Eligibility Criteria and Syllabus for the PG programs

Tezpur University Entrance Examination 2023

		School of Humanities and Social Sciences	
Sl. No	**Programmes**	**Eligibility**	**Syllabus**
1.	**B.Ed.**	Bachelors degree in any discipline (B.A./ B.Sc./ B.Tech./B.E.) with minimum 55% marks or equivalent grade point	General Awareness-Current affairs, important facts, politics, education, geography, economics etc. Teaching Aptitude-Teaching-Learning, Teacher's role, Classroom communication etc. Contemporary Issues in Education- Educational scenario of India, Inclusive Education, RTE Act 2009, Education for peace, yoga and gender, Constitutional Provisions, Environmental Education etc. ICT in Education- Online Learning Platforms, Massive Open and Online Courses, classroom communication, teaching learning aids, Educational technology, Web 2.0 Technologies etc. Perspectives in Education-Philosophical, Sociological and Psychological.

2.	**M.A. in Assamese**	Bachelor's degree with at least 45% in major/ honours in Assamese or bachelor's degree with Assamese (MIL) having at least 50% in aggregate	**Assamese Literature**
			   a. A brief history of Assamese Literature (From beginning to present times)
			Assamese Language and Script
			   a. A brief history of Assamese Language (From beginning to present times)
			   b. Evolution of Assamese Script
			   c. Dialectology and dialects of Assamese Language
			   d. Assamese Phonology and Morphology
			Assamese Culture
			   a. Assamese Folklore
			   b. Cultural History of Assam
			   c. Fairs and Festivals of Assam
			   d. Ethnic groups of Assam and their cultural contributions

			Critical Theory (Eastern and Western)
3.	**M.A. in Communication for Development**	Bachelor's degree in any discipline with minimum 45% marks or equivalent grade point, the major/ honours subject, or 50% aggregate marks or equivalent grade point, if not having any major/ honours subject.	English language and grammar, Current affairs, General knowledge, general idea about developmental issues and policies internationally and in India, basic awareness about mass media at national and international level for objective type questions. Observational, analytical and creative writing skills for descriptive questions.
4.	**M.A. in Cultural Studies**	Bachelor's degree in any discipline with minimum 45% marks or equivalent grade point, in the major/ honours subject, or 50% aggregate marks if not having any major/ honours subject.	Issues related to North East India, History, Culture, Folklore, Society Performing Arts, Literature of NE India, Matters of Contemporary Importance, Film, Sports, Indian Literature, Indian Culture etc.
5.	**M.A. in Education**	Bachelor's degree in any discipline with minimum 45% marks† in the Major/ Honours Subject, or 50% aggregate marks or equivalent grade point. if not having any major/ honours subject.	**Philosophical Perspective in Education**: Philosophy and Education, Idealism, Naturalism, Pragmatism, Educational Practices – Kindergarten, Montessori, Dalton Plan, Project Method etc. **Sociological Perspective in Education:** Education in relation to Society, Agencies of Socialization, Social Change, Social mobility and stratification etc. **Psychological Perspective in Education**: Educational Psychology and Theories, Learning, intelligence, personality, child's growth and development etc. **Educational Technology:** Concept and scope of Educational Technology, Educational Communication, Emerging technologies in education- ICT in Education, Technology based learning, MOOCs, SWAYAM, smart classroom etc. **Contemporary Issues in Education**: Educational scenario of India, Inclusive Education, RTE Act 2009, Education for peace, yoga and gender, Constitutional Provisions, Environmental Education etc.
6.	**M.A. in English**	Bachelor's degree with Major/ Honours in English with at least 45% marks or equivalent grade point in the major/ honours subject.	BA Honours/Major level syllabi taught in Indian universities - Reading Literature (Genres, Movements, Schools, Terms), History of English Literature, English Poetry: Chaucer to Dryden, British Drama: Beginning to Shakespeare, Fiction: Early English Novels, English Poetry: The Augustans and the Romantics, Literary Theory and Criticism, Drama: Jacobean to Eighteenth Century, Fiction: Victorian and Modern, Poetry:

