UNIVERSITY OF JAMMU

(NAAC ACCREDITED 'A ++' GRADE' UNIVERSITY)
Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

Academic Section
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NOTIFICATION
(26/May/Adp/15)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Competent Bodies, is pleased to authorize the adoption of the Syllabi and Courses of Studies of **Five Year Integrated Master Degree Programme in Mathematical Science** of **Semester II** as per NEP-2020 **(as given in the Annexure)** for the examinations to be held in the years mentioned below:-

Semester	**For the examinations to be held in the year**
Semester-II	May 2026, 2027 and 2028

The Syllabi of the courses are available on the University website: www.jammuuniversity.ac.in.

Sd/-
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/26/1700-1720
Dated: 01/06/2026

Copy for information and necessary action to:

1. Dean, Faculty of Mathematical Science
2. Convener, Board of Studies in **Mathematics, Computer Science & IT and Statistics**
3. Sr. P.A.to the Controller of Examinations
4. All members of the Board of Studies
5. Director, Computer Centre , University of Jammu
6. Guard File

26/5/26

JOINT REGISTRAR (ACADEMIC)

26/5/26 26/5/26

COURSE STRUCTURE

Five Year Integrated Master Degree Programme in
Faculty of Mathematical Sciences

Five Year Integrated Master Degree Programme in Faculty of Mathematical Sciences (3Yr/4Yr/5Yr)

Credit Details Year-wise

Year	Credits		
	Three Year	Four Year	Five Year
First Second	48	48	48
Third	48	48	48
Fourth	48	48	48
	-	48	48
Total	-	-	48
	144	192	240

	Credits Hours			
Courses	Three Year		Four Year	Fifth Year
Major(MJ)	1 Yr	20	28	38
	2Yr	24		
	3Yr	30		
	Total	74		
Minor (MI)	24		12	8
Multi-Disciplinary Courses (MDC)	09			
Ability Enhancement Courses(AEC)	09			
Value Added Courses/Indian Knowledge System Courses (VAC/IKS)	08			
Skill Enhancement Courses (SEC)	16		02	02
Summer Internship	04		02	
SWAYAM			04	
Total Credit	144		144+48=192	192+48=240

Syllabus for Five Year Integrated Post-Graduate Programme in Mathematical Sciences as per National Education policy (NEP) 2020 for Semester-II examinations to be held in May/Dec 2026,2027 and 2028

SEMESTER-II

Course Title: Development and Scripting a website

Course Code: UIMJCST201 **Semester:** II[nd]

Credits: 3+1 Total Marks: 100

Mode: Lectures/Practical Lab/Fieldwork

Course Outcomes:

1. Create static and interactive web pages using HTML, CSS, and JavaScript
2. Structure and style professional-looking websites
3. Validate and process user inputs
4. Understand how websites are hosted and basic backend concepts
5. Develop, test, and deploy a complete multi-page website project

Unit I: Fundamentals of Web Technologies

Introduction to the internet, web, web servers, clients, browsers, structure of a web page, HTML, tags and attributes, HTML document structure: <!DOCTYPE>, <html>, <head>, <body>, headings, paragraphs, text formatting, comments, links and anchors (<a href>), lists: ordered, unordered, and description lists, images: inserting and styling (<img>, alt, width, height), tables: basic table creation and formatting, forms: <input>, <textarea>, <button>, <select>, form attributes, semantic HTML5: <header>, <footer>, <section>, <article>

Skill Focus: HTML page structure, text formatting, semantic markup

Assignments/Hands-on: Build a personal homepage with headings, images, and links

Unit II: Styling Websites with CSS

What is CSS?, types: inline, internal, external, syntax and selectors (element, ID, class, grouping), colors, backgrounds, borders, text styling: fonts, size, line height, letter spacing, box model: margin, border, padding, width, height, layouts: display types (block, inline, inline-block, none), positioning: static, relative, absolute, fixed, sticky, flexbox: one-dimensional layouts, CSS grid: two-dimensional layouts, responsive design basics: media queries, units (%, em, rem, vw, vh)

Skill Focus: Page layout, box model, responsive design principles

Assignments/Hands-on: Style a resume webpage and create a responsive layout

Unit III: Dynamic Scripting with JavaScript (JS)

Introduction to JavaScript and its role in web pages, variables, data types, operators, conditional statements and loops, functions: declaring, calling, parameters, return, arrays and objects, DOM introduction: document.getElementById, querySelector, DOM events: onclick, onchange, onmouseover, etc., form validation basics (required fields, alerts), timing events: setTimeout, setInterval, practical: add interactivity to a simple form or website

Skill Focus: DOM scripting, form validation, interactive web behavior

Assignments/Hands-on: Create a JavaScript-based interactive quiz or calculator

Unit IV: Building Multi-Page Websites

Planning a website: site map, wireframes, structuring content across multiple pages, navigation bars and menus, reusable design with external CSS and JS files, linking pages and using anchors within pages, embedding multimedia: audio, video, iFrames, creating interactive UI elements: tabs, accordions, using icons and fonts: Google Fonts, Font Awesome, website deployment basics: GitHub Pages, Netlify, project planning and page templates

