



Estd:1962

NAAC “A+ +” Grade with CGPA 3.52

SHIVAJI UNIVERSITY, KOLHAPUR
CENTRE FOR DISTANCE AND ONLINE EDUCATION (CDOE)

Programme Project Report (PPR)

of

M.B.A. through Online Mode

A. Programme’s mission and objectives:

1. To strengthen conceptual base of executives.
2. To help them improve decision making ability, creative and logical thinking.
3. To improve analytical ability, problem solving skills and judgmental ability.

B. Relevance of the program with CDOE’s Mission and Goals:

CDOE’s Mission and Goals:

Vision: Imparting Quality Higher Education Across the Globe.

Mission: Serving the learners by offering digital learning without time and boundary restrictions.

Goals: Access to Higher Education to

- All segments of the Society across the globe.
- Offer high quality, innovative, career oriented programme to all aspirants.

- All professionals having aspiration of Career advancement are served irrespective of geographical boundaries.

With,

- Quality e-content developed by experts.
- Live Discussion Forums.
- 24 x 7 assistance through dedicated Learning Management System.
- Mentoring facilities provided to cater the needs of the learners.

By these Vision, Mission and Goals, CDOE on the global platforms; are providing the PG programmes to every aspirants of higher education.

C. Nature of prospective target group of learners:

The Aspirants of Higher Education, Working Professionals, Housewives and anyone from all over the World who desires to have technical degree of higher education such as M.B.A. will have great platform to bring dreams come true through this online M.B.A. programme offered by Centre for Distance and Online Education (CDOE), Shivaji University, Kolhapur.

D. Appropriateness of programme to be conducted in Online mode to acquire specific skills and competence:

Specific Skills and Competence to be achieved by every learner through this Online Mode programme are enlisted follows-

1. Identification of the functioning of business enterprises
2. Entrepreneurship development through Curriculum.
3. Develop skills on analyzing the business data application of relevant analysis and problem solving.
4. Demonstrate a global outlook with the ability to identify aspects of the global business and cross-cultural understanding.

5. Identification of the contemporary social problems, exploring the opportunities for social entrepreneurship, designing business solutions and demonstrate ethical standards in organizational decision making through Online discussion forums, Quizzes, Co-Curricular and Extra-Curricular Activities.
6. Development of effective and oral communication especially in business applications, with the use of appropriate technology.
7. Collaborate and lead teams across organizational boundaries and demonstrate leadership qualities, maximize the uses of diverse skill of team members in the related context through online activities and case-based learning.

E. Instructional Design:

Syllabus of Master of Business Administration through Online Mode:

- The entire MBA through Online Mode programme is of 2900 Marks.
- Each paper is of 100 marks. Project Viva Voce is of 200 Marks.

MBA Part-I / Semester-I

Paper No.	Course Code	Course Titles	Course credits	Internal Evaluation	University Evaluation	Total Marks
1		Management Philosophy	4	20	80	100
2		Management Accounting	4	20	80	100
3		Business Statistics and Analytics for Decision Making	4	20	80	100
4		Managerial Economics	4	20	80	100
5		Computer applications for business	4	20	80	100
6		Managerial Skills for Effectiveness	4	20	80	100
7		Organizational Behaviour	4	20	80	100
		Total	28	140	560	700

MBA Part-I Semester-II

Pape r No.	Course Code	Course Titles	Course credits	Internal Evaluation	University Evaluation	Total Mark s
8		Marketing Management	4	20	80	100
9		Financial Management	4	20	80	100
10		Human Resource Management	4	20	80	100
11		Operations Management	4	20	80	100
12		Legal and Business Environment	4	20	80	100
13		Research Methodology	4	20	80	100
14		Strategic Management	4	20	80	100
		Total	28	140	560	700

MBA Part-II Semester-III

Paper No.	Course Code	Course Titles	Course credits	Internal Evaluatio n	University Evaluation	Total Marks
15		Chh. Shivaji Maharaj -The Management Guru	4	20	80	100
16		Project Report and Viva	8	100	100	200
17		Elective I – Paper I	4	20	80	100
28		Elective I – Paper II	4	20	80	100
19		Elective I – Paper III	4	20	80	100
20		Elective II - Paper I	4	20	80	100
21		Elective II - Paper II	4	20	80	100
22		Elective II - Paper II	4	20	80	100
		Total	36	240	660	900

MBA Part-II Semester-IV

Paper No.	Course Code	Course Titles	Course credits	Internal Evaluation	University Evaluation	Total Marks
23		Elective I - Paper IV	4	20	80	100
24		Elective I - Paper V	4	20	80	100
25		Elective I - Paper VI	4	20	80	100
26		Elective II - Paper IV	4	20	80	100
27		Elective II - Paper V	4	20	80	100
28		Elective II - Paper VI	4	20	80	100
		Total	24	120	480	600

***27 courses of 100 Marks each and 1 course of Project Viva Voce of 200 Marks - Grand Total 2900 Marks. Each course is of 4 credits.Total programme is of 116 credits. ***

Candidates are required to select any Two Electives (Elective I & Elective II) from the lists given below for the two courses separately.

Each elective has 6 papers which are included in –

(i) Semester- III

- Elective-I (Paper I, II and III)
- Elective-II (Paper I, II and III)

(ii) Semester- IV

- Elective-I (Papers IV, V and VI)
- Elective II (Papers IV, V and VI)

Electives:

1. Marketing Management

2. Financial Management

3. Human Resource Management

4. Production & Operations
Management

5. International Business

6. Entrepreneurship

7. Business Analytics

8. Hospitality Management

9. Health Care Management

Project Work:

The students have to undergo practical training of 50 days in any manufacturing or service organization and they have to submit their project report up to the fourth semester. The project work must have a Certification from the organization.

List of Elective Courses:

Courses	Elective –1 Marketing Management	Elective – 2 Financial Management	Elective – 3 Human Resource Management	Elective – 4 Production and Operations Management	Elective -5 International Business	Elective-6 Entrepreneurship	Elective-7 Business Analytics	Electives-8 Hospitality Management	Elective-9 Health Care Management
Semester – III Paper-I	Sales and Distribution Management	Indian Financial System	Human Resource Planning and Procurement	Operations Management Strategy	International Business Environment	Project Planning and Implementation	Business Data Management	Fundamentals of Hospitality Management	Fundamentals of Hospital Administrations
Semester – III Paper-II	Integrated Marketing Communication	Financial Decision Analysis	Human Resource Development	Production Planning and Control	Export and Import Policy	Start-ups and New Venture	Business Analytics in Management	Hotel Management	Health Care Service Management
Semester – III Paper-III	Consumer Behaviour	Project Appraisal and Finance	Compensation Management	Materials and Inventory Management	Cross Cultural Management	Institutional Support and Venture Funding	Data Visualization for Managers	Tourism Management	Medico Legal Environment in Healthcare
Semester –IV Paper-IV	Service Marketing And Retail Marketing	Investment Management and Portfolio Analysis	Strategic HRM and International Perspectives	Supply Chain Management	Issues in International Business	Family Business Management	Cloud Computing and Virtualization	Travel Agency and Tour Operations Management	Facility Management
Semester –IV Paper-V	Digital Marketing	Behavioural Finance	Industrial Relations and Labour Laws	Global Operations and Logistics	International Marketing	Venture Valuation and Accounting	Business Analytics using R	Customer Relationship Management	Healthcare Marketing
Semester –IV Paper-VI	Contemporary Issues in Marketing	International Finance	Organisational Change and Organisational Development	World Class Production Management	International Business Negotiations	Innovation Technology Management	Business Forecasting	Event Management	IT Applications in Healthcare

Shivaji University, Kolhapur
Master of Business Administration through Online Mode
MBA – I Sem – I

MBA Through Online Mode MBA -I, SEM-I PAPER-I MANAGEMENT PHILOSOPHY	
Course Outcomes:	After studying this course students will 1. Understand various approaches to management 2. Illustrate functions of management 3. Demonstrate business ethics and its relevance to business 4. Understand corporate governance and CSR 5. Application of different management functions
Syllabus Contents:	
Unit 1	Introduction and Evolution of Management: Definition-Scope of management. Classical Approach-Scientific Management Approach-Behavioural Approach-Human Relations Approach- Contingency, Operational Approach Levels of Management: Different levels of Management and skills required. Management by Objectives (MBO) – Definition, Meaning and Significance, MBO process
Unit 2	Functions of Management: Planning: Nature, Principles, Process, Types and Limitations of Planning. Organizing: Basic concept, Importance of Organizing, Process of organizing, Span of control, Types of Organization, Structure and Design. Staffing- Importance and process of Staffing, recruitment, selection, induction and placement Directing: Nature and Principles, Purpose and need of Directing, Elements of directing Controlling: Process, Requirement for effective control, Control Techniques, Types of Control and Use of IT in controlling.
Unit 3	Business Ethics – Definition and its relevance to Business, Historical Perspective of Ethics, Global perspectives on business ethics. Approaches to managerial ethics. Trusteeship Management- Philosophy of Wealth Management.
Unit 4	Corporate Governance – Concept, importance, Benefits of corporate governance, role of board of directors, auditors and stakeholders in corporate governance, Principles of good corporate governance. Corporate Social Responsibility – Meaning, Need, Benefits, Responsibilities of business, Areas of CSR.

Reference Books:

- Agarwal. Tushar, (2019). *Business Ethos in Management*. New Delhi: Himalaya Publishing House.
- Daltion. M, (1974). *Management Principles and Practices*. New York: Macmillan Publications.
- Drucker, P. (2020). *Essentials of Management*. Brighton, Massachusetts: Harvard Business Review Press.
- Kelekar. Ravindra, (1960) *Trusteeship: M. K. Gandhi*. Ahmedabad: Navjeevan Publishing House.
- Koontz. (2008). *Essential of Management*. New Delhi: McGraw-Hill.
- Mrutunjaya. H, (2013). *Business Ethics and Value System*. Delhi: PHL Learning.
- Prasad. L, (2001). *Principles of Management*. New Delhi: Sultan Chand & Sons.
- Stephen. R, (2013). *Fundamentals of Management*. New Jersey: Pearson Education, Inc.
- Srivastav. R, (2010). *Principles of Management*. Mumbai: Himalaya Publishing House Pvt. Ltd.
- Sherlekar. S, (2019). *Modern Business Administration and Management*. New Delhi: Himalaya Publishing House.
- Shaw. William, (2019). *Business Ethics*. San Francisco: Cengage Learning.
- Rao. C.et.al. (2008). *Strategic Management and Business Policy*. New Delhi: Excel Books Pvt. Ltd.
- Richard. L, (2003). *Management*. Open Library: Thomson South-Western
- Velasquez. Manuel, (2006). *Business Ethics*. New Delhi: Prentice Hall India Pvt. Ltd.

MBA Through Online Mode MBA -I, SEM-I PAPER- II MANAGEMENT ACCOUNTING	
Course Outcomes:	After studying this course students will 1. Describe concepts in management accounting. 2. Understand financial statements 3. Prepare final account of a company 4. Prepare cost sheet of a company 5. Produce CVP analysis.
Syllabus Contents:	
Unit 1	Introduction to Accounting- Accounting Concepts, Convention & fundamental accounting assumptions. Journal, ledger, subsidiary books, Trial balance & final accounts (Trading, P&L A/C & B/S) Use of Computers in Accounting – Meaning, Role, Terms, Tally packages in Accounting, recent trends
Unit 2	Management Accounting- Concept, Meaning, Scope, Limitations of management Accounting, Functions of finance manager, Distinction between financial Accounting – Cost Accounting – Management Accounting.
Unit 3	Analysis of Financial Statements- Nature, objectives, uses & limitations of financial statements, Techniques of financial analysis- Comparative financial statements, Common size financial statements, Trend percentage ratios.
Unit 4	Cost Accounting- Meaning, Scope of Cost Accounting, Distinction between Financial & Cost Accounting Material, Labour, Overheads classification of cost, preparation of cost sheet Marginal Costing – Contribution Key factor, BEP, MOS, Decisionmaking through CVP analysis.
Reference Books: Arulanandam M A, M. A. (1989). <i>Advanced Accountancy</i> . Mumbai: Himalaya Publishing. Colin, D. (2015). <i>Management and Cost Accounting with CourseMate</i> . India: Cengage India. Colin, D. (2015). <i>Management and Cost Accounting with CourseMate</i> . India: Cengage India. Goel, M. &. (1996). <i>Principles and Practice of Management Accounting</i> . Chennai: Pearson. Gupta, N. S. (2018). <i>Management Accounting: Principles and Practices</i> . New Delhi: Kalyani Publishers. Jeff O. Schatzberg Charles T. Horngren, G. L. (2013). <i>Introduction To Management Accounting</i> . Chennai: Pearson. Lal Jawahar (Author), S. S. (2019). <i>Cost Accounting</i> . New York, USA: Mc Graw Hill. Pandey., I. M. (2018). <i>Management Accounting</i> . Noida, Uttar Pradesh: Vikas Publication House Pvt Ltd. Rao Tukaram, M.E. (2004). <i>Cost and Management Accounting</i> . Mumbai: Newagepublishers. Sheridan Titman, A. J. (2019). <i>Financial Management: Principles and Applications</i> . Chennai: Pearson. Shukla M.C. and Grewal T.S. Gupta, S. (2016). <i>Advanced Accountancy, Vol-I</i> . New Delhi: S Chand Publishing. Shukla, M. G. (2016). <i>Advanced Accountancy Vol-II</i> . New Delhi: S Chand Publishing.	

MBA Through Online Mode MBA -I, SEM-I Paper - III BUSINESS STATISTICS AND ANALYTICS FOR DECISION MAKING	
Course Outcomes:	Upon successful completion of this course, students will be able to: 1. Obtain summary statistics of numerical data. 2. Represent numerical data diagrammatically and graphically. 3. Perform simple correlation and simple linear regression analysis. 4. Compute probability of events. 5. Explain binomial, Poisson, and Normal distributions. 6. Perform elementary hypothesis testing
Syllabus Contents:	
Unit 1	Measures of Central Tendency: Arithmetic mean, median, mode, geometric mean, harmonic mean. Measures of Dispersion: range, quartile deviation, mean deviation, standard deviation, variance, coefficient of variation. Graphical representation: bar chart, histogram, pie chart
Unit 2	Correlation: concept of correlation between two variables, types of correlation, scatter plot, Karl Pearson coefficient of correlation, Spearman's rank correlation coefficient. Regression: meaning and utility of regression analysis, simple linear regression, interpretation of regression coefficients, coefficient of determination.
Unit 3	Probability: random experiment, sample space, event, mutually exclusive events, exhaustive events, independent events, classical definition of probability, addition and multiplication laws of probability, conditional probability. Probability distributions: discrete and continuous random variables, Binomial, Poisson, and Normal distributions.
Unit 4	Testing of hypotheses: null and alternative hypotheses, procedure of testing of a hypothesis, critical region, type –I and type II errors, one sample and two sample t-tests, paired t-test, chi-square test for variance, F-test for two variances, chi-square test of independence
Reference Books: Arora, A. P. (2007). <i>Statistics for Management</i> . New Delhi: S.Chand (G/L) & Company Ltd. Bowerman. Bruce,(2015). <i>Essentials of Business Statistics</i> . Ne-York, USA: McGraw Hill. Gupta. S,(2018). <i>Business Statistics</i> . Mumbai: Himalaya Publishing House. Gupta.S,(2019). <i>Fundamentals of Statistics</i> . Mumbai: Himalaya Publishing House. Richard. Levin,(2017). <i>Statistics for Management</i> . Chennai: Pearson. McEvoy. D,(2018). <i>A Guide to Business Statistics</i> . New Jersey, USA: John Wiley and Sons Ltd.	

