measures such as central tendency, dispersion, probability, sampling types, methods and significance test. Describe and explain neuronal genetics, environmental components in the development of animal behaviour, organization and functions of animal ethics. Illustrate and explain about the significance of toxicity test in the projects and research. Describe and explain the importance and scope of bioinformatics, various biological databases such as BLAST and FASTA, PSI- BLAST etc. and various program runs for the construction of phylogenetic tree like MEGA. Students could construct, analyze and interpret phylogenetic tree.

MZO4T13- Radiation and Chronobiology Course Outcomes (COS)

The students will be able to define and explain the scope and significance of radiobiological scope in human welfare. Identify ionizing radiation, linear energy transfer, radiation dose and units and conceptualize the radiation types. Describe, explain and analyze application of radiology and gainful and harmful effects of radiation. Comprehend the concept of circadian rhythm, central clock system and peripheral clock system. Students will describe, explain and analyze centers of biological clock, relevance of biological clock in human welfare, mechanism of regulation of biological clock and effects of irregularity of biological clock and its remedies.

MZO4T14-Molecular Biology and Biotechnology

Course Outcomes (COs)

Students will be able to analyze the basics of cellular genome, organization of genetic material, fundamental process of duplication of genetic material in prokaryotes and eukaryotes important for cell division. Evaluate the different types of DNA damage and repair mechanism. Illustrate the fundamentals of various mobile DNA elements useful in horizontal gene transfer, evolutionary process and gene expression in prokaryotes and eukaryotes. Explain the mechanisms and regulation of operon models significant in regulation of gene expression in prokaryotes. Illustrate the fundamental process of protein synthesis with explanation of antisense and ribozyme technology. They could differentiate and distinguish DNA sequencing and gene amplification methods, cloning by different cloning vectors for recombinant DNA technology.

MZO4T15- Respiratory and Reproductive Physiology Course Outcomes (COs)

Students will able to understand and evaluate the process of respiration and also understand the structure of respiratory tract. Student will be able to understand and evaluate the difference processes and hormonal control of ovarian cycle. Describe and specifies the mechanism and hormonal control and uterine cycle in different species. Comprehend the structure function regulation abnormalities and diseases of female reproductive track discuss the physiological and hormonal reasons behind body changes at puberty importance of prostaglandins in reproduction recognize the anatomical structure and development of breast mechanism of synthesis and secretion and ejaculation of milk via hormonal influence.

KAMLA NEHRU MAHAVIDYALAYA, NAGPUR DEPARTMENT OF ZOOLOGY

SESSION: 2023-2024 Program Outcomes and Course Outcomes of M.Sc. Zoology

Program Outcomes (POs)

PO 1- M.Sc. program produces post-graduates who have great readiness in playing active role cither in government or non-government organization by designing processes/strategies that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 2-Students developed analytical and creative thinking from the conducive research environments and interacting with scholars/ faculties that will help in identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual. organizational, and personal) from different perspectives.

PO 3- To use research-based knowledge and research methods including review research literature, accession of primary literature, identify relevant works for a particular topic, design of experiments, analysis, evaluation and interpretation of scientific data, and synthesis of the information to provide valid conclusions in real situations.

PO 4- To empower students to create, select, and apply appropriate techniques, resources, and ICT tools for understanding of the science.

PO 5- Apply ethical principles and commit to professional ethics and responsibilities norms of the work/research practice. Also, to promote learning and research aptitude a attitude to serve the society.

PO 6- Students are encouraged to develop an analytical mind as they ask questions, tak part in topic-based quiz and debates, and are made aware of recent study and research relevant topics. PO 7- To enhance the ability of writing research project activities, problem-solving. design and carry research project.

PO 8- M.Sc. program produces post-graduates who have great confidence which allow them to have a positive and realistic perception of themselves and their abilities in th scientific and social environment.

PO 9- Students acquiring skill-based education will make them self-employable and can generate employment.

PO 10- Students are encouraged to develop analytical and critical thinking minds which will help to develop scientific temperament in the community.

Program Specific Outcomes (PSOs)

PSO 1-Students will acquire techniques and skills to implement the knowledge in the design and execution of research in different branches of Zoology. This will help in careers related to teaching, research in Zoology; as well as in having innovative ideas and necessary training to initiate unique start-ups and entrepreneurship in the realm of life sciences.

PSO 2- To learn and apply the ethics in animal handling, during laboratory practices and experimentation.

PSO 3- In addition to the curriculum, the students will also gain skill-based learning practical knowledge to facilitate experiments in the subject Zoology.

PSO 4- Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. Demonstrate knowledge and understanding of Zoology and management principles and apply these to one's own work, as a member and leader in a team.

PSO 5- To acquired knowledge across a broad range of Zoology including recent trends which will help to solve the scientific problem logically in the context of biological process. Thus, leading to self-directed learning and evaluation.

PSO 6- Perform laboratory procedures as per standard protocols in various areas of Zoology including Animal Diversity, Cell Biology, Genetics, Molecular Biology, Physiology, Developmental Biology, Comparative Endocrinology, Immunology, Mammalian Reproductive Physiology, Fish and Fisheries and Entomology.

PSO 7- Understand the applications of zoological science in Apiculture, Sericulture, Lac culture, Fish and Fisheries, Mammalian Reproductive Physiology and Animal Physiology.

PSO 8- Develop knowledge and understanding of living organisms at several levels of Zoological and Biological organization from molecular level, through cells and ultimately the whole organisms and its impact on ecosystems.

PSO 9- To develop interest and elective modules by selecting specialization in various aspects and understanding the methods of zoological research.

PSO 10- The M. Sc. Program will lead the students to impart a scientific temperament which will help them to add new scientific knowledge/information in the field of Zoology research.

Course Outcomes (COs) M.Sc. Zoology Semester-I MZOIT01 Paper- Biology of Non-Chordata Course Outcomes (COs)

Students will be able to identify, classify, describe, discuss and explain invertebrate specimen in the field as well as maintain and organize museum specimen. Develop a skill to demonstrate and explain different anatomical systems, physiological body processes and diversity of invertebrates, animal architecture and functions. Create the awareness of the economic importance, significance and explain structural and functional relationship between invertebrate phyla. Assess and evaluate a taxonomic status of primitive members of arthropods and molluscs. Describe and analyze the sea star's body plan, elucidate the origins and evolutionary significance of echinoderm larval forms, comprehend the mechanism of movements based on fluid filled cavities in invertebrates and identify and classify minor invertebrate specimen. Perform the whole mount preparations of given invertebrate material.

MZO1T02- Cell Biology and Genetics Course Outcomes (COs) Students will be able to describe and explain the structure and function of plasma membrane through fluid mosaic model, types of membrane proteins, transport and organization of cytoskeleton, cell organelles and endomembrane system. Differentiate and illustrate the mechanism of Cell division, cell cycle regulation, types of cell signaling, signal transduction pathways and various receptors involved in cell signaling. Describe and differentiate the types and functions of cellular communication, cell adherence molecule and extracellular matrix interaction. Differentiate Mendelian, non-Mendelian inheritance and solve the problems of inheritance based on probability. Explain, differentiate and compare codominance, incomplete dominance, gene interactions, linkage, crossing over, sex limited and sex influenced characters. * Illustrate and differentiate the mode of inheritance of polygenic and monogenic traits, role of genetic and environmental factors of inheritance, inbreeding and its consequences and deduce coefficient of inbreeding and consanguinity. Explain, distinguish and describe the mutation and its types, structural and numerical alterations of chromosomes as well as the extra chromosomal inheritance, maternal inheritance, microbial genetics, genetic mapping and human genetics by using pedigree analysis and types of genetic disorders they could demonstrate metaphase chromosome Barr body and polythene chromosome.

MZO1T03-Digestive and Excretory Physiology Course Outcomes (COs)

The students will be able to differentiate and compare the types, anatomical structures, secretory and endocrine cells present in the histological structure, mechanism of secretion along with the neural and chemical control secretion of different digestive glands such as the salivary gland, stomach, pancreas, liver and intestine etc. along with movement of GIT. Demonstrate the effects of various factors on the activity of digestive enzymes. Describe, explain and compare gut brain axis, mechanism of digestion of various biomolecules such as carbohydrates, proteins and lipids and disorders associated with the GIT. Describe, explain and compare the anatomy of kidney, types and ultrastructure of nephron, mechanism of urine formation, concentration and dilution of urine and normal and abnormal constituents of urine along with micturition. Determine the regulation of urine and body fluid concentration and volume along with water, electrolyte and acid base balance. Describe, explain and compare mechanism of ADH, RAAS system, renal clearance, physiology of nitrogen excretion and causes, symptoms and treatments of renal failure. They will be able to qualitatively demonstrate the presence of various normal and abnormal constituents of urine. Further, they will demonstrate the presence of normal and abnormal urine crystals.

MZOIT04-Research Methodology

Course Outcomes (COS)

Students will be able to learn, describe and imbibe animal ethics in research, as well as various guidelines provided by IAEC and CCSEA. Students will be able to compare the

model organisms used in biological science. They will able to discuss and determine the animal facilities to laboratories, transportation, hygiene, environment, maintenance, ethical, legal and policy issues. Encourage students to pursue their interests in research and to investigate selecting appropriate methodology of scientific research. Students could design the experiments properly. They will be able to write scientific reports, research proposals, patents, review articles, and will be aware of major funding agencies. Improve the knowledge of computer skills. They will be able to use basic computer programmes such as MS-Office, Coral Draw, and Photoshop. Students will analyze and use statistics to analyze data in biological research. They will able acquainted with Al and its use in Life Science as well as to apply various statistical tools like central tendency, dispersion, skewness, and kurtosis measures to analyze results in the research work. They also learn measures of relationship tests of hypothesis testing of significance and know about statistical software. Students will also able to learn and acquainted with IPR and Patent registration.

M.Sc. Zoology Semester II MZ02T05- Biology of Chordata Course Outcomes (COs)

Students will be able to describe and recognize unique characters, life functions. connecting chordates and the diversity of urochordates, link between non-chordates and cephalochordates, cyclostomes and fish. Describe the structural, physiological and evolutionary correlation of different vertebrates; elaborate how kidneys represented successful evolutionary responses to the surrounding environmental pressures. List some migratory bird species, conduct bird tracking and watching activity. Facilitate students to explore the world of cetaceans and the marine environment. Gain a better understanding of the forces that drive evolution, speciation and the diversity of life on our planet. Identify, describe and differentiate the basic structure and functions of the central and peripheral nervous systems and define learning and memory. Compare and contrast the organization and evolution of the vertebrate circulatory system and heart. Describe specialized sensory organs of vertebrates and relate their role to their habitat. Comprehend the gradual development and evolutionary history of man. Identify, classify, describe and explain vertebrate specimen in the field as well as maintain and organize museum specimen. Develop a skill to demonstrate and explain different anatomical systems of vertebrate, and perform whole mount preparations of given vertebrate materials, different steps of microtomy and staining procedure. They could use, handle and maintain the instruments like microtome and oven. Students will able to identify, demonstrate, explain and compare the histological structure and functions of internal organs of vertebrates.

MZO2T06 - Advanced Developmental Biology

Course Outcomes (COS)

Students will be able to differentiate and explain the basic developmental concept of insects, cast differentiation in insects, amphibian metamorphosis and aves with its hormonal control

and regeneration process in vertebrates. Illustrate and classify the type, structure, function and hormones of the placenta, analyze the cell differentiation, organ formation, cell death, and multiple physiological levels of aging. They will be able to analyze the process of advanced cattle breeding with the help of MOET, cloning techniques, acquire knowledge about embryonic sexing to diagnose the genetic disorder, the economic and clinical significance embryonic stem cells. Comprehend birth control method that uses the body's immune response and classical contraceptive techniques to prevent pregnancy. Explain different antiandrogen and anti-spermiogenic compounds and also discuss transgenic animals that elevated the potential of biological research for human welfare.

MZO2T07 - Brain and Muscle Physiology

Course Outcomes (COs)

Students will be able to differentiate and classify the various morphological differentiation and analysis of the mammalian brain, brain stem and cerebellum. Elaborate on the physiology and mechanism of learning, memory and sleep. Classify and illustrate the ultrastructure of neurons and synapses, functional and bioelectrical properties of the neurons, molecular mechanism of synaptic transmission and mechanism of neurotropins and growth factors affecting the neuronal growth. Classify and analyze the biosynthesis, storage, release and mechanism of the action of various neurotransmitters and neuropeptides. Differentiate between the structure and physiology of various organs involved in photoreception and phonoreception. Analyze the various causes, symptoms, mechanism of pathogenesis, diagnosis and treatment of neurodegenerative disorders. Explain and describe the classification, ultrastructure, properties and structural proteins of muscle. Illustrate the molecular mechanism of muscular contraction, ultrastructure of the neuromuscular junction and types, causes, symptoms and treatment of various neuromuscular disorders. They could able to demonstrate and estimate liver and muscle glycogen, protein and lipid.

MZO3T08- Parasitology and Immunology

Course Outcomes (COS)

Students will be able to illustrate and differentiate life cycle, mode of transmission, infection and treatment of various bacterial infection and viral infections such as covid, dengue, hepatitis. Describe, explain, classify and differentiate organs of immune system, innate immunity, adaptive immunity, antigen, antibodies, toxin anti-toxin and their cellular target. Demonstrate antigen-antibody interaction with the help of ODD. Illustrate the maturation, activation, differentiation of T and B cell, inheritance of MHC molecules and various pathways of complement system. Classify, describe and differentiate various types of cytokines, hypersensitivity, autoimmunity and immunodeficiency diseases. Explain and describe activation and migration of leucocyte, mast cell, transplantation, tumor immunology, various infectious diseases and vaccines. Illustrate and differentiate working principle and significance of immunotechniques such as RIA and ELISA.

MZO3T09 - Wild Life and Avian Biology Course Outcomes (COs)

Students will explain, describe and analyze importance of wildlife and its conservation, international conservation bodies, predator-prey relationship, population dynamics of ungulates and carnivores. They could also explain, describe and analyze morphology, morphometry of birds, bird diversity, techniques of bird counting, bird breeding population and breeding group maps, bird hotspots, bird sanctuaries and role of birds in ecosystem.