Skill Focus: Navigation design, project structuring, website publishing

Assignments/Hands-on: Develop a portfolio site with multiple sections and navigation

Evaluation Scheme :

	Syllabus to be covered in the examination	**Time allotted for the examination**	**%Weightage (Marks)**
Mid-Semester Test	50 %	1.5 hour	30
End-Semester Test	100 %	2.5 hours	40
Project	100%		30
Total			100

- The Mid-Semester Examination will carry a weightage of 30 marks and will be based on Unit-1 and Unit-2. The question paper will be divided into three sections viz., A, B, and C. Section A will consist of 10 compulsory multiple-choice questions, each question carrying 1 mark. Section B will consist of two descriptive questions from each unit, out of which the candidate has to attempt one question from each unit, each question will carry 7.5 marks. Section C will be based on a case study worth 5 marks.
- The End-Semester Examination will carry a weightage of 40 marks. The question paper will be divided into three sections viz., A, B, and C. Section A will consist of 10 compulsory multiple-choice questions based on Unit-3 and Unit-4, each question carrying 1 mark. Section B will consist of two descriptive questions from Unit 3 and Unit-4, out of which the candidate has to attempt one question from each unit, each question will carry 10 marks. Section C will be based on a case study worth 10 marks.
- The remaining 30% weightage will be based on Project based on the course.

Books recommended:

1. Duckett,J.(2011).*HTML and CSS: Design and Build Websites*. Wiley.
2. Duckett, J. (2014). *JavaScript and JQuery: Interactive Front-End Web Development*. Wiley.
3. Robbins, J. N. (2018). *Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics* (5th ed.). O'Reilly Media.
4. Kyrnin, J., & Meloni, J. C. (2018). *HTML, CSS, and JavaScript All in One* (3rd ed.). Sams Publishing.
5. Ullman, L. (2017). *PHP for the Web: Visual QuickStart Guide* (5th ed.). Peachpit Press.

Suggested Online Resources

HTML, CSS, JavaScript

- **MDN Web Docs (by Mozilla)**
  Excellent documentation and tutorials for HTML, CSS, JS, and more.
- **W3Schools**
  Beginner-friendly with interactive code editors and quizzes.
- **freeCodeCamp**
  Structured curriculum with hands-on exercises in responsive web design, JavaScript, and front-end libraries.
- **Codecademy – Web Development Path**
  Offers interactive tutorials on HTML, CSS, JavaScript, and GitHub.

Practice Platforms

- **CodePen** – Great for trying HTML/CSS/JS code snippets.
- **JSFiddle** – Useful for sharing and testing frontend code online.
- **GitHub Pages** – To deploy static sites from GitHub repositories.

PHP and Server-Side Basics

- **PHP.net Manual** – Official documentation with code examples.
- **W3Schools PHP Tutorial** – Simple and clear for beginners.

Suggested Tools & Platforms

- **Code Editors:** VS Code, Sublime Text
- **Browsers:** Chrome, Firefox (with DevTools)
- **Online Practice Platforms:** CodePen, JSFiddle, GitHub Pages
- **Free Hosting:** GitHub Pages, Netlify, 000WebHost

Syllabus for Five Year Integrated Post-Graduate Programme in Mathematical Sciences as per National Education policy (NEP) 2020 for Semester-II examinations to be held in May 2026,2027 and 2028

Course Title: Probability Foundations for Data Analytics

Course Code: UIMJSTT202 **Semester:** IInd
Credits: 3+1 **Total Marks :**100

Mode: Lectures / Practical Lab / Fieldwork

Course Outcomes: At the end of the course, students will be able to:

1. Interpret and apply core probability principles in the context of data-driven decision-making
2. Identify and use appropriate probability distributions to model real-world phenomena
3. Incorporate probabilistic models into machine learning algorithms, such as classification and clustering
4. Analyse data using statistical inference and assess uncertainty in predictive tasks
5. Collaborate on problem-solving through creative and structured activities

Unit I: Foundations of Probability for Data Science

Sample Space, Fundamentals of probability (classical, frequentist, Bayesian), Conditional probability and independence, Bayes' Theorem in inference, Probability spaces and Combinatorics, Discrete vs. continuous random variables, Discrete vs. continuous random variables, PMF, PDF, and CDF characteristics, Expectation, variance, and higher moments, Covariance and correlation in datasets (in terms of expectation).

Activities:

- **Group Discussion**: "Bias and Fairness—How Probabilities Shape Machine Learning Ethics"

Unit II: Standard Discrete and Continuous Distributions

Concept of Bernoulli distribution: binary outcomes modelling (classification tasks), **Concept of Binomial distribution**: repeated trials, success probability, **Concept of Geometric distribution**: first success modelling.

Concept of Uniform Distribution: baseline modelling, **Concept of Exponential Distribution**: time-between-events modelling, **Concept of Poisson Distribution**: rate-based event modelling (e.g., sensor data).