			Victorian to Modern, The English Essay, English Non-fictional Prose, Drama: Nineteenth and Twentieth Century, English for Communication, Phonetics of English and ELT, Postcolonial Literature. English grammar, composition, comprehension, vocabulary, phrases and idioms, current affairs, great authors, books, prizes.
7.	M.A. in Hindi	Bachelor's degree with minimum 45% marks or equivalent Grade Point, where applicable in Major/Honours in Hindi, or 50% marks or equivalent grade point in Hindi as well as in aggregate if not having major/ honours in Hindi.	Hindi Vyakaran, Hindi Bhasha, Hindi Sahitya, Bharatiya Aur Paschatya Kavya-Shastra, Hindi Patrakarita.
8.	Master of Laws (LLM)	Bachelor's degree in Law with minimum 50% aggregate marks or equivalent grade point.	**Constitutional Law**: Preamble, Salient features of the Indian Constitution, Citizenship, Fundamental Rights, Writ Jurisdiction, Directive Principles of State Policy and Fundamental Duties, Judiciary, Executive, Parliament and State Legislatures, Amending Process of the Constitution, Union State Relationship and Emergency Provisions. **Jurisprudence**: Nature and Sources of Law, Schools and Concepts of Jurisprudence. **Law of Crimes**: Fundamental elements of crime, stages of crime, general explanations and exceptions, abetment, conspiracy and attempt, punishments, offences against state, offences affecting common well-being, offences affecting the human body, offences against property, offences relating to marriage and offences affecting reputation. **Family Law**: Concepts in Family Law, Sources of Family Law in India, Marriage and Dissolution of Marriage, Adoption and Guardianship, Succession, Maintenance, Matrimonial Remedies and Uniform Civil Code **Public International Law and Human Rights**: Nature and definition of international law, Sources of International Law, Relationship between international law and municipal law, State recognition and state succession, Treaties: Formation, application, termination and reservation, UNO and its organs, Concept and Development of Human Rights, International Bill of Human Rights and Implementation of Human Rights in India.

			Current Legal Affairs.
9.	**M.A. in Linguistics and Language Technology**	Bachelor's degree with minimum 45% marks or equivalent grade point, where applicable in major/ honours in Linguistics/English/any other allied subject, or 50% marks or equivalent grade point. in any of the specified subjects as well as in aggregate if not having major/ honours in any of the specified Subjects.	Basic grammar (syntax, morphology, phonetics, semantics), language and animal communication, English grammar (+12 level), sociolinguistics, language and society, bilingualism, multilingualism, languages and linguistic situation of Northeast, scheduled languages and non-scheduled languages, language endangerment, language policies and planning.
10.	**M.A. in Mass Communication and Journalism**	Bachelor's degree in any discipline with minimum 45% marks or equivalent grade point, in the major/ honours subject, or 50% aggregate marks or equivalent grade point, if not having any major/ honours subject.	English language and grammar, Current affairs, General knowledge, a basic level of awareness about various aspects of mass media at national and international level for objective type questions. Observational, analytical and creative writing skills for descriptive questions.
11.	**M.A. in Social Work**	Bachelor's degree in any discipline with minimum 45% marks or equivalent grade point in the major/ honours subject, or 50% aggregate marks or equivalent grade point if not having any major/ honours subject.	Current affairs, Logical Reasoning, Awareness on Social welfare schemes, Social Reform movements, Contemporary Social Issues, Rights Based Issues, Quantitative aptitude, Indian Constitution, Basic Concepts in Social Work, Social Legislations, Human Resource Management, English Language Proficiency, Basic Concepts in Social Science (Sociology, Economics, Political Science, Psychology, Research Methods in Social Sciences, Issues in North East India, Environmental and Ecological Issues
12.	**M.A. in Sociology**	Bachelor's degree in any discipline with minimum 45% marks or equivalent Grade Point, where applicable in the major/ honours subject, or 50% aggregate marks or equivalent grade point if not having any major/ honours subject.	**Sociology - Concepts and Principles**: Definition and Emergence, Basic Concepts, Basic understanding of the works of Marx, Weber, Tonnies, Durkheim, Parsons and Merton, Basic kinship terminologies. **Indian Society**: Basic Concepts: Caste, Varna, village, region, religion, Processes of Social Change: Sanskritisation, Westernisation, Modernisation, Development and Change, Nation, Nationalism and nation Building. **Northeast India:** Basic understanding of the Region: Geography, Economy, Polity, Society, Language and