MZO3T10- Comparative Endocrinology Course Outcomes (COs)

Students will be able to identify, classify, differentiate, describe and explain different types of cells and organs of neuroendocrine system of invertebrates. Illustrate the role of hormones in the regulation of various physiological processes in invertebrates such as metamorphosis, reproduction and color change mechanisms. Describe, explain, and differentiate the hypothalamo-hypophysial system, structure, hormones, functions and feedback mechanisms of pituitary, thyroid, parathyroid, pancreas, gastro-intestinal tract and adrenal gland. Comprehend the role of hormones in pharmaceuticals, including contraception, sex hormones, cancer, immune system and immune regulating hormones (IRH). Raise awareness about the significance of pharmaceutical applications. Students could demonstrate compare the preparation of histological slides of endocrine glands.

MZO3T11-Blood and Cardiac Physiology

Course Outcomes (COs)

The students will be able to illustrate the structure, properties and function of cardiac muscle along with the anatomy, histology, nerve innervation and valves of the heart. They will further be able to classify and compare the pacemakers and conducting fibers present in the heart, and illustrate various types, causes, symptoms, diagnosis, and factors affecting blood pressure and treatment. Illustrate and compare the mechanism of the cardiac cycle, heart sound, working principle of ECG, cardiac output. haemodynamic, haemorrhage, cardiac murmur, circulatory shock and cardiac failure. Describe, explain and compare the cellular composition and functions of blood glucose and lipids along with blood coagulation. Compare and illustrate the transport of gases by blood, diagnosis, symptoms and treatment of bleeding disorders and blood cancer. Illustrate the mechanism of formation, composition, transport and functions of lymph. Differentiate, describe and explain anemia and polycythemia, platelets and Blood substitute. Students will be able to demonstrate the components of the blood such as RBCs, WBCs, DLCs, Hb etc. along with the blood group.
MZO4T12- Biotechnique, Biostatistics, Toxicology and Bioinformatics Course Outcomes (COS)

Students will be able to elaborate, discuss and describe sterilization, animal cells, tissue culture, primary culture, cell lines, cell quantification, and growth kinetics and cryopreservation technique. Describe, demonstrate and explain the principle and working mechanism of sedimentation, centrifugation. TLC, gas chromatography and electrophoretic technique. Illustrate and explain the biostatistical measures such as central tendency, dispersion, probability, sampling types, methods and significance test. Describe and explain neuronal genetics, environmental components in the development of animal behaviour, organization and functions of animal ethics. Illustrate and explain about the significance of toxicity test in the projects and research. Describe and explain the importance and scope of bioinformatics, various biological databases such as BLAST and FASTA, PSI- BLAST etc. and various program runs for the construction of phylogenetic tree like MEGA. Students could construct, analyze and interpret phylogenetic tree.

MZO4T13- Radiation and Chronobiology Course Outcomes (COS)

The students will be able to define and explain the scope and significance of radiobiological scope in human welfare. Identify ionizing radiation, linear energy transfer, radiation dose and units and conceptualize the radiation types. Describe, explain and analyze application of radiology and gainful and harmful effects of radiation. Comprehend the concept of circadian rhythm, central clock system and peripheral clock system. Students will describe, explain and analyze centers of biological clock, relevance of biological clock in human welfare, mechanism of regulation of biological clock and effects of irregularity of biological clock and its remedies.

MZO4T14-Molecular Biology and Biotechnology

Course Outcomes (COs)

Students will be able to analyze the basics of cellular genome, organization of genetic material, fundamental process of duplication of genetic material in prokaryotes and eukaryotes important for cell division. Evaluate the different types of DNA damage and repair mechanism. Illustrate the fundamentals of various mobile DNA elements useful in horizontal gene transfer, evolutionary process and gene expression in prokaryotes and eukaryotes. Explain the mechanisms and regulation of operon models significant in regulation of gene expression in prokaryotes. Illustrate the fundamental process of protein synthesis with explanation of antisense and ribozyme technology. They could differentiate and distinguish DNA sequencing and gene amplification methods, cloning by different cloning vectors for recombinant DNA technology.

MZO4T15- Respiratory and Reproductive Physiology Course Outcomes (COs)

Students will able to understand and evaluate the process of respiration and also understand the structure of respiratory tract. Student will be able to understand and evaluate the difference processes and hormonal control of ovarian cycle. Describe and specifies the mechanism and hormonal control and uterine cycle in different species. Comprehend the structure function regulation abnormalities and diseases of female reproductive track discuss the physiological and hormonal reasons behind body changes at puberty importance of prostaglandins in reproduction recognize the anatomical structure and development of breast mechanism of synthesis and secretion and ejaculation of milk via hormonal influence.



Kamla Nehru Mahavidyalaya, Nagpur



Affiliated to RTM Nagpur University, Nagpur, Recognised by State Government Re-accredited by NAAC with (A+) grade (CGPA 3.53)

Program Outcomes, Program Specific Outcomes and Course Outcomes

DEPARTMENT OF MICROBIOLOGY

SESSION-2024-25

PROGRAM OUTCOMES (POs)

Name of Program: B. Sc. (NEP) MICROBIOLOGY :

- Students will be able to acquire, articulate, retain and apply specialized language and knowledge relevant to microbiology.

¬ Students will acquire and demonstrate competency in laboratory safety and in routine and specialized microbiological laboratory skills applicable to microbiological research or clinical methods, including accurately reporting observations and analysis.

 \neg Students will communicate scientific concepts, experimental results and analytical arguments clearly and concisely, both verbally and in writing.

¬ Students will demonstrate engagement in the microbiology discipline through involvement in research or internship activities, the microbiology student association club (MSA) and outreach or mentoring activities specific to microbiology.

 \neg Students study microscopic living systems and organisms. They can work across a spectrum of private industries or government agencies. Cell biologists focus on the uses, functions, development and lives of cells and their related systems and interaction

PROGRAM SPECIFIC OUTCOME OF B. Sc.(NEP) MICROBIOLOGY (PSOs)

This course presents the study of Micro organisms. On successful completion of the subject the student should have understood the Role of microorganisms in the diversity.

- A general course emphasizing distribution, morphology and physiology of microorganisms in addition to skills in aseptic procedures, isolation and identification.
- This course also includes sophomore level material covering immunology, virology, epidemiology and DNA technology.
- Recommended for all allied health students. Three hours lecture and four hours lab per week.
- With the individual Research projects, Research orientation will be improved which is reflected in the form of papers and conference presentations.
- Applied papers are advanced, making the students updated in the field. More number of practicals is there in the course making the students well worse with the subject.

Statements of Course Outcomes (COs)

Discipline Specific Core Course (DSC-1)-MICROBIOLOGY - Paper-I (BMI1T01)

DSC :PAPER I : (BMI1T01) (FUNDAMENTALS OF MICROBIOLOGY)

1. Students will understand the contributions of different scientists in the fields of Microbial science.

2. Students will have knowledge about the established and emerging fields of science with respect to Microbiology.

3. Students will have knowledge about basic structure & nutritional requirement of bacteria

4. Develop practical skills to handle microorganism aseptically

- 5. Understand the use of apparatus and their use without fear.
- 6. Correlate their Microbiology theory concepts with practical outcomes.

DSC :Paper- II (BMI1T02) (BASIC TECHNIOUES IN MICROBIOLOGY)

1. Students will be able to understand the needs and basics of techniques used in observing microbes.

- 2. Students will be aware of applications of basic techniques.
- 3. Students will learn sterilization and disinfection principles and procedures.

4 Students will learn cultivation & aseptically handling of microorganism.

GE/OE1 : Introduction and scope of Microbiology BGO1T01

1. Students will gain knowledge about the different cell organelles of microorganisms and their detailed functions.

2. Students will also study the growth and control of microbes as well as different bacteriological techniques involved in microbiology.

GE/OE 2 : INTRODUCTION TO MICROSCOPY & STAINING Course Code: BGO2T02

After this course the students will be able-

- 1. Students will be able to understand the needs and basics of techniques used in observing microbes.
- 2. Students will be aware of applications of basic techniques. 3. Handling and use of microscopes for the study of microorganisms which are among the basic knowledge expected from a practicing microbiologist.

VSC : Calibration, validation and handling of laboratory equipment

After this course, the students will be able-

1.Student will learn the basic knowledge of calibration, validation handling of laboratory instruments

2. The knowledge is very useful for opting job in industries.

SEC : Ouality control testing of fermented food

After this course the students will be able -

1. Student will learn the basic knowledge of different types of quality control testing of fermented foods.

2. The knowledge is very useful for opting job in industries.

B.Sc. Sem-II (Microbiology- Major) :

Paper-III (BMI1T03) (MICROBIAL DIVERSITY)

- 1. Acquire basics and importance of Microbiology
- 2. Learn about basic characteristics features of microorganisms
- 3. Describe the classification of Bacteria
- 4. Gain insights into the important characters, classification & life cycle of viruses.

Paper-IV (BMI1T04) (CHEMISTRY OF BIOMOLECULES)

- 1. Students will learn about different types of biomolecules and their functions.
- 2. To categorize on the types of enzymes and their mechanism.
- 3. Students will learn about the various diseases due to deficiency of vitamins.

GE/OE 1: Microbial world BGO2T03

1. Students will gain knowledge about the different cell organelles of microorganisms and their detailed functions.

2. Students will also study the growth and control of microbes as well as different bacteriological techniques involved in microbiology.

GE/OE 2: Biomolecules BGO2T04

1. Able to get skill on extraction, purification and separation techniques and can be applied to organic synthesis.

2.After completion of the course, students will able to understand regarding the essential and nonessential amino acids and can predict how their ionic charges change with pH.

VSC: Preparation and standardization of Lab reagents

Upon the completion of the course, the student will be able to do the following:

1. how to use glassware, equipment and chemicals and follow experimental procedures in the laboratory

2.how to calculate limiting reagent, theoretical yield, and percent yield

3. how to engage in safe laboratory practices by handling laboratory glassware, equipment, and chemical reagents appropriately

4. how to dispose of chemicals in a safe and responsible manner

5. how to create and carry out work up and separation procedures

6. how to critically evaluate data collected to determine the identity, purity, and percent yield of products and to summarize findings in writing in a clear and concise manner.

SEC: Testing of food adulteration

After successful completion of the course, students will be able to:

- 1. the adulteration of common foods and their adverse impact on health.
- 2. Comprehend certain basic skills of detecting adulteration in common foods.

3. extend their knowledge of detecting other kinds of adulteration.

B.Sc. Sem-III (Microbiology- Major)

DSC : PAPER I : Metabolism BMI3T05

The outcomes of a metabolism course may include understanding the mechanisms and regulation of anabolic and catabolic processes, and being able to identify disorders associated with metabolic pathways. Other outcomes may include learning about basic biochemical metabolic processes

DSC : PAPER II: Environmental Microbiology BMI3T06

In this course, students learn of the vital role of microbes in marine and terrestrial ecosystems by exploring the dynamic interactions that take place between microbial communities, the surroundings, and higher organisms.

GE/OE 1 : Metabolism of Biomolecules BGO3T05

1.Students will acquire an insight into various biomolecules which constitute the living organisms.

2. Students will learn the structure and properties of carbohydrates, proteins, lipids, cholesterol, DNA, RNA, glycoproteins, glycolipids and their importance in biological systems.

3. Students will develop perception on the sequencing of proteins and nucleic acids.

4. Students will gain knowledge on the Structure and properties of Porphyrins

B.Sc. Sem-IV (Microbiology- Major)

DSC : PAPER I : Food Microbiology BMI4T07

Upon successful completion of this course student should be able to:

 \succ Explain the interactions between microorganisms and the food environment, and factors influencing their growth and survival.

DSC : PAPER II: Dairy Microbiology BMI4T08

The course will provide an exploration of the classification and identification of bacteria, their reproduction and growth; pathogens and food poisoning micro-organisms; bacteriology of milk and milk products; thermal processes for controlling micro-organisms and the application cleaning-in-place technology.

GE/OE 1: Applied Microbiology BGO4T06

Students will be able to apply the scientific method to formulate questions and hypotheses, design experiments, employ appropriate methodology to solve problems in microbiology, and be able to analyze, interpret, and present scientific data in microbiology.

SEC BVS4T06 : Mushroom Cultivation

Students can start small scale industry of Mushroom cultivation.

1.Students study the morphology and types of Mushrooms.

2. They are aware of the identification of edible and poisonous Mushrooms.

3.Students will be able produce spawn on their own.

- 4.Learned the prospects and scope of mushroom cultivation in small scale industry.
- 5. Studied the technique of Mushroom cultivation.
- 6. Understood the Diseases. Post harvesting techniques of Mushrooms.

B.Sc. Sem-V (Microbiology- Major)

PAPER I Medical Microbiology- Host Parasite Relationship

-has knowledge of medical microbiology and the importance of microorganisms in diagnosis, monitoring and treatment of infectious diseases. Has knowledge of bacteria and viruses that can cause infectious disease. Has knowledge of prokaryotic genetics, taxonomy, growth conditions and virulence.

PAPER II Molecular Biology

Students will demonstrate ability to evaluate the impact of structure/part modification on a biological system and/or relationships between systems. Students will demonstrate application of the formal practices of observation, experimentation, and hypothesis testing.

PAPER III : Immunology

After the course, the candidate:

- has a broad knowledge of central processes in innate and adaptive immunity at a cellular and molecular level
- can explain how the immune system discriminates between self, non-self and altered self
- has advanced knowledge of the main mechanisms and consequences of inflammation
- has understood the genetic basis for immunological diversity and the generation of adaptive immune responses

- has advanced knowledge of the principles governing vaccination and the mechanisms of protection against infectious diseases
- can explain the basis of immunological tolerance, autoimmunity and transplantation
- can outline key events and cellular players governing mucosal immunity
- can describe the immunological basis of allergy and allergic diseases
- has knowledge on the role of the immune system in cancer; tumor immunology and the principles of immunotherapy

VSC Water analysis BVS5P07

1. Understand meaning of important parameters for measuring water quality;

2. Water quality criteria and standards, and their relation to public health, environment and urban water cycle;

3. Learn how to run accurate water quality tests and to determine how the parameters relate to each other

B.Sc. Sem-VI (Honors) (Microbiology- Major)

PAPER I : Industrial Microbiology BMI6T13

1. Apply the knowledge to understand the microbial physiology and to identify the microorganisms.

2. Understand the regulation of biochemical pathway and possible process modifications for improved control over microorganisms for microbial product synthesis.