Activities:

- **Seminar**: "From Data Streams to Distributions: Sensing the Future"
- **Case Study**: Failure prediction in industries using Bernoulli/Binomial models
- **Simulation Project**: Model a marketing campaign response using geometric distribution in Python or R.
- **Data Mini Project**: Use Poisson distribution to model network traffic or social media activity rates
- **Panel Debate**: "Is Correlation Enough? Insights Beyond Linearity in Analytics"

Unit III: The Normal World — Continuous Distributions and Theorems

Concept of Normal distribution: predictive modelling foundations, **Concept of Log-normal Distribution**: distribution skewed data patterns in finance and health, **Concept of Gamma distribution**: modelling variance in complex systems.

Concept of Central Limit Theorem and its implications, Standard normal distribution properties

Z-scores, normalisation, and statistical significance

Activities:

- **Visualisation Project**: Interactive dashboards using real-world datasets and fitted distributions
- **Seminar**: "CLT in Machine Learning: Why Large Data Sets Matter"
- **Case Study**: Anomaly detection in sensor data using normal vs. log-normal models

Unit IV: Probability in Machine Learning and Analytics

Concept of Multinomial distribution: multi-class classification, **Concept of Beta & Dirichlet distribution**: Bayesian priors, **Concept of Gaussian Mixture Models**: clustering in unsupervised ML.

Probabilistic models in classification (Naïve Bayes, Bayesian networks), Distributions in regression modelling, Expectation-Maximisation (EM) algorithm basics, Uncertainty quantification in predictions

Activities:

- **Capstone Mini Project**: Design and implement a Naïve Bayes classifier on public health or environmental data
- **Roleplay Exercise**: Assume the roles of data scientists, policy makers, and ethicists in decision modelling under uncertainty
- **Group Debate**: "Probability vs. Determinism in AI Systems—Where Should We Trust the Numbers?

Creative and Skill-Based Enhancements:

- Short-format hackathons where students analyse real-world datasets (e.g. public health, environmental, finance) using probabilistic models and distributions. This cultivates problem-solving, teamwork, and time-efficient data interpretation
- Simulate probabilistic experiments (e.g. dice rolls, customer churn, event arrivals) using Python or R. Use NumPy, SciPy, pandas, and matplotlib for visualisation and interpretation.
- Create dashboards or notebooks that explore how probability distributions relate to trends and insights in real datasets—tools like Tableau Public, Plotly, or seaborn foster visual storytelling and analytical clarity.
- Students to apply probabilistic analysis to a field they're passionate about—wildlife data, climate science, marketing behaviour, etc.—and present findings with actionable insights. Builds portfolio-ready experience and domain engagement.
- Incorporate priors and posteriors in decision models using PyMC3 or TensorFlow Probability
- Techniques using scikit-learn to prepare data for ML algorithms

Evaluation Scheme

	Syllabus to be covered in the examination	**Time allotted for the examination**	**%Weightage (Marks)**
Mid-Semester Test	50 %	1.5 hour	30
End-Semester Test	100 %	2.5 hours	50
Continuous Assessment/Seminar/ Quiz etc.	100%		20
Total			100

- The Mid-Semester Examination will carry a weightage of 30 marks and will be based on Unit-1 and Unit-2. The question paper will be divided into three sections viz., A, B, and C. Section A will consist of 10 compulsory multiple-choice questions, each question carrying 1 mark. Section B will consist of two descriptive questions from each unit, out of which the candidate has to attempt one question from each unit, each question will carry 7.5 marks. Section C will be based on a case study worth 5 marks.
- The End-Semester Examination will carry a weightage of 50 marks. The question paper will be divided into three sections viz., A, B, and C. Section A will consist of 10 compulsory multiple-choice questions based on Unit-3 and Unit-4, each question carrying 1. Section B will consist of One compulsory descriptive question based on Unit-1 and Unit 2, and two descriptive questions from Unit 3 and Unit-4, out of which the candidate has to attempt one question from each unit, each question will carry 10 marks. Section C will be based on a case study worth 10 marks.
- The remaining 20% weightage will be based on Continuous Practical Assessment / Assignment/Tutorial/ Group Discussion/ Presentation/ Field Work/ Quiz/Project/ Survey as may be specified in the course.

Books Recommended:

1. Dangeti, P. (2017). *Statistics for machine learning*. Packt Publishing.
2. DasGupta, A. (2011). *Probability for statistics and machine learning*. Springer.
3. Downey, A. B. (2013). *Think Bayes: Bayesian statistics for hackers*. O'Reilly Media.
4. Ross, S. M. (2020). *Introduction to probability and statistics for engineers and scientists* (6th ed.). Academic Press.