MBA Through Online Mode MBA -I, SEM-I Paper - IV MANAGERIAL ECONOMICS	
Course Outcomes:	After studying this course students will be able to - 1. Understand managerial economics and its practices 2. Demonstrate the production function 3. Illustrate pricing practices 4. Explain market structure and price determination under different market situations 5. Understand capital budgeting and business cycles
Syllabus Contents:	
Unit 1	Introduction to Managerial Economics Managerial Economics : Nature, Scope and significance in Business Decisions Demand Analysis- Types, Law of demand, factors affecting on demand Elasticity of Demand - Types of elasticity and its significance in Business Decisions Measurement of elasticity of demand- Methods and Applications
Unit 2	Production, Cost, Revenue and Profit Production function - Meaning, Short run and Long run Production function Cost of production – Cost Concepts and its curve in short and long run Revenue - Concepts of Revenue- Revenue curves under different markets Profit - Gross and Net Profit, factors affecting on profit – Break Even Analysis
Unit 3	Market Structure and Pricing methods Perfect Competition - Features -Price and Output Determination Monopoly- Features-Price and Output Determination Monopolistic Market- Features-Price and Output Determination Oligopoly Market – Features – Kinked Demand Curve – Price leadership.
Unit 4	Pricing Methods and Investment Analysis Factors affecting on Pricing of Products and Services Full Cost Pricing- Multi Product Pricing method Price Discrimination - Dumping Prices- Peak Load Pricing method Capital Budgeting - Methods, Significance and Limitations
Reference Books: Dwivedi.D, (2021). <i>Managerial Economics</i> . New Delhi: S Chand And Company Ltd. Mehta. P, (2013). <i>Managerial Economics Analysis, Problems and Cases</i> . New Delhi: Sultan Chand & Sons. Nick, W. (2005). <i>A Problem Solving Approach</i> . UK: Cambridge University Press. Paul Keat, P. Y. (2013). <i>Managerial Economics: Economic Tools for Today's Decision Makers</i> . New York, USA: Pearson Prentice Hall. Prince.M, (2021). <i>Managerial Economics & Business Strategy</i> . New York: McGraw-Hill Education. Varshney.R,(2014). <i>Managerial Economics Text Problems & Cases</i> . New Delhi: Sultan Chand & Sons.	

MBA Through Online Mode MBA -I, SEM-I Paper - V COMPUTER APPLICATIONS FOR BUSINESS	
Course Outcome:	After completion of course students will be able to : 1. Demonstrate computer applications 2. Make use of Ms-Office for business applications. 3. Organise data using MS-Excel 4. Analyse and Visualize business data using Ms-Excel. 5. Create interactive presentations and documents.
Syllabus Contents:	
Unit 1	MS-Word and PowerPoint: MS-Word-Word Processing: Introduction to MS Office components, Introduction and working with MS Word, Word basic commands Formatting Documents- Setting Font style, alignment, Indent, paragraph setting, page setting, and document style. Tables- Creating and formatting table, Border setting, Merging, Splitting, Sorting, Insertion and deletion of row column. Tools: Word completion, spell check, Mail merge, Macros, Temples, using wizards document security, Drawing: Inserting picture, drawing, formatting picture, grouping, ordering, and rotating picture.
Unit 2	Ms-PowerPoint: Creating presentation, using templates, setting presentation layout. Formatting Presentation: Adding style, management objet, header & footer, slide background, slide layout. Graphics and Effects: Inserting, drawing pictures, setting animation & transition effect, Adding multimedia files to presentation.
Unit 3	Ms-Excel: Introduction to spreadsheet, sorting, filtering of data, Relative reference, absolute reference and mixed reference formula, editing formula, Naming cell and range. Formatting Worksheet: Assigning and removing formats, using auto formats, custom formats, custom borders, controlling column height and width. Analysing Data: Entering Functions in worksheet, Mathematical functions, text functions, logical functions, and financial functions.
Unit 4	Statistical Analysis: Average, Median, Min, Max, Median, Mode, Standard deviation, variance, percentile function, quartile function COUNT, COUNTA, COUNTIF, COUNTBLANK , SUM, SUMIF. What-If-Analysis, Goal Seek, Solver, Scenario Manager, Pivot table, Pivot Chart. Data Visualization: Introduction to data visualization, Basic Charts in Excel, Creating Embedded charts, Creating charts and chart sheet. Different types of charts.

Reference Books:

- Basandra. Suresh, (1995). *Computer Today* . New Delhi: Galgotia Publications Pvt Ltd.
- Courter, G., & Marquis, A. (1999). *Mastering Microsoft Office 2000*. U.S.A.: Sybex.
- Dumpeti Harikanth, R. N. (2010). *Computer Application in Business*. Republic of Moldova: LAP Lambert Academic Publishing (Publisher).
- Panchal Sangeeta, S. A. (2013). *Foundations of Information Technology Coursebook 9: Windows 7 and MS Office 2007*. India: Oxford University Press.
- Rajaraman., V. ., (2014). *Fundamentals of Computers*. New Delhi: Prentice Hall India Learning Private Limited.
- Sinha Priti, S. P. (2004). *Computer Fundamentals : Concepts, Systems & Applications*. New Delhi: BPB Publications.

MBA Through Online Mode MBA -I, SEM-I Paper – VI MANAGERIAL SKILLS FOR EFFECTIVENESS	
Course Outcome:	After completion of course students will be able to : 1. Demonstrate the art of getting things done in the modern business world. 2. Apply written and oral communication skills 3. Analyze the appropriate use of communication principles in various business situation 4. Develop efficiency in the way how employers are performing the working tasks. 5. Adapt managerial skills with the purpose of effective and efficient fulfillment of the tasks
Syllabus contents:	
Unit 1	Business Communication - Meaning ,Importance & objectives, process of business communication, Techniques of Effective Communication Written Communication -Business Letters- Types, Purchase letter, Sales letter, Inquiries, Circulars , Quotations , Orders , Acknowledgments Executions , Complaints , Claims & adjustments Collection letter ,Banking correspondence , Agency correspondence Meetings-Notice-Agenda, Resolutions in minutes, and Minutes writing.
Unit 2	Oral Communication - Listening & Speaking, Meeting speeches, & techniques of electing response, probing questions, Recording and closing, Observations, group communication Meaning and importance of group discussions, Interviews and interview methods, Nonverbal Expressions-Body Languages, Gestures, Postures, Facial Expressions, Dress codes.
Unit 3	Managerial Skills & Personal Skills for Managers a) Essential management skills, Different methods of Improving management skills – An approach to skill development - leadership & management. b) Personal Skills (Skill Learning) Developing Self-Awareness, Managing Personal Stress, Solving Problems Analytically and Creatively c) Presentation Skill
Unit 4	Interpersonal Skills for Managers a) Methods of Building Relationships by Communicating Supportively- Skill Assessment; Skill learning; Skill Analysis; Skill practice and skill application. b) Gaining Power and Influence: Meaning; difference between power and influence c) Motivational tools d) Conflict Management- Meaning; style; process Group Skills for Managers - a) Empowering and Delegating, b) Building Effective Teams and Teamwork c) Leading Positive Change
Reference Books: Balasubramanian. M, (2003). <i>Business communication</i> . New Delhi: Kalyani Publishers. MaArcher. Robert, (2008). <i>Basic Business Communication</i> . New Delhi: Tata McGraw Hill. Murphy, (2017). <i>Effective Business Communication</i> . New Delhi: Tata McGraw Hill. Pradhan, (2003). <i>Business communication</i> . Mumbai: Himalaya Publishing House. Thill, (2016). <i>Excellence in Business Communication</i> . New Jersey, USA: Pearson Prentice Hall. Whetten. David, (2011). <i>Developing Management Skills</i> . New Jersey: Pearson Prentice Hall.	

MBA Through Online Mode MBA -I, SEM-I Paper – VII ORGANIZATIONAL BEHAVIOUR	
Course Outcome:	The students should be able to: 1. Understand the approaches and models of organizational Behaviour 2. Illustrate the concept & determinants of personality. 3. Explain the concept of perception and process of perception 4. Outline the concept of attitude; types and sources of values. 5. Understand the concept of organizational culture organizational change and development 6. Demonstrate the various strategies for managing conflicts in organization. 7. Apply different theories of motivation and leadership with current situation.
Syllabus contents:	
Unit 1	Introduction to O.B. - Concept, Historical Overview of OB; Disciplines contributing to OB; Approaches to the study of OB, Models of OB
Unit 2	Micro Perspectives of O.B. – Individual Behaviour: Personal factors – Biographical characteristics & learned characteristics, Environmental factors & organizational factors. Personality – concept, Determinants of Personality; Development of Personality Perception – Meaning, nature & process; Attitude- concept components of Attitude, Measurement of Attitude; Values – concept, types of values, Sources of values.
Unit 3	Micro & Macro Dynamics of OB Motivation –Concept, Theories of Motivation – Maslow, Alderfer, Herzberg, McClelland, Vroom & Theory Z; Money & Motivation, Non – Financial incentives and motivation conflicts – concept, Types of conflict, Resolution of conflict stress – concept, causes, strategies to reduce the stress. Leadership Styles, Functions, Theories of Leadership Power & Authority – Concept, Types of Power, Difference between Authority & Power.
Unit 4	Macro Perspectives of OB Organizational Culture – Meaning, Emerging Issues Organization change – Nature, Factors in Organization change Resistance to change, Overcome resistance to change. Organizational Development – OD Techniques -
Reference Books: Aswathappa. K, (2017). <i>Organizational Behavior</i> . Mumbai: Himalaya Publishing House. Brooks. Ian, (2018). <i>Organizational Behaviour</i> . New Jersey: Pearson David Buchanan. David, (2020). <i>Organizational Behaviour</i> . New Jersey: Pearson. Gupta. C, (2014). <i>Organizational Behavior</i> . New Delhi: S. Chand & Company. Huczynski. Andrzej, (2015). <i>Organizational Behaviour</i> . Oxford, UK: Oxford University Press. Lawley. Scott, (2019). <i>Organizational Behaviour</i> . Oxford: Oxford University Press. Luhans. Fred, (2017). <i>Organizational Behavior</i> . New York: McGraw Hill. Pettinger. Richard, (2010). <i>Organizational Behaviour</i> . London UK: Routledge Group. Robbins. Stephan, (2018). <i>Essentials of Organizational Behavior</i> . London: Pearson Education. Smith. Paul, (2012). <i>Organizational Behaviour</i> . London: Routledge Group. Tosi. Henry, (2002). <i>The Fundamentals of Organizational Behaviour</i> . New Jersey: Wiley- Blackwell	

Shivaji University, Kolhapur
Master of Business Administration through Online Mode
MBA – I Sem – II

MBA Through Online Mode MBA -I, SEM-II PAPER-VIII MARKETING MANAGEMENT	
Course Outcomes:	After completion of this course students will be able to: 1. Understand marketing, and its impression on business. 2. Illustrate the dynamic marketing environment 3. Examine buying influences 4. Explain new edge of marketing. 5. Analyze the market and develop suitable marketing strategy
Syllabus Contents:	
Unit 1	Market and Marketing Environment Introduction to Market, classification of market, Meaning & Definition of marketing, Need, scope of marketing, Objectives of marketing, Marketing functions, Core concepts of marketing, Company orientation towards market place. Introduction, Meaning, Scanning the environment, Environmental analysis, Importance and Need, Microenvironment and Macro environment of marketing, Market Plan- Importance, marketing planning process.
Unit 2	Buying Behavior and Marketing Information System Meaning & Definition of consumer behavior, Importance, Factors influencing consumer behavior, Buying decision process, Buying motives. Branding- meaning, advantages & disadvantages, Packaging-meaning, function of packaging Introduction to Marketing Information System, Importance & Requisites. Segmentation- Meaning & Importance, Bases for consumer market segmentation, Selection of segment, Market targeting, Product positioning.
Unit 3	Strategies of 4P's Meaning & Definition of product, Classification of product, Product Life Cycle & Marketing strategies, New product development process, Pricing- Meaning, Pricing objectives, Factors affecting pricing price determination policies, Pricing methods. Promotion mix-publicity, Sales Promotion - Nature & Techniques, Personal selling-nature & Importance, Process of personal selling. Channels of distribution-concept & importance, channels of distribution for consumer product & industrial product, Selection of channel for logistics management

Unit 4	New Edge of Marketing- Neuromarketing- concept, meaning, Neuroscience and Consumer Thinking, Methodology, overview of Applications. Green Marketing- Concept, Importance, Green Marketing Mix, Digital Marketing- Concept, importance, benefits, limitations. Social MediaMarketing.
Reference Books: Ahuja. Vandana, (2015). <i>Digital Marketing</i> . New Delhi: Oxford University Press. Grewal, D. (2016). <i>Marketing</i> . New Delhi: Tata McGraw Hill Education Pvt. Ltd. Kamat. Nitin, (2015). <i>Digital Social Media Marketing</i> . New Delhi: Himalaya publishing House. Karunakaran. K, (2010). <i>Marketing Management</i> . New Delhi: Himalaya publishing House. Kotler, Philip. (2017). <i>Marketing Management</i> . New Delhi: Prentice Hall India Ltd. Loss. Monica, (2013). <i>Green Marketing: Marketing Strategy and Consumer Behaviour</i> . New Delhi: Global.. Vision Publishing House. Ramaswamy, (2017). <i>Marketing Management</i> . New Delhi: Tata McGraw Hill publishingCompany Ltd. Saxena. Rajan, (2005). <i>Marketing Management</i> . New Delhi: Tata McGraw Hill publishing Company Ltd. Shimp, T. (2013). <i>Integrated Marketing Communication in Advertising and Promotion</i> . San Francisco: Cengage Learning. Singh. Surabhi (2021). <i>Neuromarketing and its Applications</i> . New Delhi: Himalaya publishing House. Walker, (2007). <i>Marketing Strategy</i> . New Delhi: Tata McGraw Hill.	

MBA Through Online Mode MBA -I, SEM-II PAPER-IX FINANCIAL MANAGEMENT	
Course Outcomes	After completion of this course students will be able to: 1. Understand Financial Management 2. Illustrate strategic financial planning and models. 3. Demonstrate working capital management. 4. Analyze statements of accounts. 5. Estimate time value of money
Syllabus Contents:	
Unit 1:	Introduction to Financial Management- Introduction, Meaning, Objective, role and functions of financial management Ratio Analysis- Meaning, Nature and interpretation of ratios Profitability, Solvency, Leverage, Turnover ratios, Computation and Comparison of ratios.
Unit 2:	Working capital management – Meaning, Significance, type and determinants of working Operating cycle and estimation of working capital, requirement, Sources and application of working capital. Operating & Financial Leverage- Meaning, Concept and measurement of leverage. Calculation of operating, financial and combined leverage.
Unit 3:	Cost of Capital- Meaning and Significance of cost capital. Capital structure, Calculation of cost of capital-preference, equity and debt. Capital Budgeting- Concept, meaning & importance of capital budgeting. Factors influencing budgeting Investment evaluation criterion –NPV, PI, PBP, IRR.
Unit 4:	Budget and Budgetary Control- Meaning, objective, limitations of budgetary control system. Types of budget. Sales, purchase, Fixed Flexible, Cash, Master budget. Management Reporting- Meaning, objective, essentials of good report. Characteristics of good reporting system. Types of report.
Reference Books: Gitman, Lawrence. (2017). <i>Principles of Managerial Finance</i> . New Jersey, USA: Pearson Education. Horne, J. (2002). <i>Financial Management & Policy</i> . New Jersey: Pearson Education. Knott, G. (1991). <i>Financial Management</i> . London: Palgrave Publications. Khan, M. (1982). <i>Financial Management</i> . New Delhi: Tata McGraw Hill. Prasanna Chandra, Prasanna. (2005). <i>Fundamentals of Financial Management</i> . New Delhi: Tata McGraw Hill. Rustagi, R. (2021). <i>Financial Management</i> . New Delhi: Taxmann Publications. Seeba, Kapil. (2015). <i>Fundamental of Financial Management</i> . New Delhi: Wiley India. VanHorne. (2001). <i>Financial Management and Policy</i> . New Delhi: Prentice Hall Publications.	