PAPER II : Medical Microbiology- Microbial Diseases BMI6T14

1. Apply the knowledge to understand the microbial physiology and to identify the microorganisms.

2. Understand the regulation of biochemical pathway and possible process modifications for improved control over microorganisms for microbial product synthesis.

PAPER III : Recombinant DNA Technology and Applications BMI6T15

This course teaches-

- 1. RDNA technology techniques and their application in the field of genetic engineering.
- 2. They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries
- 3. Student of this course have knowledge on gene manipulation, gene expression, etc which prepares them for further studies in the area of genetic engineering

VSC: Biofertilizers & Biopesticides BVS6P08

1: Ability to understand formulation and large scale industrial production of biofertilizers

2: To gain knowledge ecofriendly agricultural inputs so as to nullify the ill effects of chemical fertilizers.

B.Sc. Sem-VII (Honors) (Microbiology- Major)

DSC Enzymology –I BMI7T17

- 1. To understand ability to difference between a chemical catalyst and biocatalyst.
- 2. Exposure to the nature of non-protein enzymes such as ribozymes. Understanding the role of enzymes in clinical diagnosis and industries.

DSC Virology-I BMI7T18

Upon successful completion of this course, students will be able to:

Contrast differences in virus architecture and classification. Diagram transmission and replication for medically important viruses.

Distinguish characteristics of normal cells and virus-infected cells.

DSC Bioinstrumentation II BMI7T19

successful completion of this class, students will be able to: Demonstrate an understanding of physics and engineering in biosensor, electrodes; Demonstrate an understanding of the biomedical instrumentation principles in aspects of device design and applications.

DSC Microbial Metabolites BMI7T20

- Microbial metabolism is a prerequisite for the absorption of higher molecular weight polyphenolic compounds (>95% of ingested) in the lower gastrointestinal tract.
- Microbial glycosidases and esterases act on polyphenols which result in the production of aglycons and oligomers which are absorbed from the hindgut.

RM Research Methodology BMI7T22

After completion of the course the students will be able to

- Design a research study from its inception to its report.
- Identify ethical issues in research.
- Know the importance of research designs, parametric and non parametric tests.
- Judge between parametric and non- parametric test.

<u>RP Research Project/ Dissertation (Core) BRP7P01</u></u>

After completing the course the learner will be able to:

- Define concepts in psychology
- Describe the process of Dissertation based on topic of interest of the student .
- Explain the planning of the research proposal and execution of research.
- Analyse the data, discuss and draw conclusions.

B.Sc. Sem-VIII (Honors) (Microbiology- Major)

DSC Enzymology-II BMI8T23

The major learning objective of the course is to understand the theories of enzyme kinetics, the mechanisms of enzyme catalysis, and the mechanisms of enzyme regulation in the cell. At the conclusion of the course students should be able to:

- Describe and use the equations of enzyme kinetics.
- Describe the methods used in enzyme kinetics.
- Describe the principles of enzyme inhibition.
- Describe the mechanisms of enzyme catalysis.
- Describe the catalytic mechanisms employed by the most well-characterized enzymes.
- Describe the mechanisms of enzyme regulation

DSC Virology -II BMI8T24

Upon successful completion of this course, students will be able to:

- Contrast differences in virus architecture and classification.
- Diagram transmission and replication for medically important viruses.
- Distinguish characteristics of normal cells and virus-infected cells.

DSC Bioinstrumentation II BMI8T25

- Measure various electrical parameters with accuracy, precision, resolution.
- Illustrate and explain the mode of operation of various instrument and its medical applications. Knowledge
- Demonstrate and adjust the technical factors of the instruments.
- Understand electrical safety and the ability to design relevant protection systems.
- Interpret the static and dynamic characteristics of bioinstrumentation systems.
- Identity and solve the problem and servicing the instrument properly.

DSC Biomolecules and their Interactions BMI8T26

- Students will acquire an insight into various biomolecules which constitute the living organisms
- Students will learn the structure and properties of carbohydrates, proteins, lipids, cholesterol, DNA, RNA, glycoproteins, glycolipids and their importance in biological systems
- Students will develop perception on the sequencing of proteins and nucleic acids
- Students will gain knowledge on the Structure and properties of Porphyrins

OJT Apprenticeship (Related to DSC) BOJ8P02

- Learning outcomes describe what students should be able to do by the end of a teaching session or course.
- They are related to, but different from, teaching aims, which instead describe broadly what the session or course is about and its overall purpose.

Name of Program: M.Sc. Microbiology

Program outcomes

POI Students will be able to gain, communicative, recall and apply specialized language and knowledge relevant to microbiology.

PO2 Students will acquire and demonstrate ability in laboratory safety in routine and specialized microbiological laboratory skills applicable to microbiological research methods, including observations and analysis.

PO3 Students will develop ability for hypothesis generation and testing, development of theoretical and practical skills in the designing and execution of experiments results and analytical judgment clearly and quickly.

PO4 Students will be abte to work effectively in diverse condition as team to communicate with social community to make life easier and better for society by explaining awareness about hygienic condition, Environmental changes, recycling of waste by using microorganisms.

PO5 Students will able to develop professional and technical skilt in lectureship, quality control, scientist in industries as well as in research laboratories.

PROGRAM SPECIFIC OUTCOME OF M. Sc. MICROBIOLOGY (PSOs)

PSO1 A thorough knowledge of Environmental microbiology, Food & Dairy Microbiology, microbial genetics, Industrial microbiology and many other biotechnologies involved in microbiology industries.

PSO 2 Production of substantial original research of significance and quality sufficient for publication. Ability to present their work through written, oral, and visual presentations, including an original research proposal. Awareness of ethical issues in Microbiology research and careers options.

PSO 3 The programme provides a solid foundation for a career working with project management, business development or venture capital within the microbiology, pharmaceutical, medical technology

Course Outcomes (COs)

SEMESTER-I

PAPER-I Course Name : Microbial Metabolism

COI The students will be able to explain the metabolic pathways - the energy yielding and energy-requiring reactions in life.

C02 The students will be able to explain the diversity of metabolic regulation and how this is specifically achieved in different cells.

CO3 The students will be able to describe biochemical processes with specific control sites and key junctions.

CO4 The students will be able to explain structure, function and biosynthesis of biomolecules like lipids, carbohydrates, proteins and nucleic acid.

C05 The students will be able to explain and analyse photosynthetic bacteria from the environment.

C06 The students will be able to compare anoxygenic and oxygenic photosynthesis.

CO7 The students will be able to discuss role of Nitrogen and Sulphur metabolism and methanogenesis for useful crop production to the farmers.

PAPER II- Course Name: Enzvmology and Techniques II

COI The students will be able to discuss structure, functions and the mechanisms of action of enzymes.

CO2 The students will explain kinetics of enzyme catalyzed reactions and enzyme inhibitory and regulatory process.

CO3 Students have comprehension in the action of enzymes as biocatalysts and in factors that influence enzymc activity.

CO4 Students will able to explain and calculate the kinetics of enzyme of by using unknown substrate

CO5 Students develop an ability for purification, handling and characterization of proteins.

CO6 The students will be able to perform immobilization of enzymes for higher production of products.

CO7 Students able to perform glucose biosensor and their application and discuss about Protein engineering.

CO8 The students will get knowlcdge of wide applications of enzymes and their future potential.

PAPER III Course Name : Advance Techniques in Microbiology

COI Students will casily explain the basic principles of advance techniques lor identilication and characterization of microorganisms.

CO2 Students develop an ability to find microbial cell structure and their internal components by using SEM,TEM, Staining procedures and microscopy,Fluorescent Microscopy.

CO3 Students describe how to identify DNA, RNA on basis of blotting techniques and electrophoresis techniques.

CO4 Students will able develop practical skill for identification of proteins, DNA, RNA by using agarose electrophoresis.

CO5 Students gain experience in microbiological laboratory practices and skills in the design and implementation of microbiology related research.

PAPER-IV Course Name : Membrane Structure and Signal Transduction

COI The students will be able to explain the biochemical and biophysical properties of membranes constituents contribute to the structure and organisation of membranes.

CO2 The students will be able to describe Cell compartmentalisation and how proteins are transported between organelles.

CO3 The students will be able to explain the principles and organisation of signal transduction pathway.

CO4 The students will be able to discuss membranes ions and solutes are transported across membrane.

CO5 The students explain how sporulation and mating occurs in yeast by signal transduction pathways.

CO6 Students able to isolatc, characterize and identify membrane structure by using differential scanning colorimetry, flouroscence photobleaching recovery,flow cytometry.

Course Name : PRACTICAL-I

COI Students will able to handle instruments, calculate the amount and interpret the result of unknown biological samples such lipids, carbohydrates, proteins, DNA and RNA and also draw conclusions from data. Students will able to calculate kinetics of enzyme analyse and interpret the results.

Course Name : PRACTICAL II

COI Students will able to separate and identify biomolecules amino acids, DNA and proteins by using separation techniques such as electrophoresis and paper chromatography analyse and interpret the results.

CO2 Students will able to calculate, analyse the results of DNA and RNA also draw conclusions from data.

Course Name : SEMINAR

COL Students will able to express thoughts and ideas effectively by using appropriate media alsodevelop Skill & personality development for communication and teaching ability.

SEMESTER II

PAPER-I Course Name : Microbial Methods For Environment Management

CO1 Students will discuss about how microbial changes induced by organic and inorganic pollutants.

CO2 The students will explain Biodeterioration, Biomagnification, biotransformation of pesticides, Bioleaching, Biodegradation of plastics.

CO3 Students will easily discuss how to manage pollution from the environment with the help of microorganisms in waste water management using activated sludge, aerated lagoons, trickling filter

CO4 Students will get share thoughts about global Environmental Problems such Ozone depletion, UV-B, greenhouse effect, acid rain, their impact and biotechnological approaches for management. Global warming and climate change and can give information to communities how to prevent from these climatic changes.

PAPER II Course Name : Microbial Metabolites

CO1 Students recognise and use fundamental concepts in the field of plant secondary metabolites, mycotoxins, bioactive compounds and structure and mode of action of secondary metabolites.

CO2 Students collect the information about Biopolymers such as Polypeptides, polynucleotides and polysaccharides also have knowledge about outline and functions of polyamines.

CO3 Students develop critical and analytical attitude on the use ofplant bioactive compounds for formulation of medicines.

CO4 Students able to explain the major action and effects of antimicrobial drugs used to treat various inlectious diseases.

CO5 Students become autonomous in searching scientiflc literature on secondary metabolism and bioactive compounds.

CO6 Students able to identify Pigments as secondary metabolites and their important in plants and m icroorganisms.

CO7 Students able to know Structure, function and chemistry of vitamins and their deficiency diseases.

PAPER-III Course Name : Mcdical Microbiology and Parasitology

CO1 Students able to explainabout pathogenic microorganisms and the mechanisms by which they cause disease in the human body.

C02 Students able to develop skill about diagnostic skills, including the use and interpretation of laboratory tests in the diagnosis of infectious diseases and use of microbiology laboratories in medical field.

CO3 Students able to explain the importance of pathogenic bacteria in human disease with respect to infections of the urinary tract, respiralory tract, gastrointestinal tract and explain the methods of how microorganisms to be control.

CO4 Students will be able to distinguish aspects of the morphology, physiology and genetics of the diverse microbial groups

C05 Students will be able to apply experimental methods for the detection and identification of pathogenic agents such as bacteria, fungi, parasites.

CO6 Students will be able to describe and apply specific methods for the study of human parasites and its parasitosis.

CO7 Students will be able to devclop an ability to identify microorganisms by using different laboratory techniques and analyse the results.

PAPER-IV Course Name : Immunology and Immunodiagnostics

COI Students have to explain concepts in immunology along with overall organization of the immune system and their mechanism.

CO2 Students will discuss the significance of maintaining a state of immune tolerance sufficient to prevent the emergence of autoimmunity.

CO3 Studentsable to explain about tumour Immunology and its immune prophylaxis and immune therapy.

CO4 Students will able to explain the Immunodeficiency disorders and hypersensitivity and their types and control.

CO5 Students will able to discuss leatures of antigen antibody reaction & its uses in diagnostics and various other studies.

Course Name: PRACTICAL

COI Students will able to handle instruments, calculate the amount and interpret the result of unknown biological samples such lipids. carbohydratcs, proteins, DNA and RNA and also draw conclusions from data.

CO2 Students will able to calculate kinetics of enzyme analyse and interpret the results.

Course Name : PRACTICAL-IV

COI Students will able to isolate, identify, and differentiate between different microorganisms by using

CO2 Students will able to aseptically handle body fluids as well as identify disease by using serological tests and draw conclusions.

Course Name : SEMINAR

CO1 Students will able to cxpress thoughts and ideas effectively by using appropriate media also develop Skill & personality development or communication and teaching ability.

SEMESTER III

PAPER I Course Name : Molecular Biology and Genetics II

COL Studentswill able to explain the structure, properties and function of genes in living organisms at the molecular level and knowledge about DNA as a genetic material, and replication discuss the molecular mechanisms underlying mutations, detection of mutations, DNA damage and repair mechanisms

CO2 Students able to know the importance strategies of molecular mechanisms involved in transcription and translation

C03 Students also explain the concept of recombination, linkage mapping and elucidate the gene transfbr mechanisms in prokaryotes and eukaryotes

CO4 Students easily explain the concept of gene Regulation and its Expression

CO5 Students have knowledge about genetics of Bacteria and Bacteriophages such as mapping bacteriophage gene by recombination analysis, deletion mapping and complementation and also about Transposons

CO6 Students will able to handle and independently work on lab protocols involving molecular techniques

PAPER-II Course Name : Recombinant DNA Technology and Nanobiotechnology

COI Students will become familiar with the tools and techniques of genetic engineering- DNA manipulation enzymes, genome and analysis and Manipulation tools, gene express ion regulation.