Sl. No	Programmes	Eligibility	Syllabus
			Culture, Ethnicity and Identity Politics. **General Awareness:** National and International: Current Affairs, Basic knowledge of culture, politics, geography, history and science, Basic information about the Indian Constitution.
13.	Post Graduate Diploma in Translation (Hindi)	Bachelor's degree in any discipline having Hindi as the major/ honours subject or as a subsidiary subject, or Praveen/Sahityaratna in Hindi, with minimum 45% aggregate marks or equivalent grade point.	Hindi Vyakaran, Hindi Bhasha, Hindi Sahitya
14.	Post Graduate Diploma in Women Studies	Bachelor's degree in any discipline with 45% marks or equivalent grade point in aggregate.	Women and society, woman's in Indian history, women in media, general aptitude, current affairs and computer aptitude.

School of Management Sciences			
Sl. No	**Programmes**	**Eligibility**	**Syllabus**
1.	M.Com.	B.Com. with minimum 50% marks or equivalent grade point in major/ honours. Mathematics at degree level is desirable.	Accounting and Financial Management, Economics, Business Mathematics and Statistics, Banking, Insurance, Taxation, Management, Business Laws, General Business Awareness.
2.	Master of Tourism and Travel Management (MTTM)	Bachelor's degree in any discipline with minimum 45% marks or equivalent grade point, where applicable in major/ honours subject or in aggregate.	General Knowledge - Tourism destinations of Northeast India, India and the world. History and mythology of Northeast India and India. Current Affairs. English - English Grammar; Sentence formation. Reasoning.

			School of Sciences
Sl. No	**Programmes**	**Eligibility**	**Syllabus**
1.	**M.Sc. in Chemistry**	Bachelor's degree with minimum 55% marks or equivalent grade point in major/ honours in Chemistry, or 60% marks or equivalent grade point in Chemistry as well as in aggregate if not having major/ honours in Chemistry. Also, candidates should have Physics or Mathematics as subsidiary subjects in bachelor's degree.	Inorganic Chemistry, Quantum Chemistry & Chemical Bonding, Organic Chemistry, Physical Chemistry, Spectroscopy from Undergraduate level curriculum of all leading Indian Universities.
2.	**M.Sc. in Environmental Science**	Bachelor's degree with minimum 45% marks or equivalent grade point, where applicable in major/ honours in Physical/ Biological/ Earth/ Environmental Sciences, or 50% marks or equivalent grade point in any of the specified subjects as well as in aggregate if not having major/ honours in any of the specified subjects, or bachelor's degree in Agriculture with minimum 50% aggregate marks or equivalent grade point.	Botany, Zoology, Agriculture, Physics, Chemistry, Mathematics, Statistics, Earth and Environmental Science from Undergraduate level curriculum of Indian Universities.
3.	**M.Sc. in Mathematics**	Bachelor's degree with minimum 45% marks or equivalent grade point in major/ honours in	**Classical Algebra**: Inequalities. Sequences and series. Roots and their multiplicity. Descartes rule of sign, Sturm's theorem. Relation between the roots and coefficients of a general polynomial equation. Solution of cubic and biquadratic equations. Matrices, elementary operations on matrices,