Syllabus for Five Year Integrated Post-Graduate Programme in Mathematical Sciences as per National Education policy (NEP) 2020 for Semester-II examinations to be held in May 2026,2027 and 2028

Course Title: Exploring Calculus

Course Code: UIMIMAT203 **Semester:** II[nd]
Credits: 3+1 **Total Marks:** 100
Mode: Lectures /Tutorials

Course Outcomes: By the end of the course, students will be able to:

1. Understand and interpret basic concepts of calculus including limits, derivatives, and integrals.
2. Apply calculus concepts to real-world problems in fields like economics, biology, physics, and environmental science.
3. Develop graphical and numerical insights alongside analytical techniques.
4. Foster creative problem-solving through experiential, project-based learning.
5. Build conceptual clarity and intuition using everyday data, simulations, and technology.

Unit 1: The Language of Change – Functions, Graphs, and Limits

Functions: definitions, types, and representations, Graphical and numerical interpretation of change, Average rate of change vs. instantaneous rate, Concept of limit; numerical and graphical approach, Real-world examples: Speed, population growth, economics.

Experiential Learning Activities: Use graphing tools (Desmos or GeoGebra) to explore function behaviour near limits. Use video tracking of motion (e.g., walking or throwing a ball) to estimate instantaneous speed.

Unit 2: Derivatives and Applications of Differentiation

Derivative as a rate of change, Basic differentiation rules (power, sum, product, chain), Tangent lines and linear approximation, Applications: Marginal cost/revenue, velocity/acceleration, optimization.

Experiential Learning Activities: Online graphing tools for visualizing slopes of curves. Design and test physical models (e.g., maximize area with a fixed perimeter using string and paper).

Unit 3: Integrals and the Accumulation of Change

Antiderivatives and indefinite integrals, Area under the curve: definite integrals, Fundamental Theorem of Calculus, Applications: Total distance, accumulated cost, environmental modelling.

Experiential Learning Activities: Simulated rainfall or energy use data – estimate total accumulation over time using trapezoidal rule. Describe a real-world process using a graph and annotate it with meaning of the first and second derivatives (e.g., population growth).

Unit 4: Mathematical Modeling with Calculus:

Introduction to differential equations (Basic concepts: Degree, order, linear and non-linear) Formulation and solution of population growth and Delay models (exponential and logistic)

Experiential Learning Activities: Real life modeling problem in business, biological sciences and engineering

Evaluation Scheme

	Syllabus to be covered in the examination	Time allotted for the examination	%Weightage (Marks)
Mid-Semester Test	50 %	1.5 hour	30
End-Semester Test	100 %	2.5 hours	50
Continuous Assessment/Seminar/ Quiz etc.	100%		20
Total			100

- The Mid-Semester Examination will carry a weightage of 30 marks and will be based on Unit-1 and Unit-2. The question paper will be divided into three sections viz., A, B, and C. Section A will consist of 10 compulsory multiple-choice questions, each question carrying 1 mark. Section B will consist of two descriptive questions from each unit, out of which the candidate has to attempt one question from each unit, each question will carry 7.5 marks. Section C will be based on a case study worth 5 marks.
- The End-Semester Examination will carry a weightage of 50 marks. The question paper will be divided into three sections viz., A, B, and C. Section A will consist of 10 compulsory multiple-choice questions based on Unit-3 and Unit-4, each question carrying 1. Section B will consist of One compulsory descriptive question based on Unit-1 and Unit 2, and two descriptive questions from Unit 3 and Unit-4, out of which the candidate has to attempt one question from each unit, each question will carry 10 marks. Section C will be based on a case study worth 10 marks.
- The remaining 20% weightage will be based on Continuous Practical Assessment / Assignment/Tutorial/ Group Discussion/ Presentation/ Field Work/ Quiz/Project/ Survey as may be specified in the course.

Books Recommended:

1. Stewart, J. (2020). *Calculus: Early Transcendentals* (9th ed.). Cengage Learning.
2. Hughes-Hallett, D., Gleason, A. M., Lock, P. F., et al. (2018). *Applied Calculus* (6th ed.). Wiley.
3. Banner, A. (2007). *The Calculus Lifesaver: All the Tools You Need to Excel at Calculus*. Princeton University Press.
4. Strang, G. (2016). *Calculus*. MIT Press. (Free online: https://ocw.mit.edu)
5. Thomas, George B. and Finney, Ross L (1995). *Calculus and analytic geometry (9th ed.)*. Pearson Education.

Syllabus for Five Year Integrated Post-Graduate Programme in Mathematical Sciences as per National Education policy (NEP) 2020 for Semester-II examinations to be held in May 2026,2027 and 2028

Course Title: Financial Accounting for Decision Making

Course Code: UIMDFMT204 **Semester:** II[nd]
Credits: 2+1 **Total Marks:** 75
Mode: Lectures /Tutorials/Performance

Course Outcomes:

- Understand the fundamentals of public sector financial accounting, including financial accountability, legal and constitutional framework, fund accounting, and differences from private sector accounting.
- Apply knowledge of budgeting, budgetary control, public revenue and expenditure management, and fiscal responsibility to ensure transparency and effective financial management.
- Demonstrate skills in government accounting, financial reporting, internal control, and auditing, including the use of accounting standards (IFRS, IPSAS, Indian equivalents) and oversight mechanisms such as the CAG.
- Analyze and evaluate public sector performance using metrics, KPIs, outcome-based budgeting, e-governance tools, and accountability innovations, while identifying challenges and implementing reforms for improved financial governance.