CO2 Students have an ability to explain the steps of PCR and discuss the components and optimization of the process.

CO3 Students able to explain about Restriction mapping: dideoxy and pyrosequencing, DNA fingerprinting expressions, Dnasefootprinting, DMS footprinting, DNA sequencing Mapping, primer

CO4 Students will have practical knowledge about Tissue Culture and stem cell technology to improve food products and their applications.

CO5 Students will discuss about Stem cell technology-embryonal stem cell and multipotent stem cells

CO6 Students able to know the concept of Transgenic plants and plant products.

CO7 Students expertise handling the instruments and techniques in genetic engineering in biological research.

PAPER-III Course Name : Microbial Diversity, Evolution and Ecology

COI Students will able to ex lain about Evolution of Earth and early life forms.

C02 Students able to discuss Primitive lile lorms such asRNA world, molecular coding, energy and carbon metabolism, origin of Eukaryotes, endos mbiosis.

C03 Students will able to explains about Methods for determining evolutionary relationships like Evolutionary chronometers, Ribosomal RNA sequencing, signature sequences, phyllogenetic probes, microbial community analysis

C04 Students able to explain General Metabolism and Autotroph in archea

CO5 Students able to explain Microbial Diversity: Bacteria explaining Free living N2 fixing bacteria, purple phototrophic bacteria nitrifying bacteria, sulphur and iron oxidize bacteria. sulphate and sulphur reducing bacteria.

PAPER-IV Course Name : Drug and Disease Management

CO1 Students able to share knowledge about Drug latentiation and Prodrug, carrier-linked prodrugs bio precursors prodrugs.

C02 Students explain about Drug-microbe-Host relationship, mechanism of drug action and drug resistance including MDR.

CO3 Students will ability to know Antiinfective agents Antifungal agents.

C04 Students willable to discuss about structure activity relationships in relation to drug-target interactions

CO5 Students will able to explain Antiprotozoal agent Antimalarials Histamines and Antihistaminic agents Analgesic agents and their mechanisms of action.

Course Name : PRACTICAL-V

COI Students will able to learn all advance molecular biology techniques isolation, identification and characterization of DNA also learn the methods of how to re recombinant DNA b us Genetic cn lneenn tools

CO2 Students will able to handle instruments, prepare chemicals, calculate the amount and interpret the result of DNA, plasmid DNA and RNA and also draw conclusions from data.

Course Name : PRACTICAL VI

COI Students will able to isolate, identify, and differentiate between different microoganism by using microbiological techniques and methods.

CO2 Students will able to aseptically handle body fluids as well as identify disease by using serological tests and draw conclusions.

Course Name : SEMINAR

COI Students will able to express thoughts and ideas effectively by using appropriate media also develop Skill & personality development for communication and teaching ability.

SEMESTER.IV

PAPER-I Course Name : Virology

COI Students will able to explain the architecture of viruses, their Nomenclature and classification of viruses (Regenmortel et.a1.2005, 8th Report of ICTV). Genetic classification and the methods used in their study.

C02 Student will discuss about morphology and structure of viruses (size and shape/symmetry). Chemical composition of viruses (viral capsid, spikes, envelopes and types of viral nucleic acids) and Assay of Viruses.

CO3 Students will able to explain about Structural organization; life cycle of Viruses.

CO4 Student able to discuss about Life cycle, pathogenesis and laboratory diagnosis of plants and animal viruses.

CO5 Students will able to handle and expertise in general techniques of Diagnosis of viruses and share knowledge about antiviral drugs.

PAPER II Course Name : Microbial Fermentation Technology

CO1 Student will able to discuss how microbiology is applied in manufacture of industrial products, learn methods in discovery of new useful microorganisms and acquire knowledge of the design of Fermenters and process controls.

CO2 Students will able to explain how to develop an understanding of fermentation &inoculum media, their formulation and principles & techniques of sterilization.

CO3 Students will able to explain about the different types of fermentation processes & understand the biochemistry of various fermentations and product recovery methods.

CO4 Students have ability to gain knowledge about latest techniques applicable for Improvement of microorganisms based on known biochemical pathways and regulatory mechanisms and learn the methods of immobilization of enzymes and cells.

PAPER III Course Name : Microbial Diversity, Evolution and Ecology

COI Students explains the microbial ecosystem includes Terrestrial environment, deep surface microbiology, Fresh water environment, lake and river Microbiology. Marine Microbiology and hydrothermal vents.

CO2 Students will able to discuss about Diversity, stability and succession.

C03 Students able to discuss the source of genetic variation such as HardyWeinberg genetic drift.

CO4 Studentswill able to explain the concept of microbial Interactions and Ecosystem Management.

PAPER IV Course Name : Vaccines and Delievery System

COI Students explain the importance of vaccination and their types Active and passive prophylactive measures.

CO2 Students describe the basic principles of vaccination, Students explain how the public arc less tolerant of the risk .

CO4 Students explain subunit vaccines, DNA vaccines and Vaccines additives and adjuvants.

CO5 Students also know about conventional vaccines and advanced vaccines production and their effect on microbial model.

CO6 Students also have knowledge about Designing & delivery system Drug designing, Non-automated in vitro drug susceptibility testing, Rapid tests for susceptibility testing, and antibiotic assay in body fluid, Drugs & vaccines delivery system.

Course Name : PRACTICAL-VII

CO1 Students will able to produce transgenic plants by using plant tissue culture techniques.

CO2 Students will able to handle instruments, prepare chemicals, calculate the amount and interpret the result also draw conclusions from data.

Course Name : PROJECT WORK

COI Students will able to develop research ability in microbiology field such as medical, agricultural, food and fermentation, dairy, pharmaceutical, environmental, and genetic engineering for isolation, identification and characterization of different microorganisms also develop an ability to execution of oral and writing skills for paper publication also necessary for effective communication of experimental results, the ability to think critically regarding a respective topic, and the conveyance of scientific results to both scientists and non-scientific community.

Course Name : SEMINAR

COI Students will able to express thoughts and ideas eflectively by using appropriate media also develop Skill & personality development for communication and teaching ability.

Kamla Nehru Mahavidyalaya

Department of Biochemistry

Program Outcomes (POs) and Course Outcomes (Cos) of B.Sc. Biochemistry Program

Program Outcomes (POs)

After completion of Biochemistry program students will able

- PO1. To get exposed to strong theoretical and practical background in fundamental concepts.
- PO2. To get insights of multiple important technical areas of Biochemistry.
- PO3. To apply contextual knowledge and modern tools of biochemical research for solving problems.
- PO4. To make them able to express ideas persuasively in leadership qualities oral form to develop their leadership qualities.
- PO5 To demonstrate professional and ethical attitude with enormous responsibility to serve the society.

Course outcomes

B. Sc. Part 1 - Semester 1-PAPER I (BIOMOLECULES & Nutritional Biochemistry)

On completion of the course the students will be able to

CO1 Classify and describe various chemical, functional and nutritional aspects of Carbohydrates.

- CO2 Classify and describe various chemical, functional and nutritional aspects of lipids.
- CO3 Describe the structures, function, nutritional aspects and deficiency disorders of protein.
- CO4 Explain the structures, functions of different nucleic acids (DNA and RNA).
- CO5 Gain the knowledge about vitamins, minerals, deficiency disorders and modern methods of the improvement of nutritional quality of food.
- CO6 Comprehend about bio-fortification of food for better health.
- CO7 Understand calorimetry, BMR, energy requirement and nutritional aspect of human health.

B. Sc. Part 1 - Semester I - PAPER II (Microbial Biochemistry)

Course Outcome

On completion of the course the students will be able to

- CO1 Understand basic history, contributions of different scientist, concepts, types and applications of Microscopes.
- CO2 Explain the morphology and different characteristic features of bacteria.
- CO3 Understand different growth parameters and nutritional requirement of bacteria,
- CO4 Describe the isolation and maintenance of bacterial cultures.
- CO5 Get the knowledge of different microbial control methods.
- CO6 Apply the physical and chemical microbial control methods.
- CO7 Comprehend principle and types of microbial staining.
- CO8 Explain the role of parasitic pathogens in disease causing and understand the structure and life cycles of Viruses.

VSC Basket Biochemistry: Semester 1

Microbial Culture Media (BVS1P01)

Course Outcomes: This course is designed to offer enhanced practical skills to students. After completion of this course student will have understand, learn and perform skills needed in a microbial laboratory/pathology laboratory.

- 1. Basic instrumentations in microbial culture.
- 2. Preparation and use of nutrient broth for microbial cultivation.
- 3. Preparation and use of nutrient agar for microbial cultivation.
- 4. Preparation of enriched media and cultivation of micro-organisms from water and soil.
- 5. Preparation and uses of alkaline peptone water enrichment media for cultivation of Vibrio cholerae.
- 6. Preparation and uses of Selenite F broth enrichment media for isolation of Salmonella from feces, urine, water, foods and other materials.
- 7. Preparation and use of differential media (Mac Conkey agar, Blood agar etc.) in microbial culture.
- 8. Preparation and use of transport media.

- 9. Preparation and use of storage media for microbial culture (Egg saline medium, chalk cooked meat broth etc.).
- 10. Isolation of salt sensitive E Coli using LB lennox broth.
- 11. Cultivation of aerobic and facultative anaerobic bacteria using Mueller Hinton Broth.

B.Sc. SEMESTER – I: BVE1T01: ENVIRONMENTAL SCIENCE COURSE OUTCOMES:

At the end of the course, students shall be able to:

- 1. Explain the basics of Environmental Science and Atmospheric Science along-with the components of Environment.
- 2. Explicate the importance of Environmental Education.
- 3. Elucidate the fundamentals of atmospheric science including formation, depletion and effects of ozone layer and acid rain on environment.
- 4. Describe the various physical and chemical characteristics and properties of Water and Soil
- 5. Understand the Ecology and its allied branches
- 6. Comprehend about Population and Community Ecology
- 7. Study the changes in Population by understanding the concept of Population ecology

B.Sc. Sem-I: Indian Knowledge System (IKS): VEDIC MATHEMATICS (BIK1T01)

Course Outcomes: This course will enable the students to

- 1. Improve speed and accuracy in numerical calculations
- 2. Acquire IQ skills and high-end technical knowledge
- 3. gain test taking skills & creativity of calculations

B. Sc. Part 1 - Sem 2 - Paper I (Human Physiology and Clinical Biochemistry)

On completion of the course the students will be able to

- CO1 Understand the concept of pH and maintenance of Acid-Base balance and associated disorders.
- CO2 Get information about the blood composition, neurons and muscle.

CO3 Examine the cardiac profile and associated disorders.

CO4 Describe the role of renal function test and liver function test in testing various associated diseases.

CO5 Explain the endocrine glands and hormone secreted by them.

CO6 Describe the functions of the various different hormones secreted by endocrine glands.

CO7 Examine the body fluids such as semen, CSF etc.

CO8 Asses the diabetic profile and explain the role of insulin, glucagon in diabetes.

Course outcome of B. Sc. Part 1 – Semester 2 -Paper II (Techniques in Biochemistry)

On completion of the course the students will be able to

CO1 Understand the laws, concepts and techniques of the spectrophotometry

CO2 Know the Instrumentation & applications of UV & Visible spectrophotometry

CO3 Comprehend the concepts and types of chromatography.

CO4 Understand application s of different types of chromatography.

CO5 Study the process and types of electrophoresis.

CO6 Learn the application of types of electrophoresis.

CO7 Explain the role of radioactive and stable isotopes in biochemical studies.

CO8 Scribe the basic principles, types and applications of Centrifugation techniques in biochemical analysis.

VSC Basket Biochemistry (2 credit, 4-hour Practical) Semester 2 FOOD PROCESSING TECHNIQUES (BVS2P03)

Course Objectives: After completion of this course, the student should be able to:

- 1. Understand methods of processing and analysis of important parameters related to food science.
- 2. Perform proximate analysis to know components of food,

- 3. Demonstrate various principle applied to food processing.
- 4. Understand the importance of processing techniques.

SEM 2: CONSTITUION OF INDIA (BVE2T02)

Course Outcomes: After completion of this course, the student should be able to:

- 1. Knowing the historical background to the framing of the Indian constitution.
- 2. Understand the preamble and salient features of the constitution of India.
- 3. Acknowledged with the fundamental rights and principles of state policy and fundamental duties
- 4. Learn the different constitutional institutions and authorities of India.

Indian Knowledge System (IKS) SEM 2: INDIAN ASTRONOMY (BIK2T02)

Course Outcomes: This course will enable the students to understand that

- 1. It is possible to create a map of the intellectual growth of a culture using astronomy as a probe.
- 2. The growth of Indian astronomy occurs in distinct stages analogous to phase transitions of the evolution of cultures
- 3. Indian Astronomy therefore provides an excellent window to the past dramatic transitions.

Program Outcomes (POs) and Course Outcomes (COs) of M.sc Biochemistry Program

Program Outcomes (POs)

Students who graduate with a Master of Science in Biochemistry will

- PSO1: Demonstrate an understanding of structural and functional inter-relationship of macromolecules to derive applied technological, therapeutic and industrial benefits. PSO2: Recall and assimilate in-depth knowledge of fundamental processes and cellular mechanisms involved in perpetuation of life.
- PSO2: Acquire thorough knowledge in techniques applied in the fields of molecular biology, Enzymology, Clinical Biochemistry, Toxicology, Immunology and biotechnology.
- PSO3: Understand and learn to apply the scientific methods to the process of experimentation, Hypothesis testing, research investigations and result interpretations.
- PSO4: Develop the ability to understand and practice the ethics surrounding scientific Research. PSO5: Realize the importance of scientific research for societal benefits and national challenges

Course Outcomes (COs)

Course objectives for Semester-I:

- CO1. To enable the students to understand protein structure, organization, bonds and forces that contribute to the conformation of proteins and the interaction of proteins with other biomolecules.
- CO2. To learn the cellular processes involved in protein synthesis and targeting to various organelles.
- CO3. To introduce the concept of protein designing for industrial, therapeutic and clinical benefits.
- CO 4. To enable the students to understand the concepts of Bioinformatics and plant biochemistry with special emphasis on photosynthetic processes, hormonal regulation of plant growth, stress physiology and metabolic aspects and applied significance of tissue culture.