MBA Through Online Mode MBA -I /SEM-II HUMAN RESOURCE MANAGEMENT Paper – X	
Course Outcome:	The students should be able to: 1. Understand the concept of HRM, Functions & Development of HRM 2. Illustrate the concept of Strategic HRM 3. Demonstrate the process of HRP. 4. Explain the sources of recruitment, selection and placement process. 5. Outline the concept of Employee health and safety. 6. Illustrate the methods of wage payment and the types of incentives and benefits. 7. Understand the concept of virtual organization; flexi time & flexiwork, moonlighting, Employee engagement, Employee branding HR Capital & Talent Management.
Syllabus contents:	
Unit 1	Human Resource Management Concept , Nature, Scope & Functions; Development of Human Resource Management; Strategic Human Resource Management – Concept, Difference between Traditional HRM & Strategic HRM
Unit 2	Human Resource Planning – Meaning, Objectives, Importance & Process, Barriers of HRP Job Analysis- Concept, Uses, Process; Job Description & Job Specification; Recruitment – Objectives, Sources of Recruitment, Factors of Recruitment; Selection – Process Placement – Concept, Process; Socialization – Phases.
Unit 3	Maintenance of Manpower Employee Health & Safety – Concept; Occupational Hazards& Accidents – types and causes; Safety – Significance; Social Security- Concept, Objective, Scope, Types. Wage & Salary administration – objectives, Methods of wage payment, Factors, affecting wage & salary level, Incentives – Concept, Types, Benefits
Unit 4	HR in new era Virtual Organization, Flexi time, Flexi work, Moonlighting by employees; Human Resource Accounting – Meaning, Objectives, Methods, Limitations; Employee Engagement, Employee Branding, Green HRM, HR Capital, Talent Management.
Reference Books: Aswathappa, K. (2010). <i>Human Resource Management</i> . New Delhi: McGraw Hill Publication. Byars, Lloyd. (2000). <i>Human Resource Management</i> . New York: McGraw Hill. DiCenzo, David. (2021). <i>Human Resource Management</i> . New Delhi: Wiley India Publications. Gary Dessler, Gary. (2017). <i>Human Resource Management</i> . New Jersey: Pearson Prentice Publications. Gilbert, Joaquina (2020). <i>Human Resource Management</i> . Mumbai: Vibrant Publication. Stewart, Greg (2019). <i>Human Resource Management</i> . USA: Wiley. Joh M. Ivancevich, Joh. (2007). <i>Human Resource Management</i> . New York: McGraw Hill Khanka, S. (2003). <i>Human Resource Management</i> . New Delhi: S. Chand Publications. Mondy, Wayne. (1993). <i>Human Resource Management</i> . University of Michigan: Allyn and Bacon Rao, V. (2020). <i>Human Resource Management</i> . New Delhi: Taxmann Publications Pvt. Ltd. Subba Rao, P. (2011). <i>Human Resource Management</i> . Mumbai: Himalaya Publications. Verhulst, Suson. (2018). <i>Human Resource Management</i> . USA: Wiley	

MBA Through Online Mode MBA -I, SEM-II PAPER-XI OPERATIONS MANAGEMENT	
Course Outcomes:	After completion of this course students will be able to : 1. Understand Operations management system 2. Interpret issues pertaining to management of productivity, manufacturing technology and facilities. 3. Explain an appreciation of the crucial role of operations management in the efficiency, competitiveness, and profitability of business operations. 4. Demonstrate the formulation and application of methods and models for inventory management. 5. Illustrate various aspects of quality management.
Syllabus Contents:	
Unit 1	Introduction to Production Management Production Management- Introduction, Nature and scope of operations Management, Historical Evolution of Operations Management, Interface with other functional areas such as Marketing Personnel Finance, Purchasing, Maintenance, Research and Development. Operations Research-Computers and advanced Operations Technology Production Systems and PPC Types of Production Systems – Intermittent and continuous, Job Batch, Mass and flow production systems, Assembly lines balancing, E- Manufacturing-Emerging Manufacturing Technology, Option and Choice.
Unit 2	Production Planning Control – Objectives, Types and functions of PPC, The Aggregate Planning process, Elements of scheduling,- Master Scheduling, priority planning, Facility Loading, Sequencing problem of Scheduling. Production Control- Control Techniques. Plant location and plant Lay Out- Need, Importance and Selection of exact location, Factors affecting plant location selection, plant Lay out-Importance, Types of Plant Lay Out, Criteria for good layout.
Unit 3	Quality and Material Management A) Quality Management – Meaning and Importance, Inspection, and Quality Control, Quality Assurance, Strategic role of Quality Management, Purpose of Quality Control- Cost of Quality- Total Quality Management, ISO Certifications. Computers in Quality control. Maintenance and Material Management - Introduction to Materials Management, types of maintenance, Modern approaches to Maintenance Management, Primary and Secondary Objective of Material Management, Scope of Material Management organization. Materials Management Techniques.
Unit 4	Store and Inventory Management – Purchasing and Store Management - Importance of Purchasing- Purchasing Procedure and policies. Responsibilities of PurchaseManager, Store Keeping- Objective, Importance of Store Lay Out. Inventory Management-Types of inventory Management Systems, Objectives of MRP, Fix Order Quantity periodic Review System, Selective Control of Inventory – ABC Analysis, VED Analysis.

Reference Books:

- Aswathappa, K. (2017). *Production & Operations Management*. Mumbai: Himalaya Publishing House.
- Buffa, E. (1980). *Operations management*. New Delhi: Wiley India Private Limited.
- Cherry, S. (2009). *Production and Operations Management*. New Delhi: Tata McGraw Hill Education Pvt. Ltd.
- Chunawala, S. (2018). *Production & Operations Management*. Mumbai: Himalaya Publishing House.
- Gupta, P. (1976). *Operation Research*. New Delhi: S. Chand publication.
- Pannerselvan, R. (2012). *Production & Operations management*. New Delhi: Eastern Economy Edition.
- Swaroop, Kanti. (2019). *Operation Management*. New Delhi: Sultan Chand & Sons publication.
- Wagner, Harvey. (1975). *Principles of Operation Research*. New Delhi: PHI publication.

MBA Through Online Mode MBA -I, SEM-II Paper – XII LEGAL AND BUSINESS ENVIRONMENT	
Course Outcomes:	After studying this course students will be able to : 1. Understand Legal Aspects of Business with respect to Indian economy. 2. Identify various legal provisions relevant to business aspects and situations. 3. Illustrate components of business environment. 4. Examine Business Environment. 5. Appraise Globalization trends a, challenges and environment for foreign trade and investments.
Syllabus Contents:	
Unit 1	Introduction to Business Law and Mercantile Law Importance of legal knowledge to managerial personnel and Entrepreneurs. Structure of Indian Legal system. Fundamentals of Indian Contract Act 1872 General rules relating to formulation of contract, Performance and discharge of contract. Breach of contract and remedies for Breach of contract, Quasi contracts, Various special contracts like Bailment, agency, indemnity and guarantee General principles of sale of goods Act
Unit 2	Principles of Laws relating to Business organizations. Formation of partnership firms and company Protecting Company/ Business Property. Dissolution of partnership and winding up of company Intellectual Property Rights Copy right, Trademarks, Patents etc Registration and protect of IPRs, Remedies for infringement of IPRs.
Unit 3	Business Environment - Macro and Micro Indicators of Business environment, Growth Indicators and Development Indicators. Sectors of Indian economy and Emerging sectors during last 20 years. Relative Size and growth of Public and Private Sectors.
Unit 4	Global Business Environment - Globalization trends and challenges, Development of Rural sector since globalization, Environment for Foreign Trade and foreign investment. Exchange rate movements and its impact on economy. India's competitiveness in the world economy and ease of doing business in India.
Reference Books: Cherunilam, Fransis. (2018). <i>Business Environment</i> . Mumbai: Himalaya Publication. Davis, Keith. (2015). <i>Business and Society</i> . New York, USA: McGraw Hill Publications. Dutt, Rudder. (2019). <i>Indian Economy</i> . New Delhi: Vikas Publishing House. Hulleman. Wim, (2021). <i>Economics and Business Environment</i> . London, UK: Routledge Publication. Maheswari, (2020). <i>Mercantile Law</i> . Mumbai: Himalaya Publishing House. Pailwar, Veena. (2020). <i>Economic Environment of Business</i> . New Delhi: PHI learning Pvt. Ltd. Pathak. (2018). <i>Legal Aspects of Business</i> . Mumbai: Tata McGraw- Hill Publishing Company Limited Sulphey, M.M. (2014). <i>Laws for Business</i> . New Delhi: PHI Learning Pvt. Ltd.	

MBA Through Online Mode MBA -I, SEM-II PAPER-XIII RESEARCH METHODOLOGY	
Course Outcomes:	After studying this course students will be able to : 1. Explain various terms used in research process 2. Understand research design, sample design and sampling methods 3. Apply appropriate methods for data collection for research work 4. Make use of appropriate statistical tools for data analysis and interpretation 5. Design sampling frame
Syllabus Contents:	
Unit 1	Introduction to Research and Research Design: Meaning, objectives & Motivation in research: Types of research – Research Approach Research process, relevance & scope of research in management. Ethics in Research. Research Design: Features of good Design, Types of Research Design, and Basic principles of experimental Design. Sampling Design: steps in sample Design, Characteristics of a good Sample Design, Different Types of Sample Designs: non-probability sampling and probability sampling.
Unit 2	Measurement and Data Collection: Measurement & scaling techniques: Errors in measurement test of sound measurement, scaling & Scale construction technique, reliability and validity of scale. Methods of data collection: Primary data – Observation, Interviews Questionnaire and schedule, Collection of secondary data. Processing and analyzing data: Measures of central tendency, measures of dispersion and skewness, simple and multivariate regression analysis
Unit 3	Sampling and Testing of Hypothesis: Testing of Samples: Sampling distribution, sample theory determining size of sample, confidence level. Testing of Hypothesis: Procedure for hypothesis testing. Use of statistical techniques for testing of hypothesis.
Unit 4	Interpretation of Data, report Writing Plagiarism and research in Functional areas: Interpretation of data: Techniques of Interpretation, report writing, layout of a project report. Writing and publication of a research article. Plagiarism: Meaning, importance of plagiarism in research. Ways of checking the plagiarism. How to avoid or reduce the Plagiarism. Use of Computers and software in research. Research in general management: Research in functional areas – marketing, finance, HR, production.
Reference Books: Bryman, Alan. (2016). <i>Business Research Methods</i> . A South Asian Perspective with CourseMate, Boston: Cengage Learning. Cooper, Donald (2018). <i>Business Research Methods</i> . New York: McGraw Hill Hair, Joseph (2011). <i>Business Research Methods</i> . London: Routledge Group. Kothari, C.R. (2019). <i>Research Methodology</i> . Mumbai: New Age International Publishers. Michael, Dr. V.P. (2010). <i>Research Methodology in Management</i> . Pune: Himalaya Publishing House. Pannerselvan, R. (2014). <i>Research Methodology</i> . New Delhi: PHI Learning. Zikmund, William (2019). <i>Business Research Methods</i> . Boston, San Francisco: Cengage Publications.	

MBA Through Online Mode MBA -I , SEM-II PAPER-XIV STRATEGIC MANAGEMENT	
Course Outcomes:	After studying this course students will be able to: 1. Understand the concept and process of strategic management 2. Illustrate various tools used for strategic choice 3. Demonstrate strategy evaluation and control 4. Evaluate external and internal business environment 5. Analyse situational SWOT
Syllabus Contents:	
Unit 1	Introduction to Strategic Management - Concept of strategy, levels at which strategy operates, strategic decision making, approaches to strategic decision making, Definition of strategic management, strategic management process, Strategic intent: Vision, Mission, Goals and Objectives. Environmental scanning and appraisal, Organisational appraisal, ETOP, Strategic Advantage Profile
Unit 2	Strategy Formulation and Choice - Corporate level strategies- Stability, Expansion, retrenchment, and Combination strategies -Business level strategies- Generic business strategies; Survival and Growth strategies. -Strategic analysis and choice- Tools and techniques for strategic analysis, GAP analysis, BCG Matrix, Porter's five forces model, TOWS Matrix, Grand Strategy Matrix
Unit 3	Strategy Implementation: Inter-relationship of formulation and implementation, Project Implementation, Procedural implementation, Resource Allocation, Behavioral implementation, Structural implementation, Functional implementation.
Unit 4	Strategy Evaluation & Control - Strategy Evaluation: Importance, Overview of strategic evaluation, strategic control, Operational Control, techniques of strategic evaluation and control
Reference Books: Arthur A. Thompson et.al., (2019). <i>Crafting and Executing Strategy</i> . New York: McGraw Hill companies . Gerry Johnson et.al., G. J. (2019). <i>Exploring Corporate Strategy</i> . Chennai: Pearson Publication. Hoskisson, M. (2009). <i>Strategic Management</i> , . Ireland: Cengage Learning. Kazmi, A. (2008). <i>Strategic Management and Business Policy</i> . TMH, Europe: The McGraw Hill companies. McMillan, E. (2008). <i>Complexity Management and the Dynamics of Change</i> . UK: Routledge: Howick place., Rao, B. P. (2011). <i>Business Policy and Strategic Management</i> . Pune: Himalaya Publishing House . Wheelen, T. (2018). <i>Concepts in Strategic Management and Business Policy</i> , . Chennai: Pearson Publication.	

F. Procedure for admissions, curriculum transaction and evaluation:

Eligibility Criteria for Admission:

A Learner residing within or outside India may enroll for M.B.A. through Online Mode programme by fulfilling following norms:

- Passed Bachelor Degree of minimum 3 years duration. Obtained at least 50% marks (45% marks in case of candidates belonging to reserved

category) in the qualifying examination

- If Candidate obtained Graduation from any Foreign Institute then S/he has to produce 'Equivalence Certificate issued by the Association of Indian Universities' for admissions.

Entrance Test:

To get admission to Online MBA programme, there will not be any entrance exam.

Learners may directly apply for admission whenever notification by Shivaji University, Kolhapur.

Fee Structure for MBA through Online Mode Programme

M.B.A. through Online Mode Programme fees; learners have to pay through Internet Banking, Credit Card/ Debit Card (RuPay/Visa/MasterCard/Maestro), Internet Banking, IMPS, Cash Cards/ Mobile Wallets (additional service charges, as per rules, shall be applicable in addition to the application form processing fees). This fee is non-refundable and non-transferable under any circumstances.

For Candidates from India	₹ 1,20,000 /- (Excluding Examination and Other Fees) (For 4 Semesters)
For Foreign Learners	US \$ 1760 /- (Excluding Examination and Other Fees) (For 4 Semesters)

Documents Required for the Admission

- For Indian Learners
 - Colour Scan Copy of SSC, HSC and Graduation mark sheets.
 - Caste Certificate (If applicable).
 - Recent passport size photograph Scan copy and Scan signature of the student.
 - Any Govt. ID Proof such as Aadhaar Card, PAN Card, Passport etc.
- For Foreign Learners
 - If Candidate obtained Graduation from any Foreign Institute then S/he has to produce 'Equivalence Certificate issued by the Association of Indian Universities' for admissions.

Curriculum Transaction:

Web-based Tools:

- e-Books
- PDFs
- Video Lectures (Synchronous and Asynchronous Type)
- OERs as per Need of Programme etc.

➤ Pattern of Examination:

Examination of each course will be divided as 20 Marks for Internal Evaluation and 80 Marks for Semester-End-Examination.

1. **Internal Evaluation** (of 20 Marks) for each Course will consists of;

a. For Semester-I and II:

Home Assignments to be hand written by Learner and to be uploaded on LMS.

b. For Semester- III and IV:

Uploading the Recorded Video on Case Presentation on LMS.

2. **Semester End Evaluation** (of 80 Marks) for each Course will consists of;

Nature of Question paper and Scheme of marking for all courses are as follows:

1	Nature of Examination	Proctored Online Examination through LMS
2	Nature of Questions	Multiple Choice Questions (MCQs)
3	Number of Questions	80 Multiple Choice Questions (MCQs)
4	Marks for Each Question	01 Mark
5	Marking Scheme	01 Mark for Every Correct Answer. No Negative Marking
6	Specific Nature of Questions	Multiple Choice Questions (MCQs) be asked in the form of- • Case Study followed by MCQs (Long Case followed by 05 MCQs) • Caselet followed by 01 MCQ
7	Difficulty Level	Question Paper must have – • 30 MCQs- Easy Level-Covering Basic Conceptions • 30 MCQs- Moderate Level- Covering Quick Decision-Making abilities. • 20 MCQs- Hard Level- Covering Analytical Thinking and its Applications
8	Time Duration	03 Hours (i.e., 180 Minutes)

Standard of Passing:

1. There will be separate head of passing for internal evaluation and external evaluation. Such internal evaluation is of the 20 Marks and learner required to earn at least 10 Marks for passing of one course and there are 80 Marks for external evaluation and learner has to earn at least 40 Marks for one course, that means 50% Marks learner has to earn for passing under each head.
2. No class will be awarded to any part of examination. It will be awarded in aggregate; after successfully completion of all the courses.

Passing Rules:

1. For admission to M.B.A. Part-II, a candidate must have to appear for the Examination of MBA through Online Mode Semester - I and Semester - II.
2. The learners who have completed Semester - I are allowed to continue for Semester - II and learners who have completed Semester - III are allowed to continue for Semester - IV as per above rule.
3. Learners have to complete MBA programme within 2+4 years from the date of admission. If students fail to complete the program within stipulated period then their registration to the said program stand cancel.

G. Requirement of the laboratory support and Library Resources:**a. Requirement of the Laboratory Support:**

Nil

b. Requirement of Library Resources:

e-Books, e-journals, Online Subscriptions of Digital Books/ Library etc.