Unit I: Fundamentals of Financial Accounting

Accounting concepts, conventions and standards, double-entry system, journal, ledger, trial balance, rectification of errors, supported by case studies such as misclassification of expenses in small Indian retail shops, exercises on preparing trial balances and correcting errors, and practical exposure to TallyPrime for journal and ledger entries.

Unit II: Preparation of Final Accounts

Trading account, profit and loss account, balance sheet with adjustments, depreciation methods including straight line and written down value, illustrated with case studies on local manufacturing units, exercises on adjustments for outstanding expenses, prepaid insurance and depreciation, and demonstrations using Busy Accounting Software for automated preparation of final accounts.

Unit III: Partnership Accounts

Admission of a partner, retirement of a partner, death of a partner, revaluation of assets and liabilities, treatment of goodwill, explained through case studies of family-run Indian businesses, exercises on goodwill calculation, revaluation and distribution of profits, and practice with Tally ERP for partnership accounts.

Unit IV: Emerging Areas in Accounting

Accounting for non-profit organizations, computerized accounting systems, GST accounting basics in India, supported by case studies on NGOs and educational institutions, exercises on GST entries for small trading firms and preparation of receipts and payments accounts, and hands-on exposure to GST modules in TallyPrime along with Zoho Books for NGO accounting.

Evaluation Scheme :

	Syllabus to be covered in the examination	**Time allotted for the examination**	**%Weightage (Marks)**
Mid-Semester Test	50 %	1.5 hours	20
End-Semester Test	100 %	3 hours	40
Continuous Assessment/Seminar/Quiz etc.	100%		15
Total			75

The student shall be continuously evaluated during the conduct of each course based on his/her performance as follows:

- The Mid-Semester Examination will carry a weightage of 20 marks and will be based on Unit-1 and Unit-2. The question paper will be divided into three sections viz., A, B, and C. Section A will consist of 05 compulsory multiple-choice questions, each question carrying 1 mark. Section B will consist of two descriptive questions from each unit, out of which the candidate has to attempt one question from each unit, each question will carry 5 marks. Section C will be based on a case study worth 5 marks.
- The End-Semester Examination will carry a weightage of 40 marks. The question paper will be divided into three sections viz., A, B, and C. Section A will consist of 05 compulsory multiple-choice questions based on Unit-3 and Unit-4, each question carrying 1. Section B will consist of One compulsory descriptive question based on Unit-1 and Unit 2, and two descriptive questions from Unit 3 and Unit-4, out of which the candidate has to attempt one question from each unit, each question will carry 10 marks. Section C will be based on a case study worth 05 marks.
- The remaining 15 marks weightage will be based on Continuous Practical Assessment / Assignment/Tutorial/ Group Discussion/ Presentation/ Field Work/ Quiz/Project/ Survey as may be specified in the course.

Books Recommended:

- Narayanaswamy, R. *Financial Accounting: A Managerial Perspective*. PHI Learning Pvt. Ltd., New Delhi, 2022. ISBN: 978-9355620123.
- Maheshwari, S.N., Maheshwari, Suneel K., & Maheshwari, Sharad K. *Financial Accounting*. 8th Edition. Vikas Publishing House, New Delhi, 2021. ISBN: 978-9354534568.
- Franklin, Mitchell, Graybeal, Patty, & Cooper, Dixon. *Principles of Accounting, Volume 1: Financial Accounting*. OpenStax, Houston, 2019. ISBN: 978-1947172678.
- KPMG India. *Ind AS Accounting and Disclosure Guide*. Revised Edition, April 2023. KPMG Assurance and Consulting Services LLP.

Syllabus for Five Year Integrated Post-Graduate Programme in Mathematical Sciences as per National Education policy (NEP) 2020 for Semester-II examinations to be held in May 2026,2027 and 2028

Course Title: Personality Development through Theatre & Drama

Course Code: UIAEFMT205 **Semester:** II[nd]
Credits: 1+2 **Total Marks:** 75
Mode: Lectures /Tutorials/Performance

Course Outcomes (COs)

- Understand the fundamentals of theatre and use theatrical activities as a tool for personality development, self-exploration, and emotional expression through role play and theatre games.
- Develop confidence, public speaking ability, voice modulation, and physical awareness by practicing theatre games, observation and imagination exercises, voice and speech training, yoga, and aerobics.
- Identify and apply knowledge of different theatre genres, Indian Classical Theatre, and allied elements of theatre such as light, music, body movements, costumes, sets, and make-up.
- Demonstrate acting skills through team-work, scene work, mono acting, mime, and short performances, showcasing creativity, coordination, stage presence, and performance readiness.

Unit I: Introduction to Theatre

This unit introduces theatre as an art form and as a tool for personality development, covering the use of theatre for self-exploration, basic expressions and articulation, role play, and theatre games.