		Mathematics/ Statistics, or 50% marks or equivalent grade point, where applicable in Mathematics as well as in aggregate if not having major/ honours in Mathematics/ Statistics. Also, candidates with major/ honours in Statistics should have Mathematics as a subsidiary subject in bachelor's degree with minimum 50% marks or equivalent grade point.	Determinants and its properties, Rank of a matrix, System of linear equations and their solutions. **Calculus**: Rules of differentiation, Successive differentiation, Leibnitz theorem. Tangents and normal, Concavity andpoints of inflexion, curvature of plane curves, Asymptotes. Properties of definite integrals. Rectification, Quadrature, volume and surface area of solids of revolution. Improper Integrals. Line integral, Double integral, triple integral, Jacobian, Surface integral and their applications. **Co-ordinate Geometry**: Transformation of co-ordinate axes. Pair of straight lines. General equation of second degree and conic sections.Polar equation of a conic. Plane, straight line, Sphere, Cone and Cylinder. Central Conicoids. **Vectors**: Algebra of vectors, Differentiation of vector point functions, Gradient, Divergence, Curl, Vector integration, Green, Gauss and Stokes Theorem. **Differential Equations**: Ordinary differential equations(ODE) upto second order. **Mechanics**: Parallel forces, Couples, coplanar forces. Centre of gravity, Friction, Principle of virtual work . Velocity and acceleration, Rectilinear motion with variable acceleration, Simple harmonic motion. Motion in resisting medium.Motion of particles of varying mass.Motion of a projectile.Central orbit and Kepler's laws of planetary motion. Moments and products of inertia. **Real Analysis:** Real Numbers as a complete ordered field, Continuity and differentiability, Rolle's theorem, Mean value theorems , Taylor's theorem, expansion of functions by Maclaurin's theorem. Functions of two or more variables: Limit, Continuity, Partial derivatives, Euler's theorem on homogeneous functions, Differentiability, Chain rule, Directional derivatives, Gradient vectors and Tangent planes, Criteria for Maxima/Minima/Saddle points, Lagrange's method of multipliers. Sequences and series of functions, uniform convergence. Riemann integrals. **Abstract Algebra:** Binary operation, group, subgroup, normal subgroup and quotient group. Cyclic group, symmetric group and alternating group.Homomorphism and isomorphism of groups. Ring, integral domain, field.Homomorphism and isomorphism of rings.

			Numerical Methods: Finite differences. divided differences and their properties. Interpolation, Hermite interpolation. Error associated interpolation. Roots of algebraic and transcendental equations: bisection method, Newton-Raphson method, secant method. Numerical integration: Trapezoidal rule, Simpson's 1/3rd and 3/8th rule of integration.
			Probability and Statistics: Measures of location,Measures of dispersion, Correlation and regression. Classical definition of probability,Random variables, Discrete and continuous probability distributions.Mathematical expectation.
			Linear Algebra: Vector space, Subspace.Linear transformation, Eigenvalues and eigenvectors, Characteristic polynomial, Cayley-Hamilton Theorem. Inner product spaces.
			Linear Programming: General linear programming problems, Graphical and simplex methods for solution of L.P.P.
			Topology and Functional Analysis: Metric spaces, completeness.Uniform continuity. Topological spaces, basis, continuity, open functions, homeomorphisms. Normed linear spaces, Banach spaces.
			Number Theory: Divisibility, Euclidean Algorithm.Prime numbers and fundamental theorem of arithmetic. Concept of congruence and its elementary properties, Chinese remainder theorem.
			Complex Analysis: Complex numbers, Geometric representation of complex numbers.Continuity and differentiability of complex functions, Analytic functions, Cauchy-Riemann equations, harmonic functions. Complex integration, Cauchy-Goursat theorem, Cauchy integral formula and its applications
4.	**M.Sc. in Physics**	Bachelor's degree with minimum 45% marks or equivalent grade point in major/ honours in Physics, or 50% marks or equivalent grade point in Physics as well as in aggregate if not having major/ honours in Physics. Also, candidates should have Mathematics as a subsidiary	B.Sc. level syllabus of any Indian University (Classical Mechanics, Properties of matter, Quantum Mechanics, Atomic Physics, Solid State Physics, Nuclear Physics, Mathematical Physics, Thermodynamics and Statistical Physics, Electricity and Magnetism, Electronics)

		subject in bachelor's degree.	