I. Cost estimate of the programme and the provisions:

Sr. No.	Particulars	Details
1.	Annual Salary Expenses of Teaching Staff	Total 12 posts of Assistant Professor Cadre- Rs.57000/month X 12 Positions X 12 Months = Rs. 82,08,000 /-
2.	Annual Salary Expenses of Non-teaching/ technical staff	Non-Teaching- Rs. 30000/month X 12 months X 1 Nos. = Rs. 3,60,000 /- Technical Staff Hiring/ Outsourcing = Rs. 30,00,000 /-
3.	Library Expenses	For e-books, Subscriptions, Online Accessing Charges etc. = Rs. 10,00,000 /-
4.	Administrative Expenses	For various Local/ National /Global Certifications, Permissions, Approvals, Contingent etc. along with Admission Form Fee, e- Suvidha, Development Fund, Prospectus, eligibility Fees etc. = Rs. 1,00,00,000 /-
5.	Any Other	• LMS = Rs. 50,00,000 /- • Advertisements (Television/ Print Medium/ Social Media etc.) = Rs. 30,00,000 /- • Annual Maintenance Cost of Web/ LMS and Data Storage = Rs. 50,00,000 /- • Contingent = Rs. 2,19,32,000/-
6.	Laboratory Expenses	Nil
7.	Expenses for Tools and Equipment	• Purchasing of Computers / Tablets/ allied peripherals for e-content development etc./ Studio Development etc. = Rs. 25,00,000 /-
8.	Total Expenses	Rs. 6,00,00,000/-

J. Quality assurance mechanism and expected programme outcomes:

1. Recognize the functioning of business opportunities involvement of business enterprises and exploring the entrepreneurial opportunities.
2. Develop incubation center and entrepreneurship development center for students who intent to take up start up or grow existing business.
3. Develop skills on analyzing the business data application of relevant analysis and problem solving.
4. Demonstrate a global outlook with the ability to identify aspects of the global business and cross-cultural understanding.
5. Identify the contemporary social problems, exploring the opportunities for social entrepreneurship, designing business solutions and demonstrate ethical standards in organizational decision making.
6. Develop effective and oral communication especially in business applications, with the use of appropriate technology.
7. Collaborate and lead teams across organizational boundaries and demonstrate leadership qualities, maximize the uses of diverse skill of team members in the related context.



Estd:1962

NAAC “A+ +” Grade with CGPA 3.52

**SHIVAJI UNIVERSITY, KOLHAPUR
CENTRE FOR DISTANCE AND ONLINE EDUCATION (CDOE)**

Programme Project Report (PPR)

of

M.Sc. Mathematics through Online Mode

A. Programme’s mission and objectives:

- 1) To develop employable abilities of the learner where mathematics plays important role.
- 2) To motivate distance education M.Sc. (Mathematics) learner to take higher education.
- 3) To inspire learner to undertake research activity in Mathematics.
- 4) To make learners enough competent in basic functionalities.

B. Relevance of the program with CDOE’s Mission and Goals:

CDOE’s Mission and Goals:

Vision: Imparting Quality Higher Education across the Globe.

Mission: Serving the learners by offering digital learning without time and boundary restrictions.

Goals: Access to Higher Education to

- All segments of the Society across the globe.
- Offer high quality, innovative, career oriented programme to all aspirants.
- All professionals having aspiration of Career advancement are served irrespective of geographical boundaries.

With,

- Quality e-content developed by experts.
- Live Discussion Forums.
- 24 x 7 assistance through dedicated Learning Management System.
- Mentoring facilities provided to cater the needs of the learners.

By these Vision, Mission and Goals, CDOE on the global platforms; are providing the PG programmes to every aspirants of higher education.

C. Nature of prospective target group of learners:

In the post globalization period, there is a huge requirement of manpower having M.Sc. (Mathematics) degree to cater to the needs of manufacturing and service organizations. Further, the manpower which is already employed in manufacturing and service organizations, not having M.Sc. (Mathematics) degree are required to upgrade their qualification by possessing M.Sc. (Mathematics) degree without hampering their service/ working time.

Some graduates, primary teacher, high-school teacher already in service and they want to higher qualification than current qualification for success in their life and this is due only through Online Mode.

D. Appropriateness of programme to be conducted in online mode to acquire specific skills and competence:

Specific Skills and Competence to be achieved by every learner through this Online Mode programme are enlisted follows-

To prepare a young generation of Teachers, Bank staff, government officers who are:

1. Aware of the need of working systematically
2. Aware of the scientific and technological developments.
3. Capable of performing their work backed with theoretical and conceptual clarity.
4. Capable of solving problems and taking appropriate decisions.

E. Instructional Design:

Title of the course: M. Sc. (Mathematics) (Online Mode)

- 1) M.Sc.(Mathematics) Programme has semester pattern
- 2) Duration of the Program
 - The M.Sc. programme will be a full-time two years **online mode** i.e. 4 semesters. Pattern of examination will be Semester System.

Medium of Instruction

- The medium of Instruction will be English only.

Admission Procedure

Eligibility: 1. B.A / B. Sc graduate with Mathematics as specialization subject.
2. B.A. /B. Sc II with one subject Mathematics

3) Structure of the course

The following table gives the scheme of Examination at M.Sc. Mathematics (Part I) according to the New Syllabus and pattern of Examination.

Fees to be paid while registering for the first time for the First Year in accordance with NEP 2020 (Sem.- I & Sem.- II) in June / July :

Sr. No.	Details	Amount (in Rs.)
1.	Registration Fee	2000
2.	Exam Fee	1810
3.	Eligibility fee	As per circular of Qualification department
4.	Alumni associate fee	50
5.	Dhwaj Nidhi	10
6.	Cost of Application form	10
7.	Prospectus charges	20
8.	E-Facility Fee	50
9.	Student welfare fund	100
10.	Youth hostel fee	50
11.	Tuition / Course Fee	30000
12.	Student Accident / Medical Help Fund fee	20
	Total Amount	34,120

Fees to be paid while registering for the first time for the Second Year in accordance with NEP 2020 (Sem.- III & Sem.- IV) in June / July :

Sr. No.	Details	Amount (in Rs.)
1.	Registration Fee	2000
2.	Exam Fee	1810
3.	Eligibility fee	As per circular of Qualification department
4.	Alumni associate fee	50
5.	Dhwaj Nidhi	10
6.	Cost of Application form	10
7.	Prospectus charges	20
8.	E-Facility Fee	50
9.	Student welfare fund	100
10.	Youth hostel fee	50
11.	Tuition / Course Fee	30000
12.	Student Accident / Medical Help Fund fee	20
	Total Amount	34,120

M.Sc.(Mathematics) part I Semester - I

Course Code	Title of course	Number of Credits	Duration of Semester end Exam in hrs.	Marks- Term end Exam	Marks- (Internal) Mid Semester Exam	Total marks of Each Subject
MMT-101	Mandatory Major 4 credits Linear Algebra	4	3	60	40	100
MMT-102	Real Analysis	4	3	60	40	100
MMT-103	Ordinary Differential Equations	4	3	60	40	100
MMT-104	Mandatory Major 2 Credits Numerical Analysis-I	2	2	30	20	50
MET-105	Mandatory Elective (any one) 4 credits Combinatorics or Linear programming and its applications	4	3	60	40	100
RM-106	Mandatory 4 credits Research Methodology	4	3	60	40	100

M.Sc.(Mathematics) part I Semester - II

Course Code	Title of course	Number of Credits	Duration of Semester end Exam in hrs.	Marks-Term end Exam	Marks-(Internal) Mid Semester Exam	Total marks of Each Subject
MMT-201	Mandatory Major 4 credits Algebra	4	3	60	40	100
MMT-202	Topology	4	3	60	40	100
MMT-203	Advanced Calculus	4	3	60	40	100
MMT-204	Mandatory Major 2 Credits Numerical Analysis - II	2	2	30	20	50
MET-205	Mandatory Elective (any one) 4 credits Number Theory or Quantitative techniques in operations Research	4	3	60	40	100
OJT-206	Mandatory 4 credits On job Training / Field project	4	3	60	40	100

M.Sc.(Mathematics) part II Semester - III

Course Code	Title of course	Number of Credits	Duration of Semester end Exam in hrs.	Marks- Term end Exam	Marks- (Internal) Mid Semester Exam	Total marks of Each Subject
MMT-301	Mandatory Major 4 credits Functional Analysis	4	3	60	40	100
MMT-302	Complex Analysis	4	3	60	40	100
MMT-303	Classical Mechanics	4	3	60	40	100
MMT-304	Mandatory Major 2 Credits Advanced Discrete Mathematics	2	2	30	20	50
MET-305	Mandatory Elective (any one) 4 credits Fuzzy Set Theory or Fluid Dynamics	4	3	60	40	100
RP-306	Mandatory 4 credits Research Project	4	3	60	40	100

M.Sc.(Mathematics) part I Semester - II

Course Code	Title of course	Number of Credits	Duration of Semester end Exam in hrs.	Marks- Term end Exam	Marks- (Internal) Mid Semester Exam	Total marks of Each Subject
MMT-401	Mandatory Major 4 credits Integral Equations	4	3	60	40	100
MMT-402	Field Theory	4	3	60	40	100
MMT-403	Partial Differential Equations	4	3	60	40	100
MET-404	Mandatory Elective (any one) 4 credits Fuzzy Relation and Logic Or Computational Fluid Dynamics	4	3	60	40	100
RP-405	Mandatory 6 credit Research Project	6	3	100	50	150

M. Sc. Mathematics (Online Mode) (Part I) (Level-6.0) (Semester I)
(NEP-2020)
(Introduced from Academic Year 2025-26)

Title of Course: Linear Algebra

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. understand basic notions in Linear Algebra and use the results in developing advanced mathematics.
2. study the properties of Vector Spaces, Linear Transformations, Algebra of Linear Transformations and Inner product space in some details.
3. construct Canonical forms and Bilinear forms.
4. apply knowledge of Vector space, Linear Transformations, Canonical Forms and Bilinear Transformations.

Unit I: Elementary Basic concepts, Linear Independence and Bases, Dual Spaces, Annihilator of a subspace, Quotient Spaces. Inner product spaces, Linear Transformations.

15 Lectures

Unit II: The Algebra of Linear transformations, Characteristic Roots, Matrices of linear transformations, Eigen values and eigenvectors of a linear transformation, Canonical Forms: Similarity of linear transformations.

15 Lectures

Unit III: Triangular form, Nilpotent transformations, Jordan Form, Trace and transpose, Determinants.

15 Lectures

Unit IV: Hermitian, Unitary and Normal linear transformations, Bilinear Forms, Symmetric Bilinear Forms, Skew Symmetric Bilinear Forms.

15 Lectures

Seminars, Tutorials, Problem solving session and group discussions on above four units

Recommended Book(s):

1. Herstein I. N. : Topics in Algebra, 2nd Edition, Willey Eastern Limited.
2. Hoffman, Kenneth and Kunze R: Linear Algebra, Prentice Hill of India Private Limited., 1984.

Reference Books:

1. A. R. Rao and P. Bhimashankaran, Linear Algebra, Hidustan Book Agency.
2. Surjit Singh, Linear Algebra, Vikas publishing House (1997).
3. Gilbert Strang: Introduction to Linear Algebra, Wellesley-Cambridge Press

M. Sc. Mathematics (Online Mode) (Part I) (Level-6.0) (Semester I)
(NEP-2020)
(Introduced from Academic Year 2025-26)

Title of Course: Real Analysis

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. generalize the concept of length of interval.
2. analyze the properties of Lebesgue measurable sets.
3. demonstrate the measurable functions and their properties.
4. understand the concept of Lebesgue integration of measurable functions.
5. characterize Riemann and Lebesgue integrability.
6. prove completeness of L^p Spaces.

UNIT I:

σ -algebra and Borel Sets of Real numbers, Lebesgue Outer Measure, The sigma algebra of Lebesgue measurable sets, Outer and Inner approximation of Lebesgue Measurable Sets, Countable Additivity, Continuity and Borel-Cantelli Lemma. **15 Lectures**

UNIT II:

Nonmeasurable Sets, Lebesgue Measurable Functions: Sums, Product and Composition of Measurable Functions, Sequential Pointwise Limits and Simple Approximation, Littlewood's Three Principles (Statement and importance of Egoroff's Theorem and Lusin's Theorem) **15 Lectures**

UNIT III:

Lebesgue Integral of a Bounded Measurable Function over a Set of Finite Measure, Lebesgue integral of a Measurable Non-negative Function, The General Lebesgue Integral, Characterizations of Riemann and Lebesgue Integrability. **15 Lectures**

UNIT IV:

Lebesgue's Theorem (Statement Only), Functions of Bounded Variations, Jordan's theorem, Absolutely Continuous Functions, Integrating Derivatives: Differentiating Indefinite Integrals, The L^p Spaces: Normed Linear Spaces, The Inequalities of Young, Hölder and Minkowski, The Riesz-Fischer Theorem.

15 Lectures

Seminars, Tutorials, Problem solving session and group discussions on above four units

Recommended Books:

1. H. L. Royden, P.M. Fitzpatrick, Real Analysis, Fourth Edition, PHI Learning Pvt. Ltd., New Delhi, 2010

Reference Books:

1. G. de Barra, Measure Theory and Integration, New Age International (P) Ltd., 1981.
2. I. K. Rana, An Introduction to Measure and Integration, Narosa Book Company, 1997.
3. S. K. Berberian, Measure and Integration, McMillan, New York, 1965.
4. P. K. Jain, V. P. Gupta, Lebesgue measure and Integration, Wiley Easter Limited, 1986.
5. W. Rudin, Principles of Mathematical Analysis, McGraw-Hill Book Co, 1964.
6. P. K. Halmos, Measure Theory, Van Nostrand, 1950.

M. Sc. Mathematics (Online Mode) (Part I) (Level-6.0) (Semester I)
(NEP-2020)

(Introduced from Academic Year 2025-26)

Title of Course: Ordinary Differential Equations

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. study basic notions in Differential Equations and use the results in developing advanced mathematics.
2. solve problems modeled by linear differential equations.
3. use power series methods to solve differential equations about ordinary points and regular singular points.
4. construct approximate solutions using method of successive approximation.
5. establish uniqueness of solutions.

Unit I : Linear differential equations with constant coefficients: The second order homogeneous equation, initial value problems for second order equations, linear dependence and independence, formula for the Wronskian, the non-homogeneous equations of order two.

15 Lectures

Unit II: The homogeneous equations of order n , initial value problems for the n th order equations, the non-homogeneous equation of n th order. Linear equations with variable coefficients: Initial value problems for the homogeneous equations. Solutions of the homogeneous equations, the Wronskian and linear independence.

15 Lectures

Unit III: Reduction of the order of a homogeneous equation, the non-homogeneous equations, homogeneous equations with analytic coefficients, the Legendre equations. Linear equations with regular singular points: The Euler equations, second order equations with regular singular points.

15 Lectures

Unit IV: The Bessel equation, regular singular points at infinity. Existence and uniqueness of solutions: The method of successive approximations, the Lipschitz condition, convergence of the successive approximation.

15 Lectures

Seminars, Tutorials, Problem solving session and group discussions on above four units

Recommended books:

1. E. A. Coddington: An introduction to ordinary differential equations. (2012) Prentice Hall of India Pvt.Ltd. New Delhi.

Reference books:

1. G. Birkoff and G.G.Rota, Ordinary differential equations, John Willey and Sons.
2. G.F. Simmons, Differential Equations with Applications and Historical note, McGraw-Hill, Inc. New York. (1972).
3. E.A. Coddington and Levinson, Theory of ordinary differential equations, McGraw-Hill, New York(1955).
4. E.D. Rainvills, Elementary differential equations, The Macmillan company, New York, (1964).

M. Sc. Mathematics (Online Mode) (Part I) (Level-6.0) (Semester I)
(NEP-2020)
(Introduced from Academic Year 2025-26)

Title of Course: Numerical Analysis - I

Total Credits: 02

Course Outcomes: Upon successful completion of this course, the student will be able to:

- 1) apply the methods to solve linear and nonlinear equations.
- 2) find numerical integration and analyze error in computation.
- 3) solve differential equations using various numerical methods.
- 4) determine eigen values and eigen vectors of a square matrix.
- 5) construct LU decomposition of a square matrix.

Unit I: Transcendental & polynomial equations: Bisection method, Iteration methods based on First degree equation (Secant method, Regula-Falsi method and Newton-Raphson method). Rate of Convergence, Iterative methods (Birge-Vieta method and Bairstow method).

15 Lectures

Unit II: System of linear algebraic equations and eigen value problems: Matrix factorization methods (Doolittle's method, Crout's method), Iteration methods (Jacobi iteration method, Gauss-Seidel iteration method), convergence analysis of iterative methods, Eigen values and eigenvectors, Gerschgorin theorem, Brauer theorem, Jacobi method for symmetric matrices, Power method.

15 Lectures

Seminars, Tutorials, Problem solving session and group discussions on above four units

Recommended Books:

1. M. K. Jain, S. R. K. Iyengar, R. K. Jain, Numerical methods for scientific and Engineering Computation (Fifth Edition), New Age International Publishers 2007.