- CO5. Students will acquire the understanding of principles of enzymology, mechanisms and strategies for catalysis
- CO6. To enable the students to organize and communicate scientific information clearly and concisely, both verbally and in writing.

Course objectives for Semester-II:

- CO1. Integrate the different levels of biological organization, from molecules to cells to organisms and understand basic and advanced molecular biology concepts and techniques.
- CO2. The student will be able to clinically assess the laboratory indicators of physiologic conditions and will know the biochemical and molecular tools needed to accomplish preventive, diagnostic, and therapeutic intervention on hereditary and acquired disorders.
- CO3. The students will be able to describe immunological response and how it is triggered and regulated.
- CO4. The students will be able to identify the cellular and molecular basis of immune responsiveness and learn diagnostic immunological techniques.
- CO5. Students will learn how cellular components coordinate to communicate, regulate cellular process through signaling mechanisms.

Course objectives for Semester-III:

- CO1. Students will explain/describe regulation at the epigenetic, transcriptional, translational, and posttranslational levels including RNA stability, protein folding, modification, and degradation. Regulation by non-coding RNAs will be tied to the developmental and physiological functioning of the organism.
- CO2. Subject specific elective will enable them to learn the concepts of toxicology or Nutritional biochemistry depending upon the choice of elective. Both the papers have been included to impart in-depth knowledge of two very important applied biochemistry branches of commercial and social significance.
- CO3. Student will learn fundamentals of genetic engineering and the applied biotechnological aspects with special emphasis on fermentation and biochemical engineering.
- CO4. To enable students to learn advanced techniques used in biochemical and genetic research which are at the centre of current research.

Course objectives for Semester-IV:

- CO1. Have knowledge about assessment and management of ethical clinical trial programs.
- CO2. Demonstrate competency in biopharmaceutical clinical trial research designs and regulatory affairs.
- CO3. Demonstrate competencies in evaluating clinical research data and communicating results. Manage innovative products through the discovery processes and into the clinical trial phases.
- CO4. The students will learn how nutrients effect biochemical processes and signal transduction pathways, and how this can lead to development of nutritionally related diseases.
- CO5. Plan and develop experimental design projects from concept through to professional prototype.
- CO6. Apply theoretical knowledge, conceptual skills and techniques to the development of solutions for biochemical problems.
- CO7. Apply initiative and judgment in planning, problem solving and decision making in practice or future study.

COURSE OUTCOMES of B.Sc. PHYSICS

B. Sc. Semester-I

Discipline Specific Core Course (DSC-1)-PHYSICS - Paper-I (BPH1T01) (Measurements, Mechanics, and Properties of Matter)

COURSE OUTCOMES: After this course the students will be able to

1. Develop interest in measurement with conceptual knowledge of physics.

2. Develop practical skills in accurate measurements with minimal errors.

3. Understand and practice these skills while performing physics practical.

4. Understand the use of apparatus and their use without fear.

5. Correlate their physics theory concepts with practical outcomes.

6. Understand the concepts of errors and their estimation.

B. Sc. Semester-I Discipline Specific Core Course (DSC-2)-PHYSICS - Paper- II (BPH1T02) (Kinetic theory of gases and Thermodynamics)

COURSE OUTCOMES: After this course the students will be able to

- 1. Understand the assumptions of kinetic theory of gases, ideal and real gases.
- 2. Understand the nature of calorimetry by specific heat of solids and gases.
- 3. Analyses different transport phenomena in gases
- 4. Describe basic concepts of Thermodynamics.
- 5. Analyses the laws of thermodynamics in different cases and entropy.

6. Restate definition of system, surrounding, closed and open system, extensive and intensive variables and properties.

- 7. Design various types of basic heat engines.
- 8. Apply Maxwells thermodynamic relations.
- 9. Understanding the low temperature physics

B. Sc. Semester-1

Vocational Skill Course (VSC - 1) - PHYSICS Course Code (BVS1P01) (Electronic and Electrical Components)

COURSE OUTCOMES: After the completion of this course students will be able to

1. Get acquainted hands-on practice for electronic components and their uses in electronic circuits

2. Get acquainted hands-on practice for electrical components and their uses in electrical circuits

3. Apply the practical knowledge in conducting various practical during graduation.

4. Apply the practical knowledge in repairing household electronic and electrical gadgets.

B.Sc. Semester – I ENVIRONMENTAL SCIENCE (BVE1T01)

COURSE OUTCOMES: At the end of the course, students shall be able to:

1. Explain the basics of Environmental Science and Atmospheric Science along-with the components of Environment

2. Explicate the importance of Environmental Education.

3. Elucidate the fundamentals of atmospheric science including formation, depletion and effects of ozone layer and acid rain on environment.

4. Describe the various physical and chemical characteristics and properties of Water and Soil

- 5. Understand the Ecology and its allied branches
- 6. Comprehend about Population and Community Ecology

7. Study the changes in Population by understanding the concept of Population ecology.

B. Sc. Semester-II Discipline Specific Core Course (DSC-)-PHYSICS - Paper-III (BPH2T03) (Acoustic and Ultrasonics)

COURSE OUTCOMES: After completing this course students will be able to

1. Understand the different aspects and attributes of a musical sounds. Also response of ear to sound and audible limits of human ear

2. Learn about various musical scales and musical instruments

3. Learn about acoustics of a hall and requirement of a good acoustic of a hall

4. Learn about different microphones their design and action and also about loudspeaker.

5. Learn about the characteristics and production method as well as detection of USW.

6. Learn about different applications of USW like SONAR, soldering, cleaning and medical applications like sonography etc.

B. Sc. Semester-II Discipline Specific Core Course (DSC-4)-PHYSICS - Paper-IV (BPH2T04) (Oscillations and Black body radiation)

COURSE OUTCOMES: After completing this course students will be able to

1. Understand the simple harmonic motion, and properties of different oscillatory motion of an object

2. Understand the damped and forced oscillation

3. Understand mechanical waves in a medium and wave equation of the transverse waves on string and longitudinal waves in a fluid.

4. Understand black body radiation and development of quantised nature of blackbody radiation.

5. Understand the temperature of heavenly bodies

B. Sc. Semester-II Vocational Skill Course (VSC) - PHYSICS Course Code (BVS2P03) (Instrumental Errors in Measurement)

COURSE OUTCOMES: After the completion of this course students will be able to

1. Understand the function of different instruments.

2. Choose and apply proper instrument for the measurement.

3. Handle the instrument carefully and apply the practical knowledge in his further study.

4. Find the different man made and instrumental errors in doing different practical.

B. Sc. Semester-II CONSTITUION OF INDIA (BVE2T02) Indian Knowledge System (IKS) SEM2: INDIAN ASTRONOMY (BIK2T02)

COURSE OUTCOMES: This course will enable the students to understand that

1. It is possible to create a map of the intellectual growth of a culture using astronomy as a probe.

2. The growth of Indian astronomy occurs in distinct stages analogous to phase transitions of the evolution of cultures

3. Indian Astronomy therefore provides an excellent window to the past dramatic transitions.

M.Sc. (Physics) as per NEP-2020 Programme Objectives (POs)

M.Sc. (Physics) programme is meant to systematize and give a method and structure to learner experiences with imparting students with an in-depth knowledge and understanding through the core courses which form the basis of Physics. The elective courses are designed for more specialized and/or interdisciplinary content to equip students with a broader knowledge base. The recent developments in physical sciences, has been included in the curricula to meet out the present day needs of academic and research, institutions, and industries. Research methodology, on the job training and research-based projects included in the curricula will enrich the students

towards new findings leading to inspiration for research degree and orientation for job opportunities. After completing this Programme the learner.

PO 1: will have knowledge of fundamental laws and principles of physics along with their applications in diverse areas.

PO 2: will develop teaching and research skills which might include advanced Laboratory techniques, numerical methods, computer interfacing, etc.

PO 3: will become effective teacher and/or researcher; and will be able to exhibit good scientific knowledge and temperament in diverse fields/environment.

PO 4: will develop the skill to plan, execute and report on experimental and/or theoretical physics problems with effective scientific approach in future endeavor.

Programme Specific Outcomes (PSOs)

While studying M.Sc., Physics Programme, the learner shall be able to

PSO 1: provide well defined study of theoretical and experimental physics to impart in depth understanding in fundamental aspects of all core areas of Physics.

PSO 2: acquire core as well as specialized/disciplinary knowledge in physics.

PSO 3: equip the student to pursue research and development in any areas of theoretical, experimental, and computational physics.

PSO 4: learn how to design and conduct experiments demonstrating them understanding of scientific methods/processes/phenomena; and understand analytical methods required to interpret and analyze results and draw conclusions.

PSO 5: bridge the gap between textbook knowledge and practical problems through well-designed laboratory sessions.

PSO 6: develop written and oral communications skills in communicating physics- related topics; and realize and develop an understanding of the impact of science particularly physics on the society.

PSO 7: apply conceptual understanding and critical thinking of the physics to general real- world situations; and learn to analyze physical problems and develop correct solutions using theoretical and experimental techniques/tools and skills.

COURSE OUTCOMES OF M.Sc. PHYSICS

M.Sc. PHYSICS SEMESTER - I

Paper 1 (Core 1) Mathematical Physics (MPH1T01)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Understand the methods of mathematical physics.
- 2. Understand the basic elements of mathematical physics and demonstrate an ability to use vector analysis in the solution of physical problems.
- 3. Analyse the various types of matrix operations for solving problems in various branches of physics.
- 4. Apply mathematical skills to solve problems in quantum mechanics, electrodynamics, and other fields of theoretical physics.
- 5. Impart knowledge about various mathematical tools employed to study physics problems.

Paper 2 (Core 2) Electronics (MPH1T02)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Learn the general characteristics of important semiconductor materials and PNjunction for the construction of various types of transistors.
- 2. Understand the use of semiconductor devices in linear and digital circuits.
- 3. Analyse and design basic op-amp circuits, particularly various linear and nonlinear circuits, active filters and signal generators, and data converters.
- 4. Evaluate the characteristics of classification of memories and sequential memory and analyse the working of various A/D and D/A Converters.
- 5. Understand the basic principle of amplitude, frequency and phase modulation in Communication Electronics.

Paper 3 (Elective -1A) Energy Devices (MPH1T03A)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Understand the need of energy storage and strategies for sustainable energy development.
- 2. Learn the fundamental mechanism of energy devices, theoretical model and thermodynamic aspects of energy harvesting and storage.
- 3. Understand the concept of energy storage in capacitors, supercapacitor, and rechargeable batteries.
- 4. Describe the conceptual idea for various types of fuel cells with advantages and

disadvantages.

5. Understand the construction and working principle of various types of solar cells.

Paper 3 (Elective -1B) Experimental Techniques in Physics (MPH1T03B) Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Understand the different types of radiation and the concept of detection of radiation using various detectors.
- 2. Learn the fundamental aspect of classification of sensors and their principle of operation.
- 3. Describe the principle of working of TGA, DTA, DSC used for thermal analysis.
- 4. Understand the experimental technique for magnetic characterization using VSM and dielectric properties using impedance analyser.
- 5. Explain the spectroscopic techniques of FTIR, UV-VIS, DRS, XPS, ESR, NMR used for materials characterization.

Paper 4 (RM) Research Methodology (MPH1T04)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Understand the basic concepts regarding importance of research.
- 2. Impart knowledge about research problems identification, research question and formulation of hypotheses.
- 3. Understand the differences of qualitative vs. quantitative research methodology, field experiments vs. laboratory experiments.
- 4. Execute the methods of data collection and strategies of data processing and analysis.
- 5. Learn the ethical issues including copy right, royalty, intellectual property rights, patent law, and plagiarism in publishing research.

M.Sc. PHYSICS SEMESTER - II

Paper 5 (Core 3) Complex Analysis and Numerical Methods (MPH2T05)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Represent complex numbers, analyse limit, continuity, and differentiation of functions of complex variables.
- 2. Learn analytic functions, Cauchy Reimann conditions, how to find roots of nonlinear equations numerically and understand how iterations work.
- 3. Interpolate with evenly or unevenly spaced data.
- 4. Interpret and apply the basic methodology of numerical differentiation and numerical integration to a broad range of physics problems.
- 5. Enrich with various computational methods like Euler, Newton-Raphson and Runge-Kutta etc. to solve the problems.

Paper 6 (Core 4) Statistical Physics (MPH2T06)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Understand various models in statistical mechanics and apply statistical tools to solve the problems in Physics.
- 2. Identify the connection between statistical mechanics and thermodynamics.
- 3. Understand Bose's concept of fifth state of matter and any possibility of sixth state of matter or not.
- 4. Understand the significance and characteristics of phase transitions and critical phenomena.
- 5. Learn Einstein's theoretical analysis and Langevin theory of Brownian motion.

Paper 7 (Elective - 2 A) Spectroscopy (MPH2T07A)

Course Outcomes (COs): On completion of the course the students will be able to,

1. Explain Zeeman effect, Stark effect and hyperfine structure of spectral lines of

hydrogen.

- 2. Analyse the information from IR rotational vibration spectroscopy to determine the bond lengths of hetero nuclear diatomic molecules and applications of FTIR spectroscopy.
- 3. Explain Raman effect and application of Raman spectroscopy.
- 4. Describe the Bloch Equation and principle of High-Resolution NMR Spectrometer.
- 5. Understand molecular vibrations with the interaction of matter and electromagnetic waves and explain the Mossbauer Effect.

Paper 7 (Elective - 2 B) X-Rays (MPH2T07B)

Course Outcomes (COs): On completion of the course the students will be able to,

Basic concepts of production of X-rays, Designing concepts conventional of X-ray generators, Basics of Advanced radiation source Synchrotron and its advantages over conventional sources.