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<tr><th colspan="4">School of Engineering</th></tr>
<tr><th>Sl.
No</th><th>Programmes</th><th>Eligibility</th><th>Syllabus</th></tr>
<tr>
<td>1.</td>
<td>M.Tech. in Bioelectronics</td>
<td>B.E./ B.Tech. or equivalent bachelor's degree in Electronics and Communication Engineering/ Instrumentation/ Chemical Engineering/ Computer Science and Engineering/ Electrical Engineering/ Biomedical Engineering/ Bioengineering/ Neuroengineering/ Genetic Engineering/ Biotechnology or M.Sc. in Biotechnology/ Biochemistry/ Chemistry/ Polymer Science/ Physics/ Electronics/ Nano Science and Technology/ Instrumentation or MBBS with minimum 50% aggregate marks or equivalent grade point.</td>
<td>B.E/B.Tech. level courses in Electronics Engineering, Electrical Engineering, Instrumentation Engineering, Communication Engineering, Biomedical Engineering, Chemical Engineering, Bioengineering, Computer Science and Engineering, Biotechnology.

M.Sc. level courses on Chemistry, Biophysics, Molecular Biology, Cell Biology and Molecular Biology and Biotechnology.</td>
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<tr>
<td>2.</td>
<td>M.Tech. in Civil Engineering</td>
<td>B.E./B.Tech. in Civil Engineering with minimum 50% aggregate marks or equivalent grade point, where applicable.</td>
<td>B.E/B.Tech. level courses in Civil Engineering</td>
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<td>3.</td>
<td>M.Tech. in Computer Sc and Engineering (CSE)</td>
<td>B.E./B.Tech. or equivalent bachelor's degree in Computer Science and Engineering or MCA with minimum 50% aggregate marks or equivalent grade point. Candidates selected under GATE should have a valid GATE score in Computer Science and Information Technology (CS)</td>
<td>Analytical Reasoning.

Data Structures: Array, Stack, Queue, Linked List, Binary Tree, Heap, Graphs, AVL Tree, B-tree.

Graph Theory: Paths and Cycles, Connected Components, Trees, Digraphs.

Discrete Mathematics: Sets and Sequences Counting, Logic & Proofs, Recurrence Relations. Algebra of Matrices, Determinant, Eigenvalues and Eigenvectors of Matrices,</td>
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| | | | **Design and Analysis of Algorithms**: Asymptotic Notation, Searching, Sorting, Selection, Graph Traversal, Minimum Spanning Tree.

Formal Languages and Automata Theory: Finite Automata and Regular Expressions, Pushdown Automata, Context-free Grammar, Turing Machine, Elements of Undecidability.

Digital Logic Design: Boolean Algebra, Minimization of Boolean Functions, Combinational and Sequential Circuits - Synthesis and Design.

Computer Organization and Architecture: Number Representation, Computer Arithmetic, Memory Organization, I/O Organization.

Operating Systems: Memory Management, Processor Management, Device Management, File Systems.

Database Management Systems: Relational Model, Relational Algebra, Relational Calculus, Functional Dependency, Normalisation (2NF, 3NF and BCNF).

Principles of programming: types of programming languages, language, processors, program linking, program memory allocation, code optimization.

Computer Networks: OSI, LAN Technology - Bus / Tree, Ring, Star; MAC Protocols; WAN Technology - Circuit Switching, Packet Switching; Data Communications - Data Encoding, Routing, Flow Control, Error Detection/Correction, Inter-networking, TCP/IP Networking including IPv4. |
|---|---|---|---|
| 4. | **M.Tech. in Electronics Design and Technology** | B.E./B.Tech. or equivalent bachelor's degree in Electronics/ Electrical/ Instrumentation Engineering or M.Sc. in Electronics/ Instrumentation/ Physics (Electronics as specialization) with minimum 50% aggregate marks or equivalent grade point. | B.E. or equivalent level courses on Electronics and Communication Engineering, Electrical Engineering/ AMIE level courses in Electronics/Instrumentation Engineering. |
| 5. | **M.Tech. in Energy** | B.E./B.Tech. or equivalent bachelor's degree in | Energy sources and Energy conservation, Graduate level courses in Science and |