Reference Books:

1. S. S. Sastry, Introductory methods of Numerical Analysis (Fifth Edition), PHI learning Private Limited, New Delhi 2012.
2. D. Kincaid, W. Cheney, Numerical Analysis Mathematics of Scientific Computing (Third Edition), American Mathematical Society.
3. J.C. Butcher, Numerical methods for ordinary differential equations (Second Edition), John Wiley & Sons Ltd, 2008.
4. Kendall E. Atkinson, An Introduction to Numerical Analysis (Second Edition), John Wiley & Sons 1988.

M. Sc. Mathematics (Online Mode) (Part I) (Level-6.0) (Semester I)
(NEP-2020)

(Introduced from Academic Year 2025-26)

Title of Course: Combinatorics

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. describe Pigeonhole principle and use it to solve problems.
2. use definitions and theorems from memory to construct solutions to problems
3. use Burnside Frobenius Theorem in counting's.
4. use various counting techniques to solve various problems.
5. apply combinatorial ideas to practical problems.
6. improve mathematical verbal communication skills.

Unit I: The sum rule and product rule, permutations and combinations, the Pigeonhole principle, Ramsay numbers, Catalan numbers, sterling numbers. **15 Lectures**

Unit II: Further basic tools, generalized permutations and combinations sequences and selections, the inclusion and exclusion principle, systems of distinct representatives, solved problems derangements and other constrain derangements. **15 Lectures**

Unit III: Combinatorial number theory, the permanent of a matrix, Rook polynomials and Hit polynomials, SDR and coverings, (Sperners theorem and Symmetric chain decomposition, posets and Dilworth's theorem) statements. **15 Lectures**

Unit IV: Generating functions and recurrence relations, ordinary and exponential generating functions, partitions of a positive integer, recurrence relations, algebraic solutions of linear recurrence relations with constant coefficients and solutions of recurrence relations using generating functions. **15 Lectures**

Seminars, Tutorials, Problem solving session and group discussions on above four units

Recommended Books:

1. V. K. Balkrishnan: Combiactorics, Shaums Outlines Series, Mc Grow Hill Inc.

Reference Books:

1. Richard Brualdi – Introductory Combinatosics North Holland.
2. V. Krishnamurthy: Combinatorics, E. W. Press
3. A. Tucker: Combinatorics, John Wiley & Sons, Inc
4. C. Vasudev, Theory and Problems of Combinatorics, New Age International

M. Sc. Mathematics (Online Mode) (Part I) (Level-6.0) (Semester I)
(NEP-2020)

(Introduced from Academic Year 2025-26)

Title of Course: Linear programming and its applications

Total Credits: 04

Course outcomes: Upon successful completion of this course, the student will be able to --

1. Recognize convex sets and convex functions.
2. Calculate maximum and minimum value of a function of several variables.
3. Solve LPP by simplex and dual simplex methods.

Unit – I: General formulation of linear programming problem, Slack and surplus variables, standard form of LPP, Solution of LPP, Feasible solution of LPP, Basic solution , Basic feasible solution, Optimum Basic feasible solution, unbounded solution, Lines and hyperplanes, Convex sets, polyhedron convex set, extreme points of a convex set, convex combination of vectors, convex hull , convex polyhedron, convex function, maxima and minima of functions of several variables. **15 lectures**

Unit -II : Introduction to linear programming problems ,fundamental theorem of linear programming, computational procedure of a simplex method, examples . Two phase method, Examples, big M method , disadvantages of big M method over two phase method , problem of degeneracy, Resolution of degeneracy, unbounded solutions, non-existing feasible solutions **15 lectures**

Unit -III : Duality in linear programming, rules for converting any primal into its dual, Duality theorems, fundamental duality theorem, The dual simplex method , Computational procedure of dual simplex method, examples. **15 lectures**

Unit – IV: Integer linear programming: Importance of integer Programming problems, Gomory's all IPP Method, Gomorian slack variable, Construction of Gomory's Constraints, Gomory's cutting plane Algorithm, Computational procedure for the solution of IPP by Gomory's Method, The Branch and Bound method, branch and bound algorithm, concept goal programming, single goal models,multiple goal models, multiple goals with equal priorities, multiple goal with priorities, multiple goals with priorities and weights, formulation of goal programming models, methodology of solution procedure, graphical solution. simplex method applied to GP problems. **15 lectures**

Seminars, Tutorials, Problem solving session and group discussions on above four units

Recommended Book: 1 S.D. Sharma: Operations Research, Kedar Nath Ram Noth and co. 15th edition reprint 2009

Reference Books: 1.J.K.Sharma : Operations research

2. Kanti Swarup ,P.K.Gupta and Manmohan : Operations research, S.Chand& Co.

3. Hamady Taha : Operations Research :Mac Millan Co.

4. R.K.Gupta : Operations Research Krishna Prakashan Mandir, Meeru

5. G.Hadley : Linear programming, Oxford and IBH Publishing Co.

6. S.I.Gass : Linear Programming, Mc Graw Hill Book Co

M. Sc. Mathematics (Online Mode) (Part I) (Level-6.0) (Semester I)
(NEP-2020)

(Introduced from Academic Year 2025-26)

Title of Course: Research Methodology

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. understand skill of mathematical writing
2. Understand writing research paper
3. revise the drafts, check the proofs
4. understand the copy copyright issues
5. Type in mathematics using latex

Unit I: Mathematical Writing: What Is a Theorem?, Proofs, The Role of Examples, Definitions, Notation, Words versus Symbols, Displaying Equations, Parallelism, Dos and Don'ts of Mathematical Writing. Writing a Paper: Audience, Organization and Structure, Title, Author List, Date, Abstract, Key Words and Subject Classifications. **15 Lectures**

Unit II: Writing a Paper (Continued...): The Introduction, Review of Literature, Computational Experiments, Tables, Citations, Conclusions, Acknowledgements, Appendix, Reference List, Specifics and Deprecated Practices. Revising a Draft: How to Revise, Examples of Prose, Examples Involving Equations, Examples from My Writing, A Revised Proof, A Draft Article for Improvement. **15 Lectures**

Unit III: Publishing a Paper: Choosing a Journal, Submitting a Manuscript, The Refereeing Process, How to Referee, The Role of the Copy Editor, Checking the Proofs, Copyright Issues, SIAM Journal Article: A case study. Writing and Defending a Thesis: The Purpose of a Thesis, Content, Presentation, The Thesis Defence. **15 Lectures**

Unit IV: Quality indices of research publication: impact factor, H- index, science citation index., Using web for literature review: Google Scholar, Scopus, MathSciNet. Latex –Basic Typesetting of Mathematics, Typesetting Theorems. **15 Lectures**

Seminars, Tutorials, Problem solving session and group discussions on above four units

Recommended Book:

1. Higham Nicholas J., Handbook of writing for the mathematical sciences, SIAM, 1961.
1. LATEX Tutorials A Primer, Indian TEX Users Group, Trivandrum, India, 2003 September.<https://www.tug.org/twg/mactex/tutorials/ltxprimer-1.0.pdf>

References:

1. Stegmann J., How to evaluate journal impact factors, Nature, 390(6660), (1997), 550-550.
2. Kaltenborn K. F. and Kuhn K, The journal impact factor as a parameter for the evaluation of researchers and research, Revista Espanola de Enfermedades Digestivas, 96(7), (2004), 460-476.
3. Hirsch J. E., An index to quantify an individual's scientific research output, <https://arxiv.org/abs/physics/0508025>
4. Garfield E., The evolution of the Science Citation Index, International Microbiology, 10, (2007), 65-69. DOI: 10.2436/20.1501.01.10
5. A Primer of Mathematical Writing, Steven G. Krantz, Universities Press Hyderabad 1998.<https://arxiv.org/pdf/1612.04888.pdf> 6McGraw- Hill's Concise Guide to Writing Research Papers, Carol Ellison, McGraw-Hill, New York, 2010.

M. Sc. Mathematics (Online Mode) (Part I) (Level-6.0) (Semester II)
(NEP-2020)

(Introduced from Academic Year 2025-26)

Title of Course: Algebra

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. study group theory and ring theory in some details.
2. introduce and discuss module structure over a ring.
3. apply Sylow theorems.
4. use homomorphism and isomorphism theorems.
5. check irreducibility of polynomials over $\mathbb{Q}$ using Eisenstein criteria.

Unit I: Group of permutations, Examples, Alternating Groups, Simple groups, simplicity of A_n ($n > 4$), Applications, Subnormal and Normal Series, Jordan-Holder Theorem, The Center and the Ascending Central Series, Isomorphism Theorems.

15 Lectures

Unit II: The Zassenhaus (Butterfly) Lemma, Schreier Theorem, Group action on a set, fixed sets and isotropy subgroups, Orbits, Applications of G-Sets to Counting, Burnside theorem, p-groups, The Sylow Theorems.

15 Lectures

Unit III: Applications of Sylow theorems to p-Groups and the Class equation, Further Applications, Polynomial in an Indeterminate, Polynomial rings, The evaluation Homomorphisms, Factorization of Polynomials over Fields, The Division Algorithm in $F[x]$, Irreducible Polynomials, Eisenstein criteria, Ideal Structure in $F[x]$, Uniqueness of Factorization in $F[x]$.

15 Lectures

Unit IV: Principal Ideal Domain (PID), Uniqueness of Factorization Domain (UFD), Gauss lemma, Introduction and Definition of Euclidean Domain, Arithmetic in Euclidean Domains. Definitions and Examples of Modules, Direct Sums, Free Modules, sub-modules, Quotient Modules, Homomorphism, Simple Modules.

15 Lectures

Seminars, Tutorials, Problem solving session and group discussions on above four units

Recommended Book(s):

1. John B. Fraleigh, A first course in Abstract Algebra (Third Edition), Narosa publishing house, New Delhi.
2. C. Musili, Introduction to Rings and Modules (Second Revised Edition), Narosa Publishing house, New Delhi.

Reference Books:

1. Joseph A. Gallian, Contemporary Abstract Algebra (Fourth Edition), Narosa Publishing house, New Delhi.
2. Bhattacharya, Jain and Nagpal, Basic Abstract Algebra, 2nd edition, Narosa Publishing House, New Delhi.
3. I. N. Herstein, Topics in Algebra, Vikas Publishing House.
4. N. Jacobson, Basic Algebra, Hind Publishing Corporation, 1984.

M. Sc. Mathematics (Online Mode) (Part I) (Level-6.0) (Semester II)
(NEP-2020)

(Introduced from Academic Year 2025-26)

Title of Course: Topology

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. built foundations for future study in analysis, in geometry, and in algebraic topology.
2. introduce the fundamental concepts in topological spaces.
3. acquire demonstrable knowledge of topological spaces, product spaces, and continuous functions on topological spaces.
4. identify compact and connected sets in topological spaces.
5. use Separation and countability axioms, Urysohn lemma, Urysohn metrization.

Unit I: Topological Spaces, Basis and Subbasis for a Topology, The Order Topology, The Product Topology on $X \times Y$, The Subspace Topology. **15 Lectures**

Unit II: Closed Sets, Closure and Interior of a Set, Limit Points, Hausdorff Spaces, Continuity of Functions, Homeomorphisms, The Product Topology, The Metric Topology. **15 Lectures**

Unit III: Connected Spaces, Connected Subspaces of the Real Line, Components and Local Connectedness, Compact Spaces, Compact Subspaces of the Real Line. **15 Lectures**

Unit IV: The Countability Axioms, The Separation Axioms, Normal Spaces, The Urysohn Lemma, The Urysohn Metrization Theorem (Only statement and its importance), The Tietze Extension Theorem (Only statement and its importance). **15 Lectures**

Seminars, Tutorials, Problem solving session and group discussions on above four units

Recommended Book:

1. J. R. Munkers, Topology, Second Edition, Pearson Education (Singapore), 2000.

Reference Books:

1. W. J. Pervin, Foundations of General Topology, Academic Press, New York, 1964.
 2. J. L. Kelley, General Topology, Springer-Verlag, New York, 1955.
 3. S. Willard, General Topology, Addison-Wesley Publishing Company, 1970.
 4. K. D. Joshi, Introduction to General Topology, New Age International, 1983.
- G. F. Simmons, Introduction to Topology and Modern Analysis, McGraw Hill Book Company, New Delhi, 1963.

M. Sc. Mathematics (Online Mode) (Part I) (Level-6.0) (Semester II)
(NEP-2020)

(Introduced from Academic Year 2025-26)

Title of Course: Advanced Calculus

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

- (i) Analyze convergence of sequences and series, double sequences and double series
- (ii) Analyze convergence of sequences and series of functions
- (iii) check differentiability of functions of several variables
- (iv) Apply inverse and implicit function theorems for functions of several variables

Unit I : Sequences and series of functions: Pointwise convergence of sequences of functions, Examples of sequences of real valued functions, Definition of uniform convergence, Uniform convergence and continuity, Cauchy condition for uniform convergence, Uniform convergence and Riemann integration, Uniform convergence and differentiation

15 Lectures

Unit II: Rearrangement of series, subseries, Double sequences, Double series, rearrangement of double series, sufficient condition for equality of iterated series, multiplication of series, Cesaro summability, sufficient conditions for uniform convergence of series, uniform convergence and double sequences, mean convergence, Taylor series generated by a function, Bernstein's theorem, binomial series.

15 Lectures

Unit III: Multivariable differential Calculus: The Directional derivatives, directional derivatives and continuity, total derivative, total derivatives expressed in terms of partial derivatives, The matrix of linear function, mean value theorem for differentiable functions, A sufficient condition for differentiability, sufficient condition for equality of mixed partial derivatives, Taylor's formula for functions from $\mathbb{R}^n$ to $\mathbb{R}^1$

15 Lectures

Unit IV: Implicit functions: Functions of several variables, Linear transformations, Differentiation, Contraction principle, The inverse function theorem, The implicit function theorem and their applications.

15 Lectures

Seminars, Tutorials, Problem solving session and group discussions on above four units

Recommended books:

1. Mathematical Analysis, Apostol, Second Edition, Narosa Publishing House.1974

Reference books:

1. Principles of mathematical Analysis, Walter Rudin, third Edition, McGraw Hill book company
2. Calculus Vol. I , Vol II, Tom M. Apostol, Second Edition Wiley India Pvt. Ltd.
3. W.Fleming, Functions of several Variables, 2nd Edition ,Springer Verlag, 1977.

M. Sc. Mathematics (Online Mode) (Part I) (Level-6.0) (Semester II)
(NEP-2020)

(Introduced from Academic Year 2025-26)

Title of Course: Numerical Analysis - II

Total Credits: 02

Course Outcomes: Upon successful completion of this course, the student will be able to:

- 1) apply the methods to solve linear and nonlinear equations.
- 2) find numerical integration and analyze error in computation.
- 3) solve differential equations using various numerical methods.
- 4) determine eigen values and eigen vectors of a square matrix.
- 5) construct LU decomposition of a square matrix.

Unit I: Interpolation, differentiation and integration: Lagrange and Newton interpolations, Truncation error bounds, Newtons divided difference interpolation, finite difference operators, numerical differentiation, methods based on interpolation, numerical integration, methods based on interpolation, error analysis, Newton-Cotes methods, Error estimates for trapezoidal and Simpson's rule.

15 Lectures

Unit II: Numerical solution of differential equations: Euler method, analysis of Euler method, Backward Euler method, mid-point method, order of a method, Taylor series method, Explicit Runge-Kutta methods of order two and four, convergence and stability of numerical methods, Truncation error, error analysis.

15 Lectures

Seminars, Tutorials, Problem solving session and group discussions on above four units

Recommended Books:

1. M. K. Jain, S. R. K. Iyengar, R. K. Jain, Numerical methods for scientific and Engineering Computation (Fifth Edition), New Age International Publishers 2007.

Reference Books:

1. S. S. Sastry, Introductory methods of Numerical Analysis (Fifth Edition), PHI learning Private Limited, New Delhi 2012.
2. D. Kincaid, W. Cheney, Numerical Analysis Mathematics of Scientific Computing (Third Edition), American Mathematical Society.
3. J.C. Butcher, Numerical methods for ordinary differential equations (Second Edition), John Wiley & Sons Ltd, 2008.
4. Kendall E. Atkinson, An Introduction to Numerical Analysis (Second Edition), John Wiley & Sons 1988.

M. Sc. Mathematics (Online Mode) (Part I) (Level-6.0) (Semester II)
(NEP-2020)
(Introduced from Academic Year 2025-26)
Title of Course: Number Theory
Total Credits: 04

Course Outcome:- Upon successful completion of this course, the student will be able to:-

1. learn more advanced properties of primes and pseudo primes.
2. apply Mobius Inversion formula to number theoretic functions.
3. explore basic idea of cryptography.
4. understand concept of primitive roots and index of an integer relative to a given primitive root.
5. derive Quadratic reciprocity law and its apply to solve quadratic congruences.