- 1. Interaction of X-rays with the matter and applications of X-rays based on different physical processes involved after interaction of x-rays with matter.
- 2. The method of X-ray radiography and its applications in medical and industrial fields.
- 3. Designing concepts of different X-ray spectrographs. Different theoretical concepts regarding X-ray spectra and their interpretation.
- 4. Interpretation of X-ray absorption spectra. Experimental techniques for obtaining X-ray absorption spectra and its important applications.

M.Sc. PHYSICS SEMESTER - III

Paper 8 (Core 5) Classical Mechanics (MPH3T08)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Interpret the notion of degrees of freedom, identify them for a given mechanical system and DÁlembert's principle, Formulation of Lagrangian mechanics and problem solving.
- 2. Describe the Canonical transformations and generating functions and properties of Poisson's bracket.
- 3. Enable to solve Hamilton-Jacobi equations and use it for the solution of harmonic oscillator problem.
- 4. Demonstrate an understanding of intermediate classical mechanics topics such as coordinate transformations, oscillatory motion, gravitation and other central forces, and Lagrangian mechanics
- 5. Evaluate the Central Force Problems and Relativistic Mechanics.

Paper 9 (Core 6) Quantum Mechanics – I (MPH3T09)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Introduce postulates and working principles of quantum mechanics.
- 2. Familiarity with operator and matrix formalism of quantum mechanics.
- 3. Solve Schrodinger equation for simple systems.
- 4. Formulate the Heisenberg & Dirac formulation of quantum mechanics.
- 5. Learn angular momentum operator, spin and be able to add angular momenta.

Paper 10 (Core 7) Electrodynamics (MPH3T10)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Provide basic understanding of the concepts of electricity, magnetism and electromagnetic waves.
- 2. Describe EM waves in vacuum as well as matter to solve the difficult problems of electrodynamics.

- 3. Analyse and apply the laws of electromagnetism and Maxwell's equations.
- 4. Understand the basics of electrostatics and magnetostatics to solve the electric and magnetic fields problems for different configurations.
- 5. Describe relativistic electrodynamics to understand the magnetism as a relativistic phenomenon.

Paper 11 (Elective - 3 A) Materials Science (MPH3T11A)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Review of principle of thermodynamics and understand the fundamental concepts of phase rule and phase diagram.
- 2. Understand the kinetics of phase transformation, homogeneous and heterogeneous nucleation and growth of particles.
- 3.
- 4. Explain the concept of equilibrium and non equilibrium processing of materials and their importance.
- 5. Describe the various physical and chemical route of materials synthesis.
- 6. Understand the metallic and non-metallic, ceramic and other materials processing and heat treatment methodologies.

Paper 11 (Elective - 3 B) Basic Nanoscience and Nanotechnology (MPH3T11B) Course Outcomes (COs): On completion of the course students will be able to,

- 1. Explain the term Nanoscience and Nanotechnology and quantum confinement, zero, one and two-dimension nano structures.
- 2. Identify the various techniques to investigate the different properties such as optical, structural and morphology of nanoparticles.
- 3. Acquire knowledge of basic approaches like Bottom up and Top down to synthesize inorganic colloidal nanoparticles and their self-assembly in solution and surfaces.
- 4. Apply their acquired knowledge in research level to synthesis by various techniques and characterize the nanomaterials by microscopic and spectroscopic techniques.
- 5. Understand the techniques of preparation of special nanomaterials and the properties of nanomaterials for future applications.

M.Sc. PHYSICS SEMESTER - IV

Paper 12 (Core 8) Nuclear and Particle Physics (MPH4T12)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Explain the nuclear structure and properties, nuclear forces and two body problems.
- 2. Discuss the stability and properties of different nuclei by various nuclear models.
- 3. Describe radioactive α , β , γ -decay of nuclei by their respective quantum mechanical theories, Conservation laws and various nuclear reactions.
- 4. Know various nuclear radiation detectors and particle accelerators.
- 5. Discuss the Elementary particles as the building blocks of matter and interacting fields. Describe Quark Hypothesis, Quark structures of Mesons and Baryons.

Paper 13 (Core 9) Quantum Mechanics - II (MPH4T13)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Discuss the time independent perturbation theory and its application (Zeeman and Stark effect).
- 2. Explain the time dependent perturbation theory and semi-classical theory of radiations and its applications.
- 3. Describe the ground state of helium atom using WKB approximation.
- 4. Analyse and apply the central field approximation for system of identical particles and system of non-interacting particles, Born-Oppenheimer approximation.
- 5. Understand Klein- Gordon equation, Dirac's relativistic equation, Field quantization of the non-relativistic Schrodinger equation.

Paper 14 (Core 10) Solid State Physics (MPH4T14)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Understand the basics of free electron theory and band theory.
- 2. Understand lattice vibrations of linear monoatomic and diatomic chains, dispersion relations, acoustic and optical phonons.
- 3. Describe Dulong and Petit's law, Einstein and Debye models, T3 law, etc theories of lattice specific heat.
- 4. Explain electrical conductivity, Hall effect and magnetic properties of solids.
- 5. Describe type I and II superconductors, elements of BCS theory, and elementary of high temperature superconductor and applications.

Paper 15 (Elective - 4A) Properties of Materials (MPH4T15A)

Course Outcomes (COs): On completion of the course the students will be able to,

- 1. Understand the mechanical response and mechanical properties of materials.
- 2. Explain the corrosion and degradation of materials and strategies of corrosion prevention.
- 3. Get the knowledge of laws of diffusion, types of diffusion and methods of determining diffusion coefficients.
- 4. Impart knowledge of Solid State Ionics.
- 5. Describe silver ion conductors, cation conductors, oxygen ion conductors, halide ion conductors, proton conductors and electronic conductors with ionic

transport.

Paper 15 (Elective - 4 B) Applied Nanoscience and Nanotechnology (MPH4T15B) Course Outcomes (COs): On completion of the course students will be able to,

- 1. Understand accurate description of optical properties of material and basics of non-linear optics at nanoscale.
- 2. Understand the basic magnetic parameters, the magneto-transport in nanoscale
- 3. systems and gain the basic mechanisms for tuning the magnetic properties.
- 4. Implicate the basic knowledge of Nano-CMOS to design the circuit and physical design for the single electron transistor.
- 5. Know the meaning of composite materials and preparation techniques.
- 6. Analyse the essential data on nanoscale materials dispersed in, or chemically bonded with metal/ceramic/polymer matrix.

KAMLA NEHRU MAHAVIDYALAYA, NAGPUR DEPARTMENT OF CHEMISTRY POS & COS UG

B.Sc. Semester – I BCH1T01 Inorganic Chemistry-1 (Atomic structure, bonding and main group elements)

1. Solve the conceptual questions using the knowledge gained by studying the quantum mechanical model of the atom, quantum numbers, electronic configuration, radial and angular distribution curves, shapes of s, p, and d orbitals, and periodicity in atomic properties.

2. Draw the plausible structures and geometries of molecules using VSEPR theory.

3. Explain geometries and properties of molecules based on VBT. 4. Understand the concept of lattice energy using Born-Haber Cycle.

5. Rationalize the metallic properties based on various theories. 6. Elaborate structures and properties of common compounds formed by main group elements.

7. Identify acidic and basic radicals in simple inorganic salts.

B.Sc. Semester – I BCH1T02 Organic Chemistry-1 (Fundamentals, stereochemistry and hydrocarbons)

1. Understand and explain the different nature and behaviour of organic compounds based on fundamental concepts learnt.

2. Formulate the mechanism of organic reactions by recalling and correlating the fundamental properties of the reactants involved.

3. Learn and identify many organic reaction mechanisms including Free Radical Substitution, Electrophilic Addition and Electrophilic Aromatic Substitution.

4. Understand the fundamental concepts of stereochemistry.

5. Elaborate various properties of aliphatic and aromatic hydrocarbons.

6. Experimentally identify extra element and functional group in the given organic compound.

7. Synthesize various organic compounds making use of selective reagents.

B.Sc. Semester – I Vocational Skill Course (VSC) BVS1P01: Soap, detergent and disinfectant Technology

1. Gain an understanding of the history and influences behind modern soap creation processes and projected trends in the future of soap.

2. The analytical approach of this course is to enhance the reasoning and to understand the mechanical part of the industry.

3. Learn the most common formulations of soap products by exploring compositions and physical chemistry.

4. Understand the different aspects of industrial processes of Manufacturing disinfectants.

5. Optimise use of limited resources of harmful chemicals.

6. Suggest remedial measures for surfactant quality and threshold quantity improvement.

B.Sc. SEMESTER – I BVE1T01: ENVIRONMENTAL SCIENCE COURSE OUTCOMES:

1. Explain the basics of Environmental Science and Atmospheric Science along-with the components of Environment

2. Explicate the importance of Environmental Education.

3. Elucidate the fundamentals of atmospheric science including formation, depletion and effects of ozone layer and acid rain on environment.

4. Describe the various physical and chemical characteristics and properties of Water and Soil

5. Understand the Ecology and its allied branches

6 Comprehend about Population and Community Ecology

7. Study the changes in Population by understanding the concept of Population ecology

Indian Knowledge System (IKS) SEM1: VEDIC MATHEMATICS (BIK1TO 1)

COs: This course will enable the students to

- 1. Improve speed and accuracy in numerical calculations
- 2. Acquire IQ skills and high-end technical knowledge
- 3. gain test taking skills & creativity of calculations

B.Sc. Semester – I SEC (Chemistry) BVS1P02: Food Adulteration Analysis Practical

Course Outcomes By the end of this course, students will be able to:

1. Get basic knowledge on various foods and about adulteration.

2. Understand the adulteration of common foods and their adverse impact on health

3. Comprehend certain skills of detecting adulteration of common foods.

4. Be able to extend their knowledge to other kinds of adulteration, detection and remedies.

5. Know the basic laws and procedures regarding food adulteration and consumer protection.

B.Sc. Semester – I

BGO1T01: Food Adulteration

Course Outcomes

After successful completion of the course, students will be able to:

1. Understand the adulteration of common foods and their adverse impact on health.

2. Comprehend certain basic skills of detecting adulteration in common foods.

- 3. The students are able to understand role and importance of food additives.
- 4. Apply their knowledge of food safety and regulations.

5. Prevent food adulteration in the day to day life

B.Sc. Semester – I

BGO1T02: Cosmetic Chemistry

Course Outcomes: By the end of this course, students will be able to:

- 1. Understand the basic principles of cosmetic chemistry.
- 2. Identify and describe the function of various cosmetic ingredients.
- 3. Formulate and evaluate different types of cosmetic products.
- 4. Apply knowledge of skin and hair biology to cosmetic product development.
- 5. Understand the regulatory and safety considerations in the cosmetic industry.

B.Sc. Semester – II BCH2T03

Organic Chemistry-2 (Functional group chemistry)

Cos:

On completion of the course, the student will be able to:

1. Understand preparation, properties and reactions of haloalkanes, haloarenes and oxygen containing functional groups.

2. Use the synthetic chemistry learnt in this course to do functional group transformations.

3. To propose plausible mechanisms for various reactions.

4. Suggest synthesis routes for desired product from initial reactant.

5. Identify given organic compound by systematic chemical analysis.

6. Synthesize derivatives of given organic compound.

B.Sc. Semester – II BCH2T04

Physical Chemistry-1 (Thermodynamics, gaseous and liquid states)

Course Outcomes By the end of the course, students will be able to:

1. Solve fundamental mathematical function-based problems in chemistry.

2. Understand the three laws of thermodynamics, concept of State and Path functions, extensive and intensive properties.

3. Derive the expressions of ΔU , ΔH , ΔS , ΔG , ΔA for ideal gases under different conditions.

4. Evaluate thermodynamics of various physical and chemical processes.

5. Analyse and explain properties of ideal gas, real gas and liquids.

6. Evaluate thermodynamic constants through calorimetric studies.

7. Use various properties of liquids for determination of their concentration and composition.

B.Sc. Semester – II Vocational Skill Course (VSC) BVS2P03

Drug synthesis and analysis

Course Outcomes By the end of this course, students will be able to:

1. A foundational understanding of the principles and concepts of medicinal chemistry, including drug design and development.

2. Gaining practical experience in common laboratory techniques used in medicinal chemistry, such as synthesis and purification.

3. Ability to design and perform experiments to test the effectiveness of potential drug candidates, including assays.

4. Develop an understanding of the Physico-Chemical properties of drugs through fundamentals of volumetric analytical skills.

Indian Knowledge System (IKS) SEM2: INDIAN ASTRONOMY (BIK2TO 2)

Course Outcomes: This course will enable the students to understand that

1. It is possible to create a map of the intellectual growth of a culture using astronomy as a probe.

2. The growth of Indian astronomy occurs in distinct stages analogous to phase transitions of the evolution of cultures

3. Indian Astronomy therefore provides an excellent window to the past dramatic transitions.

B.Sc. Semester – II (Chemistry) Skill Enhancement Course (SEC) Water and wastewater analysis (BVS2P04)

Course Outcomes By the end of this course, students will be able to:

- 1. Identify sampling locations for different types of water samples.
- 2. Carry out sampling of water and wastewater from various sources.
- 3. Analyze spot parameters at sampling location.
- 4. Carry out complete physico-chemical analysis of different types of water samples.
- 5. Suggest remedial measures for water detoxification.

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SEMESTER I Paper 1 MCH1T01: Inorganic Chemistry

Course Outcomes:

At the end of the course students would be able to

1. predict the nature of bond and its properties through various electronic structural methods; bonding models

2. design new coordination compounds based on a fundamental understanding of their electronic properties

3. develop the possible catalytic pathways leading to desired products

4. apply the principles of transition metal coordination complexes to derive reaction mechanisms.

SEMESTER I Paper 2 MCH1T02: Physical Chemistry

Course Outcomes: At the end of the course students will be able to

1. Understand, analyze and exercise the principles of classical thermodynamics in various applications

2. Understand and execute the quantum mechanical problems and their applications

3. Understand the concept of adsorption and its application in surface chemistry

4. Analyze and understand the characterization techniques for polymer

5. Understand the principles of chemical kinetics and their applications in chemical dynamics.

SEMESTER I Paper 3 (Elective) MCH1T03: (b) Biomolecules

Course Outcomes:

At the end of the course students would be able to

1. Draw the structures of essential biomolecules

2. Understand the role of biomolecules in various life processes

3. Understand the way how drug can be administrated, absorbed, distributed and metabolized

4. Understand the relation of drug with different types of receptors, chemical messengers, binding site and DNA.

SEMESTER I Paper 4 MCH1T04: Research Methodology

Course Outcomes: At the end of the course, student will be able to 1. understand what research is and what is not.