Activity: Students will participate in role play exercises and theatre games to practice expressions, articulation, and self-exploration.

Unit II: Theatre Games and Allied Elements

This unit focuses on theatre games and activities for confidence building and public speaking, introduction to different genres of theatre, introduction to Indian classical theatre, and allied elements of theatre including light, music, body movements, costumes and sets, and make-up. It also includes observation and imagination exercises, voice and speech exercises, yoga, and aerobics.

Activity: Students will design a short performance integrating allied elements such as light, music, and costumes, followed by voice and speech drills.

Unit III: Performance and Teamwork

This unit emphasizes teamwork activities, performance activities, scene-work, mono acting performance, mime performance, demonstration of acting skills, and short performances for evaluation.

Activity: Students will collaborate in groups to prepare a short scene incorporating mime and mono acting, which will be evaluated for creativity and teamwork.

Unit IV: Applied Theatre and Reflection

This unit explores applied theatre practices, theatre for social awareness, improvisation techniques, and reflective exercises on performance. Students will learn how theatre can be used in education, community building, and social change.

Activity: Students will create a short improvisational performance on a social theme relevant to the Indian context and reflect on their learning through group discussion.

Evaluation Scheme :

Component	Marks	% Weightage of Marks	Description
Continuous Internal Assessment	**30**	**40%**	
Class Participation	10		Regular involvement in theatre games, role plays, and group activities.
Practical Exercises	10		Unit-based activities such as articulation drills, voice and speech, mime.
Reflective Journals	10		Written reflections on self-exploration, teamwork, and learning outcomes.
Mid-Semester Practical	**15**	**20%**	
Scene Work Presentation	7.5		Group performance integrating allied elements (light, music, costumes).
Individual Performance	7.5		Solo activity such as mono acting or mime, evaluated for creativity.
End-Semester Practical Exam	**22.5**	**30%**	
Final Performance	15		Short performance demonstrating acting skills, teamwork, and theatre tools.
Improvisation & Applied Theatre	7.5		Improvised performance on a social theme relevant to Indian context.

Component	Marks	% Weightage of Marks	Description
Viva Voce / Oral Exam	**7.5**	**10%**	Oral discussion on theatre concepts, genres, allied elements, and learning.
Total	**75**		

Books Recommended:

- Chaudhuri, A. *Stages of Life: Indian Theatre and Performance*. Seagull Books, Kolkata, 2010.
- Banham, M. (Ed.). *The Cambridge Guide to Theatre*. Cambridge University Press, 1995.
- Bharata. *Natyashastra*. Translated by Manomohan Ghosh. Asiatic Society, Kolkata, 1967.
- Cohen, R. *Theatre: Brief Version*. McGraw-Hill Education, 2014.
- Ranganathan, S. *Indian Classical Theatre: Traditions and Practices*. National School of Drama Publications, New Delhi, 2015.
- Constantin Stanislavski , *An Actor Prepares* , Bloomsbury Publishing PLC, Paperback Edition, 1987, ISBN: 9780878300013.
- Adya Rangacharya ,*Introduction to Bharata's Natyasastra* Munshiram Manoharlal Publishers, Reprint of 1966 Edition (2005), ISBN: 8121508290

Syllabus for Five Year Integrated Post-Graduate Programme in Mathematical Sciences as per National Education policy (NEP) 2020 for Semester-II examinations to be held in May 2026,2027 and 2028

Course Title: Foundations of Multimedia and Visual Design

Course Code: UISEFMT206 **Semester:** II[nd]
Credits: 2+2 **Total Marks:** 100
Mode: Lectures /Tutorials

Course Outcomes: By the end of this course, learners will be able to:

1. Design visually appealing graphics using basic design principles
2. Edit images, audio, and video content professionally
3. Create animations and simple interactive multimedia products
4. Develop and publish complete multimedia projects for web or social media
5. Apply copyright-safe practices and optimize content for online platforms

Unit I: Multimedia Fundamentals and Visual Design

Introduction to multimedia and its components: text, image, audio, video, animation, applications of multimedia in education, advertising, and entertainment, multimedia file formats and standards including JPEG, PNG, MP3, MP4, and GIF, principles of visual design such as balance, contrast, alignment, proximity, color theory and typography basics, raster vs vector graphics, introduction to design tools like Canva, Figma, and Adobe Express, designing posters and flyers using Canva, working with templates, fonts, icons, and grids, case study analysis of good vs bad visual design.

Unit II: Image Editing and Graphic Creation

Introduction to image editing software such as GIMP and Photopea, image cropping, resizing, brightness and contrast adjustment, working with layers, selections, and masks, retouching tools including clone, healing brush, and eraser, adding text, effects, and filters, creating social media graphics like Instagram posts and YouTube thumbnails, making transparent backgrounds and logos, introduction to vector drawing tools like Inkscape, exporting images in various formats and optimizing for web use.