Unit I: Review of divisibility: The division algorithm, G.C.D., Euclidean algorithm, Diophantine equation $ax + by = c$. Primes and their distribution : Fundamental theorem of Arithmetic, The Goldbach Conjecture. **15 Lectures**

Unit II : Congruences : Properties of Congruences, Linear congruences, Special divisibility tests. Fermat's theorem : Fermat's factorization method, Little theorem, Wilsons theorem. Number theoretic functions : The functions τ and σ . The Mobius Inversion formula, The greatest integer function. **15 Lectures**

Unit III: Euler's Generalization of Fermat's theorem: Euler's phi function, Euler's theorem, properties of phi function, An application to Cryptography. Primitive roots : The order of an integer modulo n . **15 Lectures**

Unit IV: Primitive roots for primes, composite numbers having primitive roots, The theory of Indices. The Quadratic reciprocity law: Eulerian criteria, the Legendre symbol and its properties, quadratic reciprocity, quadratic reciprocity with composite moduli . **15 Lectures**

Seminars, Tutorials, Problem solving session and group discussions on above four units

Recommended Books :

1. D.M.Burton : Elementary Number Theory, Seventh Ed. MacGraw Hill Education(India) Edition 2012, Chennai.

Reference Books :

1. S.B.Malik : Basic Number theory, Vikas publishing House.
2. George E. Andrews : Number Theory, Hindustan Pub. Corp.(1972).
3. Niven, Zuckerman : An Introduction to Theory of Numbers. John Wiley & Sons.
4. S. G. Telang , Number Theory, Tata Mc.Graw-Hill Publishing Co., New Delhi.
5. M.B. Nathanson, Methods in Number Theory, Springer(2009).

M. Sc. Mathematics (Online Mode) (Part I) (Level-6.0)
(Semester II) (NEP-2020)

(Introduced from Academic Year 2025-26)

Title of Course: Quantitative techniques in operations Research

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. Decide policy for replacement.
2. Calculate economic lot size.
3. Derive Poisson distribution theorem and compute attributes of distribution model.
4. Identify optimal path by using CPM and PERT.

Unit I: Replacement Problems: Introduction, Failure mechanism of items, Replacement policy for items whose maintenance cost increases with time and money values is constant, Money value, Present worth factor and discount rate, Replacement policy for items whose maintenance cost increases with time and money values changes with constant rate, Individual replacement policy: Mortality theorem, Group replacement policy.

15 lectures

Unit – II : Inventory – Introduction, Cost involved in inventory problems, variables in inventory problem, symbols in inventory, concept of Economic Ordering Quantity (EOQ), The EOQ models without shortage: Model I (a) The economic lot size system with uniform demand. Model I (b) Economic lot size with different rates of demand in different cycles. Model I (c) Economic lot size with finite Rate of Replenishment. (EOQ production model), EOQ model with shortages: Model II (a) The EOQ with constant rate of demand, scheduling time constant, Model II (c) The production lot size model with shortages. Probabilistic inventory Models, Instantaneous demand, no set up cost model Model VI (a) Discrete case Model VI (b) continuous case, Problems on above models. **15 lectures**

Unit – III : Queuing Theory - Queuing systems, Queuing Problems: transient and steady states, A list of symbols, traffic intensity, Probability distributions in Queuing systems: Distribution of arrivals 'The Poisson process', Properties of Poisson process of arrivals, Distribution of inter-arrival times (Exponential process). Distribution of Departures (Pure death model), Analogy of exponential service time with Poisson Arrivals Model I : (M/M/1) : (/FCFS): Birth and Death model, Solution of model, Examples on model I, Problems. **15 lectures**

Unit – IV: PERT / CPM : Applications of PERT / CPM techniques, Network diagram representation. Rules for constructing the Network diagram, Time estimates and critical path in network analysis, Examples on optimum duration and minimum duration cost, Problems **15 lectures**

Seminars, Tutorials, Problem solving session and group discussions on above four units

Recommended Books:

1. S.D.Sharma : Operations Research Kedarnath and co. 1999

Reference Books:

1. Hamdy Taha : Operations Research, Macmillan and Co.
2. J.K. Sharma : Operations Research, Macmillan India Ltd. 1999.
3. R.K.Gupta : Operations research Time estimates h, Krishna Prakashan Mandir, 1999

M.Sc. Mathematics (Distance Mode) (Part I) (Level-6.5) (SemesterII) (NEP-2020)
(Introduced from Academic Year 2025-26)

Title of Course: On job Training / Field project

Total Credits: 04

M.Sc. Mathematics (Distance Mode) (Part II) (Level-6.5) (SemesterIII) (NEP-2020)
(Introduced from Academic Year 2026-27)

Title of Course: Functional Analysis

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. understand the fundamental topics, principles and methods of functional analysis.
2. demonstrate the knowledge of normed spaces, Banach spaces, Hilbert space.
3. define continuous linear transformations between linear spaces, bounded linear functionals.
4. apply finite dimensional spectral theorem.
5. identify normal, self adjoint, unitary, normal operators.

UNIT– I : Normed linear spaces, Banach spaces, quotient spaces, continuous linear transformations, equivalent norms, finite dimensional normed spaces and properties, conjugate space and separability, The Hahn-Banach theorem and its consequences.

15 Lectures

UNIT –II: Second conjugate space, the natural embedding of the normed linear space in its second conjugate space, reflexivity of normed spaces, the open mapping theorem, projection on Banach space, the closed graph theorem, the conjugate of an operator, the uniform boundedness principle. **15 Lectures**

UNIT –III: Hilbert spaces: examples and elementary properties, orthogonal complements, the projection theorem, orthogonal sets, the Bessel's inequality, Fourier expansion and Parseval's equation, separable Hilbert spaces, the conjugate of Hilbert space, Riesz's theorem, the adjoint of an operator. **15 Lectures**

UNIT – IV: Self adjoint operators, normal and unitary operators, projections, eigen values and eigenvectors of an operator on a Hilbert space, the determinants and spectrum of an operator, the spectral theorem on a finite dimensional Hilbert space. **15 Lectures**

Recommended Book(s):

G. F. Simmons, Introduction to Topology and Modern Analysis, Tata McGraw Hill, 1963.

Reference Books:

1. Erwin Kreyszig, Introductory Functional Analysis with Applications, John Wiley and Sons, 1978.

2. A. E. Taylor, Introduction to Functional analysis, John Wiley and sons, 1958.
3. J. B. Conway, A course in Functional Analysis, Springer-Verlag, 1985.
4. G. Bachman and L. Narici, Functional Analysis, Academic Press, 1972.
5. B. V. Limaye, Functioned Analysis, New age international, 1996.

**M.Sc. Mathematics (Distance Mode) (Part II) (Level-6.5) (Semester III) (NEP-2020)
(Introduced from Academic Year 2026-27)**

Title of Course: COMPLEX ANALYSIS

Total Credits: 04

Course outcomes: to enable the student to

1. understand fundamental concepts of complex analysis.
2. identify analytic functions, Conformal maps.
3. construct Taylor and Laurent series.
4. classify singularity and apply Residue Theorem to evaluate real integrals.
5. enjoy the beauty of analytic functions and related concepts.

Unit 1: Power series, Radius of convergence, analytic functions, Cauchy-Riemann equations, Harmonic functions, Conformal mappings, Mobius Transformations, line integral. **15 Lectures**

Unit 2: Power series representation of analytic functions, zeros of an analytic function, Liouville's Theorem, Fundamental theorem of algebra, maximum modulus theorem, the index of a closed curve, Cauchy's theorem and integral formula, Morera's Theorem. **15 Lectures**

Unit 3: Counting zeros, open Mapping theorem, Goursat's Theorem, classification of singularities, Laurent series development, Casorati-Weierstrass theorem, residues, residue theorem, evaluation of real integrals. **15 Lectures**

Unit 4: The argument principle, Rouché's theorem, the maximum principle, Schwarz's lemma and its application to characterize conformal maps, Riemann mapping theorem. **15 Lectures**

Recommended Book :

1. J. B. Conway: Functions of One Complex Variable (3rd Edition) Narosa Publishing House.

References :

1. S. Ponnusamy, Foundations of Complex Analysis, Narosa Publishing House.
2. Alfors L. V.: Complex Analysis, McGraw 1979.
3. Churchill and Brown, Complex Variables and applications, MacGrawHill(India). (8th Edition, 2014)
4. Serge Lang, Complex Analysis, Springer
5. Steven G. Krantz, Complex Analysis, A Geometric view Point, The Carus Mathematical Monographs.
6. T. W. Gamelin, Complex Analysis, Springer.

M.Sc. Mathematics (Distance Mode) (Part II) (Level-6.5) (Semester III) (NEP-2020)
(Introduced from Academic Year 2026-27)

Title of Course: CLASSICAL MECHANICS

Total Credits: 04

Course outcomes: to enable the student to

1. discuss the motion of system of particles using Lagrangian and Hamiltonian approach.
2. solve extremization problems using variational calculus.
3. discuss the motion of rigid body.
4. construct Hamiltonian using Routh process. use infinitesimal and finite rotations to analyze motion of rigid body.

UNIT – I: Mechanics of a particle, Mechanics of a system of particles, conservation theorems, constraints, Generalized coordinates, D’Alembert’s Principle, Lagrange’s equations of motion, Simple applications of Lagrangian formulation, Cyclic co-ordinates and generalised momentum, conservation theorems. **15 Lectures**

UNIT – II: Functionals, basic lemma in calculus of variations, Euler- Lagrange’s equations, first integrals of Euler- Lagrange’s equations, Geodesics in a plane and space, the minimum surface of revolution, the case of several dependent variables . **15 Lectures**
Undetermined end conditions, the problem of Brachistochrone, Isoperimetric problems, problem of maximum enclosed area. Hamilton’s Principle, Derivation of Hamilton’s principle from D’Alembert’s principle, Lagrange’s equations from Hamilton’s principle. Lagrange’s equations of motion for nonconservative systems (Method of Lagrange’s undetermined multipliers)

UNIT – III: Hamiltonian function, Hamilton’s canonical equations of motion, cyclic co-ordinates and Routh’s procedure, Derivation of Hamilton’s equations from variational principle, Physical significance of Hamiltonian, The principle of least action. Orthogonal transformations, Properties of transformation matrix, infinitesimal rotations. **15 Lectures**

UNIT – IV: The Kinematics of rigid body motion: The independent co-ordinates of a rigid body, the Eulerian angles, Euler’s theorem on motion of rigid body, Angular momentum and kinetic energy of a rigid body with one point fixed, the inertia tensor and moment of inertia, Euler’s equations of motion, Cayley- Klein parameters, Matrix of transformation in Cayley- Klein parameters, Relations between Eulerian angles and Cayley- Klein parameters. **15 Lectures**

Recommended Books :

- 1) Goldstein, H. Classical Mechanics. (1980), Narosa Publishing House, New Delhi.
- 2) Weinstock: Calculus of Variations with Applications to Physics and Engineering (International Series in Pure and Applied Mathematics). (1952), Mc Graw Hill Book Company, New York. **Reference Books :-** 1) Whittaker, E. T. A Treatise on the Analytical Dynamics of Particles and Rigid Bodies. (1965), Cambridge University Press.
- 3) Gupta, A. S. Calculus of Variations with Applications (1997), Prentice Hall of India.
- 4) Gelfand, I. M. and Fomin, S. V. Calculus of Variations (1963), Prentice Hall of India. Rana, N.C. and Joag, P. S. Classical Mechanics. (1991) Tata McGraw Hill, New Delhi

**M.Sc. Mathematics (Distance Mode) (Part II) (Level-6.5) (Semester III) (NEP-2020)
(Introduced from Academic Year 2026-27)**

**Title of Course: Advanced Discrete Mathematics
Total Credits: 02**

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. classify the graphs and apply to real world problems.
2. simplify the graphs using matrix.
3. simplify the Boolean identities and apply to switching circuits.
4. learn applications of discrete mathematics including lattices and Boolean Algebra.

UNIT– I : Graph: Definition, examples, isomorphism, simple graph, bipartite graph, complete bipartite graph, vertex degrees, regular graph, sub-graphs, complement of a graph, self complementary graph, paths and cycles in a graph, the matrix representation of a graph. Definition and simple properties of a tree, Bridges. **15**

Lectures

UNIT –II: Posets: Definition, examples, Hasse diagrams of posets, supremum and infimum, isomorphic ordered sets, duality. Lattices: Definition, examples, sublattices. Ideals: Definition, examples, bounded lattices, distributive lattices, modular lattices, complemented lattices, Boolean algebra, basic definitions, basic theorems, Boolean algebras as lattices, CNF, DNF, applications of Boolean algebra to switching circuit. **15**

Lectures

Recommended Book(s):

1. John Clark and Derek Holton, A first look at Graph Theory, Allied Publishers Ltd., 1991.
2. G. Gratzner, General Lattice Theory, Birkhauser, 2002.
3. J. Eldon Whitesitt, Boolean Algebra and Its Applications, Addison-Wesley Publishing Company, Inc., 1961.

Reference Books:

1. Seymour Lipschutz and Mark Lipson, Discrete Mathematics (second edition) Tata Mc Graw Hill Publishing Company Ltd. New Delhi.
2. Garrett Birkhoff: Lattice Theory, American mathematical society, 1940

M.Sc. Mathematics (Distance Mode) (Part II) (Level-6.5) (SemesterIII) (NEP-2020)
(Introduced from Academic Year 2026-27)

Title of Course: FUZZY SET THEORY

Total Credits: 04

Course outcomes: to enable the student to Course Outcomes:-

1. acquire the knowledge of notion of crisp sets and fuzzy sets,
2. understand the basic concepts of crisp set and fuzzy set,
3. develop the skill of operation on fuzzy sets and fuzzy arithmetic,
4. demonstrate the techniques of fuzzy sets and fuzzy numbers.
5. apply the notion of fuzzy set, fuzzy number in various problems.

Unit I: Fuzzy sets and crisp sets, examples of fuzzy sets, types of fuzzy sets, standard operations, cardinality, degree of subset hood, level cuts and its properties, representation of fuzzy sets, decomposition theorems, extension principle, properties of direct and inverse images of fuzzy sets. **15 Lectures**

Unit II: Operations on fuzzy sets, types of operations, fuzzy complement, equilibrium and dual point, Increasing and decreasing generators, fuzzy intersection: t-norms.

15 Lectures

Unit III: Fuzzy union t-conorms, characterization theorem of t-conorm, combination of operators, aggregation operations, ordered weighted averaging operations. **15 Lectures**

Unit IV: Fuzzy numbers, characterization theorem, linguistic variables, arithmetic operations on intervals, arithmetic operations on fuzzy numbers, lattice of fuzzy numbers, fuzzy equations. **15 Lectures**

Unit V: Examples, seminars, group discussions on above four units. **15 Lectures**

Recommended Books:

1. George J. Klir, Bo Yuan, Fuzzy sets and Fuzzy Logic. Theory and Applications, PHI, Ltd.2000

Reference Books:-

1. M.Grabish, Sugeno, and Murofushi Fuzzy Measures and Integrals: Theory and Applications, PHI, 1999.
2. H.J.Zimmerermann, Fuzzy Set Theory and its Applications, Kluwer, 1984.
3. M. Hanss, Applied Fuzzy Arithmetic, An Introduction with EngineeringApplications, Springer- Verlag Berlin Heidelberg 2005.
4. M. Ganesh, Introduction to Fuzzy Sets & Fuzzy Logic; PHI Learning Private Limited, New Delhi 2011.
Bojadev and M. Bojadev, Fuzzy Logic and Application, World Scientific Publication Pvt.Ltd. 2007.

M.Sc. Mathematics (Distance Mode) (Part II) (Level-6.5) (Semester III) (NEP-2020)
(Introduced from Academic Year 2026-27)
Title of Course: FLUID DYNAMICS

Total Credits: 04

Course outcomes: to enable the student to Course Outcomes:-

- 1) explain physical properties of fluids.
- 2) represent general motion of fluid element.
- 3) test possible fluid flows, classify rotational and irrotational fluid flows .
- 4) transform stress components from one co-ordinate system to another, establish relation between strain and stress tensor..
- 5) develop constitutive equations for Newtonian fluids, conservation laws and Navier-Stokes equation.
- 6) determine the complex potential and images of a two dimensional source, sink and doublet.