2. raise awareness of crucial aspect of the nature of Knowledge and the value of scientific method.

3. Introduce the concept at the heart of every research project – the research problem - and to discuss what a researchable problem is.

4. evaluate literature, form a variety of sources, pertinent to the research objectives.

5. identify and justify the basic components of the research framework, relevant to the tackled research problem.

6. explain and justify how researchers will collect research data.

7. discuss how to cite sources, and justify this choice.

8. put forward a credible research proposal, and

9. warn the common mistakes in the field of research methodology.

SEMESTER II Paper 5 MCH2T05: Organic Chemistry

Course Outcomes: At the end of the course students will be able to

1. Implement rules of aromaticity to organic molecules

2.Sketch organic molecules in different projection formula and assign its configuration.

3. Apply their understanding about the organic reactions of industrial significance with respect to the chemo- selectivity, regioselectivity and enantioselectivity.

4. Analyse the product distribution and the stereochemistry of various organic products.

5. Evaluate the relationship between structure and reactivity.

SEMESTER II Paper 6 MCH2T06: Analytical Chemistry

Course Outcomes: At the end of the course students will be able to-

1. Select a specific analytical technique based on sample and target analyte

2. Develop analytical ability and critical thinking in selection of statistics and their use in making interpretation meaningful and productive.

3. Explain the logic behind working of indicator used in each type of titration

4. Elaborate interaction of radiation with matter and its application in chemical analysis.

5. Develop spectral methods of analysis for desired analytes.

6. Apply electroanalytical techniques based on conductance and emf measurements.

SEMESTER II Paper 7 (Elective) MCH2T07: (b) Organic Reaction Mechanism

Course Outcomes: At the end of the course students will be able to

1. Predict the orientation and stereochemistry of the product of addition and elimination reaction

2. Apply enolate chemistry to achieve molecular complexity

3. Design organic reactions in order to achieve the required product(s)

4. Formulate green chemistry synthesis to increase atom economy

5. Application of free radicals in functional group transformation

SEMESTER II Practical 4 MCH2P04: Organic Chemistry

Course Outcomes: At the end of the course students would be able to

1. Handling of the hazardous chemicals by safely

2. Predict and analysis of the major and minor products of a variety of organic reactions

3. Monitoring of the chemical reactions

4. Calculation of yield, percentage yield of the chemical reactions

5. Understand the concept of Qualitative analysis

SEMESTER II Practical 5 MCH2P05: Analytical Chemistry

Course Outcomes: At the end of the course, student will be able to

1. Carry out calibration of glassware available in the laboratory.

2. Analyze the data obtained through experiments using statistical analysis parameters.

3. Estimate quantitatively analyte present in different samples using classical and instrumental methods of analysis.

4. Design experiments based on classical and instrumental techniques.

5. Understand the principles involved in visual and instrumental volumetric techniques.

6. Formulate experiments based on optical and electroanalytical techniques. SEMESTER III Paper 8 MCH3T08: Spectroscopy-I

Course Outcomes: At the end of the course, student will be able to

- 1. Understand the symmetry properties of molecules
- 2. Interpret the structure of simple organic molecules using mass spectrometry
- 3. Correlate the presence of functional groups with IR frequencies
- 4. Apply the IR and Raman spectroscopy to simple molecules

SEMESTER III Paper 9 MCH3T09: Advanced Organic Chemistry-I

Course Outcomes: At the end of the course students would be able to

1. Identify a pericyclic reaction and categorize it as a cycloaddition, a group transfer reaction, a sigmatropic rearrangement, or an electrocyclic reaction,

2. Apply frontier molecular orbital (FMO) theory to rationalize selectivity and reactivity aspects of pericyclic reactions.

3. Understand the reaction mechanism of various common reagents employed in organic synthesis

- 4. Understand the reactivity of sulphur, silicon and phosphorous elements.
- 5. Apply pericyclic reactions for the synthesis of complex organic molecules **SEMESTER III Paper 10 MCH3T10: Advanced Inorganic Chemistry Course** Outcomes: At the end of the course students would be able to
- 1. Understand the crystal structures of simple inorganic molecules.
- 2. Understand the industrial applications of catalysis.
- 3. Apply the mechanism of metallo-enzyme actions in various life processes.
- 4. Apply simple methods of synthesis and characterization to nanomaterials.

SEMESTER III Paper 11 MCH3T11: Elective (b) Organic Chemistry Special-I Course Outcomes: At the end of the course students would be able to

1. Learn the important aspects of steroids and terpenoids.

- 2. Understand the biosynthesis of natural products.
- 3. Analyze the enzyme reactions involved in various life processes

4. Illustrate the structure elucidation of unknown naturally occurring organic compound

5. Apply the knowledge of organic reactions for the total synthesis of useful natural products

SEMESTER III Practical 6 MCH3P06: Elective (b) Organic Chemistry Special

Course Outcomes: At the end of the course students would be able to

1. Understand the types of reactions involved in organic synthesis.

2. Realize the various functional groups which are commonly present in simple organic molecules.

3. Develop skills to understand the reactions of different functional groups by the hands-on experience.

4. Characterize the synthesized compounds using IR spectroscopy

5. Draw the structures using Chem-Draw

SEMESTER IV Paper 12 MCH 4T12: Spectroscopy-II

Course Outcomes: At the end of the course, student will be able to

- 1. Interpret the structures of simple molecules using physical methods of analysis
- 2. Understand and interpret the NMR data
- 3. Analyze X ray diffraction data
- 4. Develop the skills of analytical ability
- 5. Execute out the combined application of spectral method

SEMESTER IV Paper 13 MCH 4T13: Advanced Organic Chemistry II

Course Outcomes: At the end of the course, student will be able to

1. Recognize the chemical reactions of carbonyl compounds and alkenes under photochemical conditions

2. Understand the stereochemistry of complex organic molecules

3. Apply the knowledge of enaolate chemistry in modern organic synthesis

4. Demonstrate the applications of stereochemistry of common organic reactions

5. Analyze the philosophy of synthesis of small molecules

SEMESTER IV Paper 14 MCH 4T14: Advanced Physical Chemistry

Course Outcomes: At the end of the course, student will be able to

- 1. Understand the types and behavior of solids based on their structure.
- 2. Estimate various dependent parameters of under different influences.
- 3. Understand solid state reactions and synthesis process.
- 4. Understanding nano chemistry.
- 5. Identification of crystals and their analysis.

SEMESTER IV Paper 15 MCH4T15: Elective (b) Organic Chemistry Special-II Course Outcomes: At the end of the course students would be able to

1. Understand the reactivity of organometallic compounds

2. Demonstrate the applications of organometallic reagents in C-C bond formation

3. Understands the reactivity of heterocyclic compounds in various reaction conditions

4. Understand the electrophilic, nucleophilic reactions and synthesis of various heterocycles

5. Justify the need of protecting groups in organic synthesis

PROGRAMME OUTCOMES (POs)

Bachelor of Computer Application (BCA) (Honors/Research)

(Computer Application-Major)

1. Discipline knowledge: Acquiring knowledge on basics of Computer Science and ability to apply to design principles in the development of solutions for problems of varying complexity

2. Problem Solving: Improved reasoning with strong mathematical ability to Identify, formulate and analyse problems related to computer science and exhibiting a sound knowledge on data structures and algorithms.

3. Design and Development of Solutions: Ability to design and development of algorithmic solutions to real world problems.

4. Programming a computer: Exhibiting strong skills required to program a computer for various issues and problems of day-to-day scientific applications.

5. Application Systems Knowledge: Possessing a minimum knowledge to practice existing computer application software.

6. Communication: Must have a reasonably good communication knowledge both in oral and writing.

7. Ethics on Profession, Environment and Society: Exhibiting professional ethics to maintain the internality in a working environment and also have concern on societal impacts due to computer based solutions for problems.

8. Lifelong Learning: Should become an independent learner. So, learn to learn ability.

9. Motivation to take up Higher Studies: Inspiration to continue educations towards advanced studies on Computer Science.

Course Outcomes

BCA Sem-I (Computer Application-Major) SC-DSC

SC-DSC (Paper I) BCA1T01

After completing this course satisfactorily, a student will be able to:

1. Write simple algorithms for arithmetic and logical problems.

2. Write the C code for a given problem

3. Perform input and output operations using programs in C

4. Write programs that perform operations on arrays, strings, structures, unions, functions and file handling.

Course Outcomes: SC- DSC (Paper II)

After completing this course satisfactorily, a student will be able to:

- 1. Confidently operate computers to carry out computational tasks
- 2. Understand working of Hardware and Software and the importance of operating systems.

3. Understand number systems, peripheral devices, networking, multimedia and internet

concepts

OFFICE AUTOMATION (BVS1P01)

Course Outcomes: After completing this course satisfactorily, a student will be able to:

- 1. understand functionality of Operating Systems and its applications.
- 2. Working with the user interface.
- 3. prepare documents, letters and do necessary formatting of the document.
- 4. Worksheet creation, inserting and editing data in cells.
- 5. Opening/saving a presentation and printing of slides and handouts.

BVE1T01: ENVIRONMENTAL SCIENCE

Course Outcomes: At the end of the course, students shall be able to:

- 1. Explain the basics of Environmental Science and Atmospheric Science along-with the components of Environment
- 2. Explicate the importance of Environmental Education.
- 3. Elucidate the fundamentals of atmospheric science including formation, depletion and effects of ozone layer and acid rain on environment.
- 4. Describe the various physical and chemical characteristics and properties of Water and Soil
- 5. Understand the Ecology and its allied branches
- 6. Comprehend about Population and Community Ecology
- 7. Study the changes in Population by understanding the concept of Population ecology

SEM1: VEDIC MATHEMATICS (BIK1T01)

Course Outcomes: This course will enable the students to

- 1. Improve speed and accuracy in numerical calculations
- 2. Acquire IQ skills and high-end technical knowledge
- 3. gain test taking skills & creativity of calculations

BCA Sem-II (Computer Application-Major) SC- DSC (Paper I) BCA2T03

Course Outcomes: After completion of this course, students will be able to:

- 1. Realize the need and features of OOP and idealize how C++ differs from C.
- 2. Infer knowledge on various types of overloading.

3. Choose suitable inheritance while proposing solution for the given problem.

4. Handle pointers and effective memory management.

5. Illustrate application of pointers in virtual functions.

SC-DSC (Paper II) BCA2T04

Expected Course Outcome:

1. Describe the various OS functionalities, structures and layers.

2. Usage of system calls related to OS management and interpreting different stages of various process states.

3. Design CPU scheduling algorithms to meet and validate the scheduling criteria.

4. Apply and explore the communication between inter process and synchronization techniques.

5. Implement memory placement strategies, replacement algorithms related to main memory and virtual memory techniques.

6. Differentiate the file systems; file allocation, access techniques along with virtualization concepts and designing of OS with protection and security enabled capabilities.

7. Working on Linux OS.

BVS2P03 COMPUTER ANIMATION

Course Outcome: After completion of this course, students will be able to:

1. Get knowledge about various terms like, images, text, fonts, file formats. Understanding these things is very necessary.

2. produce traditional style animation as well as puppet animation and the knowledge of the principles of animation to be built upon in subsequent courses leading up to the Portfolio course.

3. apply skills learned in this class in other areas including motion graphics, stop motion and basic traditional animation

SEM2: INDIAN ASTRONOMY (BIK2T02)

Course Outcomes: This course will enable the students to understand that

1. It is possible to create a map of the intellectual growth of a culture using astronomy as a probe.

2. The growth of Indian astronomy occurs in distinct stages analogous to phase transitions of the evolution of cultures

3. Indian Astronomy therefore provides an excellent window to the past dramatic transitions.

Bachelor of Science B. Sc. (Honors/Research) (Data Science - Major)

PROGRAMME OUTCOMES (POs)

1. Discipline knowledge: Acquiring knowledge on basics of Computer Science and ability to apply to design principles in the development of solutions for problems of varying complexity

2. Problem Solving: Improved reasoning with strong mathematical ability to Identify, formulate and analyze problems related to computer science and exhibiting a sound knowledge on data structures and algorithms.

3. Design and Development of Solutions: Ability to to prepare students to apply data science concepts and methods to solve problems in real-world contexts and will communicate these solutions effectively

4. Programming a computer: Exhibiting strong skills required to program a computer for various issues and problems of day-to-day scientific applications.

5. Application Systems Knowledge: Possessing a minimum knowledge to practice existing computer application software. Provide opportunity for statistical analyses with professional statistical software

6. Communication: Must have a reasonably good communication knowledge both in oral and writing.

7. Ethics on Profession, Environment and Society: Exhibiting professional ethics to maintain the integrity in a working environment and also have concern on societal impacts due to computer-based solutions for problems.

8. Lifelong Learning: Should become an independent learner. So, learn to learn ability.

9. Motivation to take up Higher Studies: Inspiration to continue educations towards advanced studies on Computer Science.

Course Outcomes

B.Sc. Sem-I (Data Science – Major) SC-DSC (Paper I) BDS1T01 Linear Algebra

Course Outcomes: At the end of the course the student should be able to

1. Observe the various types of matrix, determinant and its properties.

2. Understand the concepts of system of linear equations and solving by various methods.

3. Understand the concepts of vector space, subspace and basis.

4. Understand the concepts of orthogonality, Hermitian and unitary transformations.

SC-DSC (Paper II)

Course Outcomes: After completion of this course, students will be able to:

- 1. Realize the need and features of OOP and idealize how C++ differs from C.
- 2. Infer knowledge on various types of overloading.
- 3. Choose suitable inheritance while proposing solution for the given problem.
- 4. Handle pointers and effective memory management.
- 5. Illustrate application of pointers in virtual functions.