Unit III: Audio, Video, and Animation Production

Basics of digital audio and video formats including MP3, WAV, MP4, and AVI, audio editing with Audacity, recording voiceovers, trimming clips, removing background noise, adding effects and music, exporting audio files, video editing tools such as Clipchamp, CapCut, and OpenShot, importing media, cutting, transitions, titles, background music, captions, and effects, creating slideshows and promotional videos, principles of animation including frames, timing, and easing, 2D animation tools like Animaker, Canva Animator,

and Pencil2D, creating animated GIFs, text animation, motion effects, and using keyframes and timelines.

Unit IV: Interactive Multimedia and Project Development

Creating interactive multimedia with buttons and links, designing interactive presentations using Genially and Google Slides, embedding videos, maps, and quizzes, developing animated infographics and storytelling slides, planning multimedia projects with clear objectives, audience targeting, and medium selection, content scripting and storyboarding, asset collection and organization including images, audio, video, and fonts, collaboration tools like Google Drive, Trello, and Figma, introduction to content management platforms such as YouTube, WordPress, and Instagram, understanding copyright, creative commons, and royalty-free resources, compressing and optimizing content for web, uploading and sharing multimedia projects, conducting peer reviews, final presentations, and evaluation

Suggested Tools & Platforms

- **Graphics & Design:** Canva, Photopea, GIMP, Figma, Inkscape
- **Audio:** Audacity
- **Video:** CapCut, Clipchamp, OpenShot
- **Animation:** Animaker, Canva, Pencil2D
- **Publishing:** Google Drive, YouTube, Instagram, WordPress
- **Project Management:** Trello, Google Docs/Slides

Evaluation Scheme :

	Syllabus to be covered in the examination	Time allotted for the examination	%Weightage (Marks)
Mid-Semester Test	50 %	1.5 hour	30
End-Semester Test	100 %	2.5 hours	40
Project	100%		30
Total			100

- The Mid-Semester Examination will carry a weightage of 30 marks and will be based on Unit-1 and Unit-2. The question paper will be divided into three sections viz., A, B, and C. Section A will consist of 10 compulsory multiple-choice questions, each question carrying 1 mark. Section B will consist of two descriptive questions from each unit, out of which the candidate has to attempt one question from each unit, each question will carry 7.5 marks. Section C will be based on a case study worth 5 marks.
- The End-Semester Examination will carry a weightage of 40 marks. The question paper will be divided into three sections viz., A, B, and C. Section A will consist of 10 compulsory multiple-choice questions based on Unit-3 and Unit-4, each question carrying 1 mark. Section B will consist of two descriptive questions from Unit 3 and Unit-4, out of which the candidate has to attempt one question from each unit, each question will carry 10 marks. Section C will be based on a case study worth 10 marks.
- The remaining 30% weightage will be based on Project based on the course.

Recommended Books:

1. Gokhale, P. (2017). *Introduction to Multimedia Systems*. University Science Press.
2. Hillman, D. (1998). *Multimedia Technology and Applications*. Galgotia Publications.
3. Ramesh Bangia. (2013). *Multimedia and Web Technology*. Firewall Media.
4. Tay Vaughan. (2010). *Multimedia: Making It Work* (8th ed.). McGraw-Hill Education.
5. Ze-Nian Li, & Mark S. Drew. (2014). *Fundamentals of Multimedia* (2nd ed.). Springer.

Online Resources

Design & Visual Content

Canva Design School – Free design tutorials, guides, and courses.
Figma for Beginners – Tutorials and beginner design principles.
Google Fonts – Typography resource.
Unsplash, Pixabay, Pexels – Royalty-free images.

Image Editing

- **Photopea** – Photoshop-like online editor.
- **GIMP Tutorials** – Open-source image editing guide.

Audio/Video Editing

- **Audacity Tutorials** – Free audio editing guide.
- **CapCut** – User-friendly video editor for short videos.
- **Clipchamp** – Microsoft's free browser-based video editor.

Animation & Interactivity

- **Animaker Academy** – Animation tutorials.
- **Pencil2D Tutorials** – Open-source 2D animation.
- **Genially** – Interactive content creation with templates.

Publishing & Hosting

- **YouTube Creator Academy** – Best practices for publishing.
- **WordPress.com Learn** – Create and manage blogs/sites.
- **GitHub Pages** – For static web content publishing.

Free Assets & Tools

- **Icons8** – Icons, illustrations, music, and more.
- **Flaticon** – Free vector icons.
- **DaFont** – Free fonts for design.
- **Incompetech** – Free royalty-free music.

AI Tools

- **Pixlr, Leonardo** – Graphics tool.
- **Runway** – Video editing.
- **Pika** – Animation.
- **Incompetech** – Free royalty-free music.

Syllabus for Five Year Integrated Post-Graduate Programme in Mathematical Sciences as per National Education policy (NEP) 2020 for Semester-II examinations to be held in May 2026,2027 and 2028

Course Title: Symmetry and Symbolism: An Introduction to Indian Culture

Course Code: UIVAFMT207 **Semester:** II[nd]

Credits: 2 **Total Marks:** 50

Mode: Lectures/Practical Lab/Fieldwork

Course Outcome:

- Develop a holistic understanding of Indian culture by integrating history, philosophy, art, and sociology.
- Critically appreciate cultural continuity and change through institutions, literature, education, and heritage practices.
- Gain special insights into the cultural traditions and heritage of Jammu and Kashmir.
- Acquire analytical skills to interpret cultural diversity across regions of India.
- Foster informed citizenship and cultural sensitivity in contemporary contexts.
- Strengthen interdisciplinary thinking by connecting cultural studies with broader societal issues.