Unit I: Physical properties of fluids and kinematics of fluids: Concepts of fluids, continuum hypothesis, density, specific weight, specific volume, pressure, viscosity, surface tension, Eulerian & Lagrangian methods of description of fluids, Equivalence in Eulerian and Lagrangian methods, General motion of a fluid element, Integrability and compatibility conditions, general orthogonal curvilinear co-ordinate system, stream lines, path lines, streak lines, stream function, vortex lines, circulation, condition at rigid boundary. **15 Lectures**

Unit II: Stresses in fluids: Strain rate tensor, stress tensor, normal stress, shearing stress, symmetry of stress tensor, Transformation of stress components from one co-ordinate system to another, principle axes and principle values of stress tensor. Newtonian fluids, non Newtonian fluids, purely viscous fluids, Constitutive equations for Newtonian fluids. **15 Lectures**

Unit III. Conservation laws: Equation of conservation of mass, equation of conservation of momentum, Navier-Stokes equation, equation of moment of momentum, Equation of energy, Basic equations in different co-ordinate systems: Cartesian co-ordinate system, Cylindrical co-ordinate system, Spherical co-ordinate system, boundary conditions. **15 Lectures**

Unit IV. Rotational and irrotational flows: Theorems about rotational and irrotational flows: Kelvins minimum energy theorem, Kinetic energy of finite and an infinite fluid, uniqueness of irrotational flows, Bernoulli's equation, Bernoulli equation for irrotational flows, Two dimensional irrotational incompressible flows, Blasius theorem, circle theorem, Sources and sinks, sources, sinks and doublets in two dimensional flows, Methods of images. **15 Lectures**

Recommended Books:

- a. R. K. Rathy, An introduction to Fluid Dynamics, Oxford & IBH publishing company.
- b. F. Chorlton, Text book of Fluid Dynamics, CHS Publishers, Delhi, 1985.

Reference Books:

1. L. D. Landay and E. M. Lipschitz, Fluid Mechanics, Pergamon Press London 1985.
2. Kundu and Cohen, Fluid Mechanics, Elsevier pub. 2004.
3. L M Milne-Thomson, Theoretical Hydrodynamics, Macmillan Education Ltd, London 1986.

M.Sc. Mathematics (Distance Mode) (Part II) (Level-6.5) (Semester III) (NEP-2020)
(Introduced from Academic Year 2026-27)
Title of Course: Research Project
Total Credits: 04

M.Sc. Mathematics (Distance Mode) (Part II) (Level-6.5) (Semester IV) (NEP-2020)
(Introduced from Academic Year 2026-27)
Title of Course: INTEGRAL EQUATIONS
Total Credits: 04

Course outcomes: to enable the student to Course Outcomes:-

1. classify the linear integral equations and demonstrate the techniques of converting the initial and boundary value problem to integral equations and vice versa.
2. develop the technique to solve the Fredholm integral equations with separable kernel.
3. develop and demonstrate the technique of solving integral equations by successive approximations, using Laplace and Fourier transforms
4. to analyze the properties of symmetric kernel.
5. to prove Hilbert Schmidt Theorem and solve the integral equation by applying it.

UNIT– I Classification of linear integral equations, conversion of initial value problem to Volterra integral equation, conversion of boundary value problem to Fredholm integral equation, separable kernel, Fredholm integral equation with separable kernel, Fredholm alternative. Homogeneous Fredholm equations and eigen functions.

15 Lectures

UNIT –II Solutions of Fredholm integral equations by: Successive approximations method, successive substitution method, Adomian decomposition method, modified decomposition method, resolvent kernel of Fredholm equations and its properties, solutions of Volterra integral equations, successive approximations method, Neumann series, successive substitution method. **15 Lectures**

UNIT –III Solution of Volterra integral equations by Adomian decomposition method and the modified decomposition method, resolvent kernel of Volterra equations and its properties, convolution type kernels, applications of Laplace and Fourier transforms to solutions of Volterra integral equations, symmetric kernels, fundamental properties of eigen values and eigen functions for symmetric kernels, expansion in eigen functions and bilinear form. **15 Lectures**

UNIT – IV Hilbert Schmidt Theorem and its consequences, solution of symmetric integral equations, operator method in the theory of integral equations, solution of Volterra and Fredholm integro-differential equations by Adomian decomposition method. Green's function: Definition, construction of Green's function and its use in solving boundary value problems. **15 Lectures**

Recommended Books:

1. R. P. Kanwal, Linear Integral Equation: Theory and Technique, Birkhauser 2012.
2. Abdul-Majid Wazwaz, Linear and Nonlinear Integral Equations-Methods and Applications, Springer, 2011

Reference Books:

1. L. G. Chambers, Integral Equations- A Short Course, International Text Book Company, 1976.
2. M. A. Krasnov, et.al. Problems and exercises in Integral equations, Mir Publishers, 1971.
3. J. A. Cochran, The Analysis of Linear Integral Equations, Mc Graw Hill Publications, 1972.
4. C. D. Green, Integral Equation Methods, Thomas Nelson and sons, 1969.

**M.Sc. Mathematics (Distance Mode) (Part II) (Level-6.5) (Semester IV) (NEP-2020)
(Introduced from Academic Year 2026-27)**

Title of Course: FIELD THEORY

Total Credits: 04

Course outcomes: to enable the student to

- 1) determine the basis and degree of a field over its subfield.
- 2) construct splitting field for the given polynomial over the given field.
- 3) find primitive n^{th} roots of unity and n^{th} cyclotomic polynomial.
- 4) make use of Fundamental Theorem of Galois Theory and Fundamental Theorem of Algebra to solve problems in Algebra.
- 5) apply Galois Theory to constructions with straight edge and compass.

UNIT-I: Algebraic Extensions of fields Adjunction of roots, Algebraic extensions, Algebraically closed fields. **15 Lectures**

UNIT-II: Normal and Separable extensions Splitting fields, Normal extensions, Multiple roots, Finite fields, Separable extensions. **15 Lectures**

UNIT-III: Galois Theory Automorphism groups and fixed fields, Fundamental theorem of Galois theory, Fundamental theorem of algebra, Roots of unity and cyclotomic polynomials, Cyclic extensions. **15 Lectures**

UNIT-IV: Applications of Galois theory Polynomials solvable by radicals, Symmetric functions, Constructions by ruler and compass. **15 Lectures**

Recommended Book(s):

1. Bhattacharya, Jain and Nagpal, Basic Abstract Algebra, 2nd edition, Cambridge University Press, UK.(Asian edition) 2005.

Reference Books:

1. Nathan Jacobson, Basic Algebra I, second edition, W. H. Freeman and company, New York
2. I. N. Herstein, Topics in Algebra, Wiley Eastern Ltd.
3. U. M. Swamy, A. V. S. N. Murthy, Algebra: Abstract and Modern, Pearson Education, 2012
4. John Fraleigh, A first course in Abstract Algebra (3rd edition) Narosa publishing house, New Delhi
5. I. T. Adamson, Introduction to Field Theory, second edition, Cambridge University Press, 1982.
6. M. Artin, Algebra, PHI, 1996. Ian Stewart, Galois Theory, CRC Publication.

**M.Sc. Mathematics (Distance Mode) (Part II) (Level-6.5) (Semester IV) (NEP-2020)
(Introduced from Academic Year 2026-27)**

Title of Course: PARTIAL DIFFERENTIAL EQUATION

Total Credits: 04

Course outcomes: to enable the student to

1. classify partial differential equations and transform into canonical form
2. solve linear partial differential equations of both first and second order.
3. 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.
4. apply method of characteristics to find the integral surface of a quasi linear partial differential equations.
5. establish uniqueness of solutions of partial differential equations.

Unit I:

Curves and surfaces, First order Partial Differential Equations, classification of first order partial differential equations, classifications of Integrals, Linear equations of first order. Pfaffian differential equations, Criteria of Integrability of a Pfaffian differential equation. Compatible systems of first order partial differential equations. **15 Lectures**

Unit II:

Charpits method, Jacobi method of solving partial differential equations, Cauchy Problem, Integral surfaces through a given curve for a linear partial differential equations, for a non-linear partial differential equations. Method of characteristics to find the integral surface of a quasi linear partial differential equations. **15 Lectures**

Unit III:

Second order Partial Differential Equations. Origin of Partial differential equation, wave equations, Heat equation. Classification of second order partial differential equation, Vibration of an infinite string (both ends are not fixed), Physical Meaning of the solution of the wave equation. Vibration of a semi infinite string, Vibration of a string of finite length, Method of separation of variables, Uniqueness of solution of wave equation. Heat conduction Problems with finite rod and infinite rod.

15 Lectures

Unit IV:

Families to equipotential surfaces, Laplace equation, Solution of Laplace equation, Laplace equation in polar form, Laplace equation in spherical polar coordinates. Kelvin's inversion theorem. Boundary Value Problems: Dirichlet problems and Neumann problems, Maximum and minimum principles, Stability theorem. Dirichlet Problems and Neumann problems for a circle, for a rectangle and for a upper half plane, Duhamel's Principle. **15 Lectures**

Recommended Book:

1. **T. Amarnath:** An Elementary Course in Partial Differential Equations, 2nd edition, Narosa publishing House(2012).

Reference Books:

1. Mark Pinsky: Partial Differential Equations and Boundary-value Problems with Applications, AMS, 3rd edition(2011).
2. I. N. Sneddon: Elements of Partial Differential Equations, McGraw Hill Int.
3. Fritz John: Partial Differential Equations, Springer(1952).

M.Sc. Mathematics (Distance Mode) (Part II) (Level-6.5) (Semester IV) (NEP-2020)

(Introduced from Academic Year 2026-27)

Title of Course: FUZZY RELATIONS & LOGIC

Total Credits: 04

Course outcomes: to enable the student to Course Outcomes:-

1. acquire the concept of fuzzy relations.
2. understand the basic concepts of fuzzy logic and fuzzy algebra.
3. develop the skills of solving fuzzy relation equations.
4. construct approximate solutions of fuzzy relation equations. 5.solve problems in Engineering and medicine.

Unit I

Projections and cylindrical extensions, binary fuzzy relations on single set, fuzzy equivalence relations, fuzzy compatibility relations, fuzzy ordering relations, fuzzy morphisms sup-i composition and inf-wi composition. **15 Lectures**

Unit II

Fuzzy relation equations, problem partitioning, solution methods, fuzzy relational equations based on sup-i and inf-wi compositions, approximate solutions. **15 Lectures**

Unit III

Fuzzy propositions, fuzzy quantifiers, linguistic hedges, inference from conditional fuzzy propositions, qualified and quantified propositions. **15 Lectures**

Unit IV

Fuzzy algebra, fuzzy groups and fuzzy rings and their basic properties . **15 Lectures**

Recommended Books:

1. George J Klir, Bo Yuan, Fuzzy Sets and Fuzzy Logic. Theory and applications, PHI.Ltd. (2000)
2. John Mordeson, Fuzzy Mathematics, Springer, 2001

Reference Books:

- 1.M.Grabish, Sugeno, and Murofushi, Fuzzy Measures and Integrals: Theory and Applications PHI, 1999.
2. H.J.Zimmerermann, Fuzzy set :Theory and its Applications, Kluwer, 1984.
- 3.M. Ganesh, Introduction to Fuzzy sets & Fuzzy Logic; PHI Learning Private Limited, New Delhi. 2011.

.M.Sc. Mathematics (Distance Mode) (Part II) (Level-6.5) (Semester IV) (NEP-2020)

(Introduced from Academic Year 2026-27)

Title of Course: COMPUTATIONAL FLUID DYNAMICS

Total Credits: 04

1. **Course outcomes: to enable the student to Course Outcomes:-**

2. classify partial differential equations (PDEs) mathematically and physically.
3. apply separation of variables method for solving initial boundary value problems.
4. construct forward, backward and centered difference formulae.
5. test stability, convergence & consistency of finite difference schemes.
6. solve problems in CFD using computer software.

Unit I

Comparison of experimental, theoretical and numerical approaches, governing equations, continuity equation, momentum equation (inviscid, viscous flows) energy equation, incompressible viscous flow, laminar boundary layer flow. Introduction of Scilab to solve problems in CFD. **15 Lectures**

Unit II Nature of a well posed problems, physical classification and mathematical

classification of partial differential equations: hyperbolic, parabolic, elliptic partial differential equations (PDEs). Conversion of PDE to canonical form. Traditional solution method: separation of variables. Transformation relationships, evaluation of transformation parameters. Forward, backward, centered difference formulae, generalized co-ordinates structure of first and second order PDE. **15 Lectures**

UNIT –III:

Stability, convergence and consistency of finite difference scheme, Explicit, Implicit and Crank- Nicolson methods for heat equation, Von Neumann analysis, Euler's explicit method, upstream differencing method, Lax method, Euler implicit method for wave equation. Finite difference representation of Laplace equation, five point method. Problem solving by Scilab: codes of explicit methods for heat and wave equations and five point method for Laplace equation. **15 Lectures**

UNIT – IV:

Finite difference schemes for Burgers equation (inviscid): Lax method, implicit methods. Finite difference schemes for Burgers equation (viscous): FTCS method, Briley – McDonald method. Convergence and stability, grid generation, orthogonal grid generation, order of magnitude analysis, reduced Navier-Stokes equations, boundary layer flow. **15 Lectures**

Recommended Book(s):

1. Dale A Anderson, John Tannehill, R. H. Fletcher, Computational Fluid Mechanics and Heat Transfer, Hemisphere publishing corporation, 1984.
2. G D Smith, Numerical Solution of Partial Differential Equations: Finite Difference Methods, Oxford Applied Mathematics and Computing Science Series, Oxford University Press, 1985.
3. C. A.J. Fletcher, Computational Techniques for Fluid Dynamics Vol. I & II, Springer Verlag Berlin Heidelberg, 1988.

Reference Books:

1. T J Chung, Computational Fluid Dynamics, Cambridge University Press, 2002.

**M. Sc. Mathematics (Distance Mode) (Part II) (Level-6.5) (Semester IV) (NEP-2020)
(Introduced from Academic Year 2024-25)**

Title of Course: Research Project

Total Credits: 06

F. Scheme of Teaching

- 1) Synchronous session as per the scheduled of Online education Shivaji University, Kolhapur.
- 2) e-Content videos.
- 3) Discussion Forum

G. Examination Pattern

Theory:

- **For 4 credit course:**

University examinations shall be of 80 marks and internal examination of 20 marks

- **For 2 credit course:**

University examinations shall be of 40 marks and internal examination of 10 marks

Practical:

Practical evaluation shall be through university appointed panel of one external and one internal examiner.

On Job Training/Field Project:

Assessment criteria of OJT/FP shall be based on final report, presentation and oral examination.

1. Student has to submit final report based on the work carried out during OJT/FP.
2. Student has to make a presentation of the work carried out during OJT/FP in front of examiner panel.
3. Student has to give midterm presentation of the work carried out during OJT/FP.

Research Project:

- **For 4 credit course:**

Assessment criteria of research project shall be based on final report/ dissertation, presentation and oral examinations. University examinations shall be of 80 marks and internal examination of 20 marks.

1. Project viva by university appointed external and internal examiners.
2. Internal evaluation will be carried out by internal guide.

- **For 6 credit course:**

Assessment criteria of research project shall be based on final report/ dissertation, presentation and oral examinations. University examinations shall be of 100 marks and internal examination of 50 marks.

1. Project viva by university appointed external and internal examiners.
2. Internal evaluation will be carried out by internal guide.

Research Methodology:

University examinations shall be of 80 marks and internal examination of 20 marks.

H. Nature of Question Paper and Scheme of Marking: Theory:

(I) Nature of the Theory Question Papers for courses of 4 credits:

1. There shall be 7 questions each carrying 16 marks.
2. Question No.1 is compulsory. It consists of objective type questions.
3. Students have to attempt any four questions from Question No.2 to Question No.7.
4. Question No. 2 to Question No.7 shall consist of short/descriptive-answer type sub-questions.
5. Duration of university theory examination of 80 marks shall be of 3 hours.

(II) Nature of the Theory Question Papers for courses of 2 credits:

1. There shall be 4 questions.
2. Question No.1 is compulsory of objective type questions carrying 8 marks.
3. Students have to attempt any two questions from Question No.2 to Question No.4.
Each question carries 16 marks.
4. Duration of university theory examination of 40 marks shall be of 2 hours.

Practical:

University examinations shall be of 80 marks and internal examination of 20 marks.

- 1) Duration of Practical Examination shall be of 3 hours.
- 2) There shall be three questions out of which any two questions to be attempted and each question carries 25 Marks.
- 3) The final practical examination shall be conducted by the university appointed examiners (External and internal). The pattern of final Practical Examination shall be as follows:

1	Coding and Execution of Program	50 Marks
2	Viva-voce	20 Marks
3	Journal	10 Marks
4	Total	80 Marks

The practical examination will be conducted semester wise in order to maintain the relevance of the respective theory course with laboratory course.