BVS1P01 OFFICE AUTOMATION

Course Outcomes: After completing this course satisfactorily, a student will be able to:

- 1. understand functionality of Operating Systems and its applications.
- 2. Working with the user interface.
- 3. prepare documents, letters and do necessary formatting of the document.
- 4. Worksheet creation, inserting and editing data in cells.
- 5. Opening/saving a presentation and printing of slides and handouts.

BVE1T01: ENVIRONMENTAL SCIENCE

COURSE OUTCOMES: At the end of the course, students shall be able to:

- 1. Explain the basics of Environmental Science and Atmospheric Science along-with the components of Environment
- 2. Explicate the importance of Environmental Education.
- 3. Elucidate the fundamentals of atmospheric science including formation, depletion and effects of ozone layer and acid rain on environment.
- 4. Describe the various physical and chemical characteristics and properties of Water and Soil
- 5. Understand the Ecology and its allied branches
- 6. Comprehend about Population and Community Ecology
- 7. Study the changes in Population by understanding the concept of Population ecology

SEM1: VEDIC MATHEMATICS (BIK1T01)

Course Outcomes: This course will enable the students to

1. Improve speed and accuracy in numerical calculations 2. Acquire IQ skills and high-end technical knowledge 3. gain test taking skills & creativity of calculations

B.Sc. Sem-II (Data Science – Major)

SC-DSC (Paper I) BDS2T03

Course Outcomes (COs): After completing this course satisfactorily, a student will be able to: 1. Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms

2. Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs

3.Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs

4. Demonstrate different methods for traversing trees

5. Compare alternative implementations of data structures with respect to performance 6. Describe the concept of recursion, give examples of its use

7.Discuss the computational efficiency of the principal algorithms for sorting and searching

SC-DSC (Paper II) BDS2T04 Probability and Statistics

Course Outcomes: At the end of this course the students are expected to

1. Have an understanding of the probability concepts.

2. Analyze the problems connected with statistics.

3. Understand how to make the transition from a real problem to a probability model for that problem.

4. Expose students to practical applications.

BVS2P03 COMPUTER ANIMATION

Course Outcome: After completion of this course, students will be able to:

1. Get knowledge about various terms like, images, text, fonts, file formats. Understanding these things is very necessary.

2. produce traditional style animation as well as puppet animation and the knowledge of the principles of animation to be built upon in subsequent courses leading up to the Portfolio course.

3. apply skills learned in this class in other areas including motion graphics, stop motion and basic traditional animation

SEM2: INDIAN ASTRONOMY (BIK2T02)

Course Outcomes: This course will enable the students to understand that

1. It is possible to create a map of the intellectual growth of a culture using astronomy as a probe.

2. The growth of Indian astronomy occurs in distinct stages analogous to phase transitions of the evolution of cultures

3. Indian Astronomy therefore provides an excellent window to the past dramatic transitions.

<u>Program Outcomes</u> <u>B.Voc. Consumer Electronics Department Outcomes:</u> Session :(2024-25)

- The course content should be taught and implemented with the aim to develop required skills in the students so that they are able to acquire following competency: Maintain various consumer electronic applications.
- On completion of the B.Voc. Consumer Electronics program the student should possess understanding and knowledge of the following:

PROGRAM OUTCOME:

- Ability to design basic circuits and conduct electronics experiments, as well as to analyze and interpret the data.
- Utilize the basic knowledge of Electronics science .
- To provide opportunity to students to learn the latest trends in Electronics.
- To provide opportunities to the students for becoming researchers and developers.
- To satisfy the needs of the Electronics Industry useful for the society.
- To provide opportunities to the students to formulate, analyze and resolve the problems in Electronics Industry and also Skill based training.

COURSE OUTCOME

B.Voc.(Consumer Electronics) SEMESTER 1

PAPER 1: Maintenance Concept

- □ To enrich the students with the basic of repair, servicing and maintenance of Electronic device.
- \Box To describe the trouble shooting procedure.
- \Box To explore the use of basic terms related to AC and DC.
- \Box To familiarize about the use of types of soldering in circuit.

PAPER 2: Passive devices and Circuits

- □ To enrich the students with the basic requirement of passive components of electronics.
- \Box To describe the use of DC Circuits.
- \Box To describe the use of AC Circuits
- \Box To explore the use of types of Transformer.

B.Voc..(Consumer Electronics) SEMESTER 2

PAPER 1: Measuring Instruments

- \Box To explain about Analog Meters and its working .
- □ To acquire the knowledge of Analog and Digital Multimeters used in many electronic circuits.
- □ To familiarize about the Other laboratory equipment and its operation.
- □ To explore the use of regulators required in electronics circuits.
- □ To familiarize about the applications of oscilloscope.

PAPER 2: Semiconductor Devices-I

- □ To explain about semiconductors used for the fabrication of semiconductor devices.
- □ To acquire the knowledge of transistor used in many electronic circuits.
- \Box To familiarize about the field effect transistor and its operation.
- \Box To explore the use of power devices required in electronics circuits.

B. Voc. .(Consumer Electronics) SEMESTER 3

PAPER 1: Semiconductor Devices-II

- □ To illustrate applications of FET, MOSFET.
- □ To describe the role of UJT,SCR,Diac,Triac in various applications of power devices.
- □ To elaborate the concept of feedback and construction of feedback amplifier and Oscillators in

OP-AMP.

- □ To explore the use of power amplifier in electronics circuits.
- □ To familiarize about the applications of sensors and transducer.

PAPER 2: Digital Electronics

- To enrich the students with the basic requirement of digital electronics.
- To describe the use of Boolean Algebra for circuit operations.
- To elaborate the use of flip flops as memory in data processing system.
- To explore the use of binary circuits in digital system.
- To familiarize about the basic building blocks required for digital system.

B. Voc.(Consumer Electronics) **SEMESTER 4**

PAPER 1: Home and Office Equipment's-I

- □ To familiarize about the use of Power Amplification Systems.
- $\hfill\square$ To understand the principle and how to record and reproduce audio system.
- \Box To explore the use of radio receivers and its types.
- \Box To use the Electronics gadgets systems.

PAPER 2: Home and Office Equipment's-II

- \Box To study and use UPS and inverters.
- □ To explore the use and controlling circuit of UPS and inverters in power loading..
- □ To study office equipment's and its applications.
- □ To study security system and its applications

B. Voc.(Consumer Electronics) SEMESTER 5

PAPER 1 Cellular Phones: Principle and Practices

- □ To understand the concept cellular/mobile communication and its operation
- □ To understand various cellular techniques.
- □ To understand about messaging and security.
- □ To understand the telecommunication traffic, channel and cellular capacity
- □ To understand various application of cellular technology

PAPER 2: Maintenance of Computer System

□ To understand importance of Microprocessors as a programmable digital system element in computer

system.

- □ To understand architecture and features of 8085 Microprocessor.
- □ To explore some basic concepts of microprocessors through assembly language programming.
- □ To grown-up the in-depth understanding of the operation of microprocessors & interfacing techniques.
- \Box To use the peripheral devices of microprocessor

B. Voc.(Consumer Electronics) **SEMESTER 6**

Industrial Based Project:

- To learn how to make project.
- To use the project in various industrial applications.
- Undertake problem identification, formulation and solution
- Demonstrate a sound technical knowledge of their selected project
- Demonstrate the knowledge skills and attitudes of a professional
- Produce a workable model from the knowledge and skills

Bachelor of Vocation (B.Voc.) Course Outcomes

(B.Voc – Software Development)

Program outcomes

Specific Outcomes

- B.Voc. in Software Development course implements the inherent practical nature of B.Voc. Course in the domain of software and computer science.
- Vocationally qualifies candidate is an easy absorb in the job market as he/she is already seen aware of the functioning and techniques in practical and industrial level. Hence, the employability prospects are boosted several times as compared to a traditional bachelor's graduate.
- Vocational studies as per their nature and course curriculum are seen focused towards discussing the practical and application based side of any subject. Thus, the domain of vocational studies expose the student to industrial working well before their entry into the job market.
- To enhance skills and adapt new computing technologies for attaining professional excellence and carrying research.
- To pursue the career in corporate sector can opt for MBA.
- To work in the IT sector as programmer, system engineer, software tester, junior programmer, web developer, system administrator, software developer etc.
- To work in public sector undertakings and Government organization.

Bachelor of Vocation (B. Voc) Skill Development Component Software Development (Semester I) Paper – I Computer Fundamentals & Networking

LEARNING OUTCOMES

To be competent, you must be able to:

1. demonstrate basic computer and internet literacy including operating a computer, describing its major components and how they work, using Windows and Linux OS, operating a browser, searching the internet, managing mails and using social internet media.

2. demonstrate aptitude for analyzing information and making logical conclusions.

3. demonstrate knowledge of the foundational mathematical concepts in computing.

4. design algorithms to solve problems and convert them into code using the appropriate programming language constructs.

5. read and execute a test case and record the outcome in the appropriate template.

6. be able to communicate effectively with appropriate people w.r.t. assigned roles in simple English – both oral and written.

Bachelor of Vocation (B. Voc) Skill Development Component Software Development (Semester I) Paper – II C Programming

To be competent, you must be able to:

1. Demonstrate basic computer and internet literacy including operating a computer, describing its major components and how they work, using Windows and Linux OS, operating a browser, searching the internet, managing mails and using social internet media.

2. Demonstrate aptitude for analysing information and making logical conclusions.

3. Demonstrate knowledge of the foundational mathematical concepts in computing.

4. Design algorithms to solve problems and convert them into code using the appropriate programming language constructs.

5. Read and execute a test case and record the outcome in the appropriate template.

6. be able to communicate effectively with appropriate people w.r.t. assigned roles in simple English – both oral and written.

Bachelor of Vocation (B. Voc) Skill Development Component Software Development

(Semester II) Paper –I OPERATING SYSTEM CONCEPTS & LINUX

To be competent, you must be able in: 1. Programming for the Web

2. Analysis and Design of Web based Applications

3. Media Content and Graphics Design

Software Development (SEMESTER-II) Paper – II Programming in 'C++'

To be competent, you must be able in:

- 1. Programming for the Web
- 2. Analysis and Design of Web based Applications
- 3. Media Content and Graphics Design

Bachelor of Vocation (B. Voc) Skill Development Component Software Development

(SEMESTER-III) Paper – I DATA STRUCTURES

To be competent, you must be able to:

1. Demonstrate basic computer and internet literacy including operating a computer, describing its major components and how they work, using Windows and Linux OS, operating a browser, searching the internet, managing mails and using social internet media.

2. Demonstrate aptitude for analysing information and making logical conclusions.

3. Demonstrate knowledge of the foundational mathematical concepts in computing.

4. Design algorithms to solve problems and convert them into code using the appropriate programming language constructs.

5. Read and execute a test case and record the outcome in the appropriate template. be able to communicate effectively with appropriate people w.r.t. assigned roles in simple English – both oral and written.

Semester III Paper – II Web Designing

To be competent, you must be able to:

1. demonstrate basic computer and internet literacy including operating a computer, describing its major components and how they work, using Windows and Linux OS, operating a browser, searching the internet, managing mails and using social internet media.

2. demonstrate aptitude for analyzing information and making logical conclusions.

3. demonstrate knowledge of the foundational mathematical concepts in computing.

4. design algorithms to solve problems and convert them into code using the appropriate programming language constructs.

5. read and execute a test case and record the outcome in the appropriate template. be able to communicate effectively with appropriate people w.r.t. assigned roles in simple English – both oral and written.

Bachelor of Vocation (B. Voc) Skill Development Component Software Development

Semester IV Paper- I Database management system

To be competent, you must be able to:

1. Demonstrate basic computer and internet literacy including operating a computer, describing its major components and how they work, using Windows and Linux OS, operating a browser, searching the internet, managing mails and using social internet media.

2. Demonstrate aptitude for analysing information and making logical conclusions.

3. Demonstrate knowledge of the foundational mathematical concepts in computing.

4. Design algorithms to solve problems and convert them into code using the appropriate programming language constructs.

5. read and execute a test case and record the outcome in the appropriate template. be able to communicate effectively with appropriate people w.r.t. assigned roles in simple English – both oral and written.

Semester IV Paper – II Web development in PHP

To be competent, you must be able to:

1. Demonstrate basic computer and internet literacy including operating a computer, describing its major components and how they work, using Windows and Linux OS, operating a browser, searching the internet, managing mails and using social internet media.

2. Demonstrate aptitude for analyzing information and making logical conclusions.

3. Demonstrate knowledge of the foundational mathematical concepts in computing.

4. Design algorithms to solve problems and convert them into code using the appropriate programming language constructs.

5. Read and execute a test case and record the outcome in the appropriate template. be able to communicate effectively with appropriate people w.r.t. assigned roles in simple English – both oral and written.

Bachelor of Vocation (B. Voc) Skill Development Component Software Development Semester V Paper – I System Analysis & Software Engineering

To be competent, you must be able to:

1. Design basic programming structures to implement functionality in line with requirements defined in BRS/URS, SRS and HLD

2. Check the understanding of the Business Requirements Specification (BRS)/User Requirements Specification (URS) with appropriate people

3. Check the understanding of the Software Requirements Specification (SRS) with appropriate people

4. Check their understanding of High Level Design (HLD) with appropriate people

5. Review their designs with appropriate people & Analyse inputs from appropriate people to identify, resolve and record design defects and informs future designs

6. Document designs using standard templates and tools Comply with organization's policies, procedures and guidelines when contributing to the design of software products and applications

(SEMESTER-V) Paper – II Java Programming

To be competent, you must be able to:

1. Design basic programming structures to implement functionality in line with requirements defined in BRS/URS, SRS and HLD

2. Check the understanding of the Business Requirements Specification (BRS)/User Requirements Specification (URS) with appropriate people

3. Check the understanding of the Software Requirements Specification (SRS) with appropriate people 4. Check their understanding of High Level Design (HLD) with appropriate people

5. Review their designs with appropriate people & Analyse inputs from appropriate people to identify, resolve and record design defects and inform future designs

6. Document designs using standard templates and tools Comply with organization's policies, procedures and guidelines when contributing to the design of software products and applications.