Unit I: Foundations of Indian Culture

Meaning and scope of Indian culture; The Harappan Civilization: First Urban Culture in India; Vedic Influence on later philosophical schools like Vedanta, Yoga, Nyaya and Sankhya; Rise of Heterodox Sects: Lokayata and Charvaka: Materialism and atheism; Origin and development of Indian Classical music; Origin of Indian theatre; Natyashastra and the concept of Rasa; classical Sanskrit drama and folk theatre traditions and its social role.

UNIT II: Indian Cultural Heritage

Characteristics and types of Cultural Heritage: Tangible, intangible and oral Traditions; UNESCO list of Tangible and Intangible World Heritage sites in India; Performing Arts: Dance: Folk, Classic and Contemporary, Classical Dance Forms: Bharatanatyam, Kathak, Odissi, and their origins; Social Institutions: Studying the caste system, family, kinship, and tribal societies as cultural foundations; Social Change: Analyzing processes like Sanskritisation, Westernisation, and Secularisation to understand how Indian culture evolves.

UNIT III: Education, Literature

Development of Literary traditions: Kautalya, Panini, Kalidasa, Bhasa, Veda Vyasa, Valmiki.; Centers of Learning: Takshashila, Nalanda, Vikramshila and their Influence on Southeast Asia and transmission of knowledge; Foreign Travelers in India: Fa-Hien, Hiuen Tsang, Ibn Battuta and Influence of travellers on global perceptions of India; Cultural Places of Interest: Bhimbetka, Sanchi, Khajuraho, Konark, Hampi, Golconda, Madurai, Jaipur, Shankaracharya Temple, Ajanta, Ellora, Elephanta, Shore temple, Kailasanatha temple, Gol Gumbaz.

Unit IV: Cultural History of Jammu and Kashmir

Literary Works of Kashmir: Nilamata Purana, Rajatarangini, Kathasaritsagara; Kashmiri Art and Culture- Handicrafts: Kashmiri carpets, shawls, papier-mâché - Kashmiri dance forms: Rouf, Bhand Pather; Theatrical traditions of Jammu - folk and modern theatre traditions rooted in Dogri culture; role of theatre as a medium of social reform, cultural identity, and popular education; Cultural Development under the Dogra Rulers: Patronage to art, architecture, education, literature, and cultural institutions.

Evaluation Scheme

	Syllabus to be covered in the examination	**Time allotted for the examination**	**%Weightage (Marks)**
Mid-Semester Test	50 %	1 hour	15
End-Semester Test	100 %	2 hours	25
Project/Survey	100%		10
Total			50

The student shall be continuously evaluated during the conduct of each course based on his/her performance as follows:

- The Mid-Semester Examination will carry a weightage of 15 marks and will be based on Unit-1 and Unit-2. The question paper will be divided into two sections viz., A and B. Section A will consist of 05 compulsory multiple-choice questions, each question carrying 1 mark. Section B will consist of two descriptive questions from each unit, out of which the candidate has to attempt one question from each unit, each question will carry 5 marks.
- The End-Semester Examination will carry a weightage of 25 marks. The question paper will be divided into three sections viz., A, B, and C. Section A will consist of 05 compulsory multiple-choice questions based on Unit-3 and Unit-4, each question carrying 1. Section B will consist of One compulsory descriptive question based on Unit-1 and Unit 2, and two descriptive questions from Unit 3 and Unit-4, out of which the candidate has to attempt one question from each unit, each question will carry 05 marks. Section C will be based on a case study worth 05 marks.
- The remaining 20% weightage will be based on Project/Survey based on the course.

Recommendations:

1. The Wonder That Was India – A.L. Basham
2. Indian Culture – Sri Aurobindo
3. An Introduction to Indian Philosophy – S. Radhakrishnan
4. A History of Ancient and Early Medieval India – Upinder Singh
5. Cultural Heritage of India – Ramakrishna Mission Institute of Culture
6. Indian Art and Architecture – Percy Brown
7. The Arts of India – C. Sivaramamurti
8. Indian Society – M. N. Srinivas
9. Religion and Society Among the Coorgs of South India – M. N. Srinivas
10. Indian Sociology Through Ghurye – G. S. Ghurye
11. Education in Ancient India – R. K. Mukherjee
12. Ancient Indian Education – A. S. Altekar
13. Cultural History of Kashmir – R. C. Kak
14. Rajatarangini – Kalhana (translated editions)
15. Kashmir Under the Dogras – P. N. K. Bamzai
16. Indian Heritage and Culture – NCERT (Senior Secondary & UG bridge texts