I. Procedure for Admissions, Curriculum Transaction and Evaluation:

Admissions:

Eligibility:

i) Any candidate who has successfully completed B. Sc. with a principal subject Mathematics or with a subsidiary subject Mathematics of this University or of any other statutory University recognized by UGC, New Delhi.

OR

ii) Any candidate who has successfully completed the Bachelor's degree with Mathematics courses at Second Year of Bachelor's degree of this University or of any other statutory University recognized by UGC, New Delhi.

OR

iii) Any candidate who has successfully completed level 5.5 with major or minor subject as Mathematics of this University or of any other statutory University recognized by UGC, New Delhi.

Eligibility for level 6.5:

i) Any candidate who has successfully completed Post Graduate Diploma (Level 6.0) in Mathematics of this University or of any other statutory University recognized by UGC, New Delhi.

OR

ii) Any candidate who has successfully completed Bachelor's Degree (Honours / Honours with Research) (Level 6.0) with principal / major subject Mathematics of this University or of any other statutory University recognized by UGC, New Delhi.

OR

iii) Completed all requirements of the relevant Post Graduate Diploma (Level 6.0) in Mathematics.

J. Intake: No limit

K. Documents Required for the Admission:

- Color scan copy of SSC, HSC and Graduation mark sheets.
- Caste Certificate (If applicable).
- Two identity card size photographs along with its scan copy of 09 KB and Scan signature of the student 09KB.
- TC/MC (whichever applicable). In case of TC/MC is not available at the time of admission student will get provisional admission. Grace period of 30 days will be given to submit the original TC/MC otherwise provisional admission gets cancelled no fee will be refunded.

L. Curriculum Transaction:**Web-based Tools:**

- e-Books
- PDFs
- Video Lectures (Synchronous and Asynchronous Type)
- OERs as per Need of Programme etc.

M. Academic Calendar:

Part- I		
Sr. No.	Programme Events	Months
A.	Admission Process	15 th June, 2025 to 30 th June, 2025
B.	Induction Programme	1 st July, 2025 to 15 th July, 2025
C.	Dissemination of Course Contents and Internal Evaluation (Semester-I)	16 th July, 2025 to 15 th November, 2025
D.	Semester - I Examination	20 th November, 2025 to 30 th November, 2025
E.	Introductory Session (Semester-II)	10 th December, 2025 to 15 th December, 2025
F.	Dissemination of Course Contents and Internal Evaluation (Semester-II)	16 th December, 2025 to 15 th April, 2026
G.	Semester – II Examination	16 th April, 2026 to 30 th April, 2026

N. Programme Fees:

M.Sc. Mathematics through Online Mode Programme fees; learners have to pay through Internet Banking, Credit Card/ Debit Card (RuPay/Visa/MasterCard/Maestro), Internet Banking, IMPS, Cash Cards/ Mobile Wallets (additional service charges, as per rules, shall be applicable in addition to the application form processing fees). This fee is non-refundable and non-transferable under any circumstances.

₹ 30,000 /- (Excluding exam and other fees)
For 1 year

O. Requirement of the laboratory support and Library Resources:**a. Requirement of the Laboratory Support:**

Nil

b. Requirement of Library Resources:

e-Books, e-journals, Online Subscriptions of Digital Books/ Library etc.

P. Cost estimate of the programme and the provisions:

Sr.	Particulars	Description	Amounts
1	e- Tutorial (Videos / Audios / Presentation, etc.) Required Videos = 864 Videos Required Minutes = 8640	For 10.00 Minutes Video Including Transcript and PPT approved rate is as Rs. 2,000/-	17,28,000/-
2	Development of Question Banks Total 48 Question bank sets * Rs. 500/-	Question paper set comprising of Case studies, Short/Long Answer, MCQs etc.	24,000/-
3	e-Content (SLMs/e-books/manual/Handbooks etc.)	For Unit Writing, Editing, DTP and allied activities	Nil
4	Discussion Forum/ Live Sessions	4 Live Sessions of each course	Nil
5	Employees Salary 1 Programme Co-Ordinator * 36,000/- 4 course Co-Ordinators * 36,000/- 1 mentor * 36,000/-	For Coordinating and Live Sessions	23,76,000/-
6	Digital Marketing	Rs. 3,00,000/- for 3 Months / 3 online courses	1,00,000/-
7	Advertising in Newspaper	Rs. 2,00,000/- / 3 online courses	67,000/-
8	Premiere Pro License	Rs. 80,000/- / 3 online courses	27,000/-
9	Learning Management System (LMS)	Rs. 25,00,000/- / 3 online courses	8,40,000/-
10	Personal Computers	Rs. 60,000/- * 06 Employees	3,60,000/-
	Miscellaneous Expenses		1,50,000/-
		Total Cost	56,72,000/-

Q. Quality assurance mechanism and expected programme outcomes:

After completion of M.Sc. (Mathematics) programme, distance learner can able to,

- 1) Solve any mathematical problem by properly applying mathematical principles.
- 2) Apply their knowledge in their current profession.
- 3) Make their careers in analysis of mathematical data in government and non-government organization.
- 4) Undertake research activity of new simplex methods in Mathematics.

Shivaji University, Kolhapur
Centre for Distance and Online Education
Online M. Com. Programme
Academic Plan 2025-2026

Shivaji University, Kolhapur
Centre for Distance & Online Education
Online M. Com. Academic Plan 2025-26

Day	Date	Event
Monday	02.06.2025 to 31.08.2025	M. Com. (Online Mode) Admission Process and Document Verification
Monday	01.09.2025 to 05.09.2025	Online M. Com. Distribution of Login Credential to Registered Learners
Saturday	06.09.2025	Online M. Com. Academic Session 2025-26 Semester - I begins
Tuesday	09.09.2025 to 11.09.2025	Online M. Com. Induction and orientation of students of the Programme
Thursday	11/09/2025 to 30/09/2025	Synchronous Sessions (Online M. Com.) for all courses of Sem. - I
Monday	01/09/2025	Online M. Com. - Announcement of Assignments
Monday	06/10/2025 to 25/10/2025	Online M. Com. - Discussion Forum
Saturday	06/11/2025 to 25/11/2025	Online M. Com. - Submission of Assignments
Saturday	01/11/2025 to 15/11/2025	Online M. Com. - Revision sessions
Monday	17/11/2025 to 18/11/2025	Online M. Com. - Question Bank & Mock Test
Wednesday	19/11/2025 to 28/11/2025	Online M. Com. - End Examination of Sem. - I
Saturday	29/11/2025 to 10/12/2025	Online M. Com. - Sem. - I Result Declaration
Thursday	25/12/2025 to 31/12/2025	Online M. Com. - Synchronous Sessions for all courses of Sem. - II
Thursday	01/01/2026 to 31/01/2026	Online M. Com. - Synchronous Sessions for all courses of Sem. - II
Monday	02/02/2026 to 18/02/2026	Online M. Com. - Discussion Forum
Thursday	19/02/2026 to 28/02/2026	Online M. Com. - Revision sessions
Monday	02/03/2026	Online M. Com. - Announcement of Assignments
Wednesday	11/03/2026 to 22/03/2026	Online M. Com. - Submission of Assignments
Monday	23/03/2026 to 25/03/2026	Online M. Com. - Question Bank & Mock test
Thursday	26/03/2026 to 08/04/2026	Online M. Com. - End Examination of Sem. - II
Thursday	09/04/2026 to 20/04/2026	Online M. Com. - Sem. - II Result Declaration
Tuesday	21/04/2026 to 30/04/2026	Online M. Com. - End of First Academic Year
Monday	01/06/2026 to 15/06/2026	Online M. Com. - Induction and orientation of students of the programme
	April	Paper Setting March/April 2026
	April	Examination March/April 2026
	May	Result, Result Analysis Repeater Exam Follow/up

[Signature]
 Programme Coordinator
 Online M. Com.

Shivaji University, Kolhapur
Centre for Distance & Online Education
Academic Calendar 2025-26 Mathematics Online Mode

Session I Oct 2025		
Day	date	Event
Monday	02- 30/06/2025	Admission Process , ABC ID , DEB ID
Tuesday	10/06- 15/06/2025	E content allotment Sem I
Wednesday	11/06- 15/09/2025	Prepare MCQ questions for Internal Exam M.Sc Maths
Thursday	12/06-30/06/2025	Contact to students for taking admission from previous registered data.
Tuesday	17/06- 30/06/2025	Contact to study centre for new admissions.
Monday	02/06-30/09/2025	Prepare e content for Certificate course and M.Sc. Mathematics Online.
Wednesday	04/06/2025	Prepare a whatsapp group for M.Sc Part I students.
Tuesday	17/06/2025	Course Introduction for M.Sc Part I students.
Wednesday	02/07/2025	Course Introduction for M.Sc Part I students
Thursday	03/07- 20/07/2025	Synchronous session Sem I M.Sc Maths
Friday	04/07- 31/07/2025	E content follow up
Monday	07/07-3/07/2025	E content editing .
Wednesday	09/07-20/07/2026	Review and approval process of e content
Thursday	10/07-31/07/2025	Design of course and upload e content on LMS
Thursday	10/07-31/07/2025	Study center follow up for new admission.
Friday	11/07/2025	Diksharanbh Programme
Friday	25/07-10/08/2025	Synchronous session Sem I M.Sc Maths
Wednesday	13/08-31/08/2025	Filling exam form oct 2025 follow up.
Saturday	23/08- 10/09/2025	Synchronous session Sem I
Wednesday	23/09 30/09/2025	Conduct internal exam
Friday	26/09-28/09/2025	Coollection of Internal work from students
Friday	03/10 -20/10/2025	Contact session Sem I
Monday	06/11/-15/11/2026	Examinations Oct 2025
	November	Internal mark submission
Monday	22/12/2025	National Mathematics Day
Wednesday	24/12-3012/2025	E content allotment Sem II
	December	Billing process
	December	Examinations Oct 2025

Session II March 2026		
Day	Date	Event
	January 2026	Result, Repeater Exam Form Follow-up
Monday	03/01-20/01/2026	E content follow up
Tuesday	11/01/2026	On job training workshop.
Monday	17/01-30/01/2026	E content editing
Tuesday	04/01/2026 to 31/01/2026	Design of course and upload e content on LMS
Monday	02/02- 20/02/2026	Synchronous session Sem II M.Sc Maths
Saturday	21/02- 05/03/2026	Synchronous Session sem I (for backlog)
Tuesday	03/03/2026	E content follow up sem II and E content editing
	21/03/2026	Review and approval process of e content
		upload e content on LMS
Tuesday	10/03/2026 to 25/03/2026	Checking students OJT project .
Friday	27/03 – 03/04/2022	SET/NET Workshop
Monday	06/04- 12/04/2026	Conduct Internal exam March 2026
Tuesday	15/04-20/04/2026	Collection of Internal work from students
Wednesday	20/05-23/05/2026	OJT project viva
Monday	25/05 -27/05/2026	Internal Mark submission.
Tuesday	26/05-30/05/2026	Billing process
Wednesday	03/06-10/06/2026	E content allotment Sem III
Tuesday	09/06/2026	Review and approval process of PPR
	June	March 2026 Examination
	June	Prepare prospectus and admission procedure 2026-27

Sd/-
Course Coordinator

Sd/-
Programme Coordinator



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Shivaji University, Kolhapur
Centre for Distance and Online Education

Online MBA
Academic Plan: 2025-2026

Day	Date	Event
Monday	02.06.2025 to 31.08.2025	Admission Process and Document verification
Monday	02.06.2025 to 31.08.2025	Admission Process and Document verification
Monday	02.06.2025 to 31.08.2025	Admission Process and Document verification
Monday	01.09.2025 to 04.09.2025	Distribution of Login ID and Passwords to Registered Learners
Friday	05.09.2025	Teachers Day celebration
Monday	08.09.2025	Academic Session 2025-26 Semester-I begins
Monday	08.09.2025	Workshop for LMS and students counselling and orientation of LMS
Tuesday	09.09.2025 to 11.09.2025	Induction and orientation of students of the Programme
Friday	12.09.2025 to 30.09.2025	Synchronous Sessions for all courses of SEM-I
Wednesday	01.10.2025 to 10.10.2025	Synchronous Sessions for all courses of SEM-I
Thursday	02.10.2025	Gandhi Jayanti celebration
Sunday	05.10.2025	World Teachers day Celebration
Saturday	11.10.2025 to 26.10.2025	Discussion Forum
Monday	27.10.2025	Announcement of Assignment
Tuesday	28.10.2025 to 16.11.2025	Submission of Assignments
Sunday	09.11.2025	Entrepreneurship day celebration
Monday	17.11.2025 to 18.11.2025	Question Bank & Mock test
Wednesday	19.11.2025 to 28.11.2025	End Examination of SEM-I
Saturday	29.11.2025 to 10.12.2025	SEM-I Result Declaration
Thursday	11.12.2025 to 21.12.2025	Academic Session 2025-26 Semester-II begins
Monday	22.12.2025 to 24.12.2025	Induction and orientation of students of the Programme
Thursday	25.12.2025 to 31.12.2025	Synchronous Sessions for all courses of SEM-II
Thursday	01.01.2026 to 31.01.2026	Synchronous Sessions for all courses of SEM-II



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Monday	02.02.2026 to 18.02.2026	Discussion Forum
Thursday	19.02.2026 to 28.02.2026	Revision sessions
Saturday	21.02.2026	Management day celebration
Monday	02.03.2026 to 10.03.2026	Announcement of Assignment
Sunday	08.03.2026	Women's day Celebration
Wednesday	11.03.2026 to 22.03.2026	Submission of Assignments
Monday	23.03.2026 to 25.03.2026	Question Bank & Mock test
Thursday	26.03.2026 to 08.04.2026	End Examination of SEM-II

Sd/-
Programme Coordinator



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Shivaji University, Kolhapur
Centre for Distance and Online Education

Online M. Com.

**Mechanism to ensure the proper implementation of
Programme Project Report (PPR)**

In accordance with the UGC's regulations (ODL Programmes and Online Programmes) Regulations, 2020, the following Key mechanisms are used to ensure the proper implementation of Programme Project Report (PPR)-

1. Admission, tuition fee and concession to various groups are approved by university authority and implemented time to time.
2. The developed e-content undergoes a structured process of assessment and review to ensure its overall quality, accuracy, and relevance to the prescribed course material. Each e-content is carefully examined to confirm its correctness, consistency, and alignment with the intended course outcomes. Based on the feedback and recommendations provided by the e-Content Review and Approval Committee (e-CRAC), necessary revisions are incorporated before finalization. Once approved, the validated e-content is uploaded on the Learning Management System (LMS). To further support accessibility and smooth functioning, the University has appointed dedicated technical assistants for managing and facilitating the use of e-content.
3. e-SLM is developed by subject experts and its editing process is implemented successfully before uploading on LMS with printable form.
4. Question paper setting and assessment workshop is conducted for proper implementation of evaluation structure approved by University authority.
5. Conduct of examination and declaration of results are scheduled as per university norms.
6. University has industry-interaction cell which conducts programme to enhance the employment and earn ability of learners.

Prof. (Dr.) Shrikrishna Mahajan
Dean

Faculty of Commerce and Management
Shivaji University, Kolhapur



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Mechanism to ensure the proper implementation of Programme Project Reports (PPR)

Sr. No.	Component of PPR	Action Taken
1.	A. Programme’s objectives	In the Process of implementation
2.	B. Relevance of the program with CDOE’s Mission and Goals Vision, Mission, Goal, PO (Program Outcome), PSO (Program Specific Outcome)	In the Process of implementation
3.	C. Nature of target group of learners	Reached to the Target Group
4.	D. Appropriateness of programme to be conducted in Open and Distance Learning and/or Online mode to acquire specific skills and competence	In the Process of implementation
5.	E. Instructional Design: 1. Title of The Programme 2. Duration of the Programme 3. Medium of Instruction 4. Credit System Implementation 5. Programme Structure 6. Specification For Online Mode of Delivery of the Programme 7. Details Syllabus	Completed
6.	F. Procedure for admissions, curriculum transaction and evaluation 1. Eligibility 2. Intake 3. Academic Calendar 4. Required Document while taking Admission to Programme along with Payments of Fees. 5. Programme Fees. 6. Evaluation Pattern 7. Standard of Passing 8. Nature of Question Paper	Completed
7.	G. Requirement of the laboratory support and Library Resources a. Requirement of the laboratory support b. Requirement of the Library Resources	Not Applicable
8.	H. Cost estimate of the programme and the provisions	Budgetary Provision is available
9.	I. Quality assurance mechanism and expected programme outcomes a. Quality assurance mechanism: b. Expected programme outcomes:	In the Process of implementation