	Technology	Mechanical/ Electrical/ Electronics/ Instrumentation/ Chemical/ Agricultural/ Energy Engineering / Civil/ Petroleum/ Material Science/ Engineering Physics/ Renewable Energy. Or M.Sc. in Physics/ Chemistry/ Material Science/ Engineering Physics/ Engineering Science/ Polymer Science/ Renewable Energy/ Energy/ Nanoscience/ M. Voc. in Renewable Energy with minimum 50% aggregate marks or equivalent grade point.	Engineering.
6.	M.Tech. in Food Engineering and Technology	B.E./B.Tech. /M.Sc. in Food Engineering and/or Technology/ Agricultural Engineering/ Chemical Engineering and/or Technology/ Dairy Engineering and/or Technology with minimum 50% aggregate marks or equivalent grade point. Also, candidates must have Mathematics at 10+2 standard with minimum 50% marks or equivalent grade point or as a subsidiary subject in the specified degree programmes.	**Part-I: Mathematics and General Engineering (weightage: 20%)** Mathematics at the level of B. Tech. 1st and 2nd Semester General Engineering: Thermodynamics; Fluid Mechanics; and Heat & Mass Transfer **Part-II: Food Engineering & Technology (weightage: 80%)** Food Engineering; Food Chemistry & Nutrition; Food Microbiology; Food Product technology (As per the outline of GATE syllabus for Food Technology, copy attached)
7.	M.Tech. in Information Technology	B.E./B.Tech. or equivalent bachelor's degree in Computer Science and Engineering/ Information Technology/ Electronics and Communication Engineering/any other allied Discipline, or MCA or its equivalent degree, or M.Sc. in Computer Science/ Information Technology/ Electronics/ Mathematics/ Statistics with minimum 50% aggregate marks or equivalent grade point. Candidates selected under GATE should have a valid GATE score in Computer Science and Information Technology (CS).	**Analytical Reasoning** **Discrete Mathematics**: Permutations and Combinations, Recurrence Relations. Algebra of Matrices, Determinant, Rank and Inverse of a Matrix, Functions and Relations. **Discrete Probability Theory**: Combinatorial Probability, Conditional Probability, and Bayes Theorem. Discrete Random Variables. Expectation and Variance of Discrete Random Variables. **Graph Theory:** Graphs, Adjacency Matrix and Adjacency List representations of Graphs, Subgraphs, Connectivity, Trees and their Properties, Vertex Coloring, Planar Graphs. **Algorithmic Thinking**: Asymptotic Notations, Searching, Sorting, Selection, Graph Traversal, Minimum Spanning Tree.

			Basic Programming Concepts using C/C++
			Data Structures: Array, Stack, Queue, Linked List, Binary Tree, Heap, AVL Tree, B-tree.
			Computer Organization and Architecture: Number Representation, Computer Arithmetic, Memory Organization, I/O Organization,
			Operating Systems: Memory Management, Processor Management, Device Management, File Systems.
			Database Management Systems: Relational Model, SQL, Functional Dependency, Normalisation (2NF, 3NF and BCNF).
			Computer Networks: OSI, LAN Technology, MAC Protocols, WAN Technology - Circuit Switching, Packet Switching, Routing, Flow Control, Inter-networking, TCP/IP Networking including IPv4.
8.	**M.Tech. in Mechanical Engineering** *(Specialization: 1. Machine Design; 2. Thermo Fluids)*	B.E./B.Tech. or equivalent bachelor's degree in Mechanical/ Aerospace/ Automobile Engineering or in any other relevant engineering discipline with minimum 50% aggregate marks or equivalent grade point.	**Engineering Mathematics**
			Linear Algebra: Matrix algebra, systems of linear equations, eigenvalues and eigenvectors.
			Calculus: Functions of single variable, limit, continuity and differentiability, mean value theorems, indeterminate forms; evaluation of definite and improper integrals; double and triple integrals; partial derivatives, total derivative, Taylor series (in one and two variables), maxima and minima, Fourier series; gradient, divergence and curl, vector identities, directional derivatives, line, surface and volume integrals, applications of Gauss, Stokes and Green's theorems.
			Differential equations: First order equations (linear and nonlinear); higher order linear differential equations with constant coefficients; Euler- Cauchy equation; initial and boundary value problems; Laplace transforms; solutions of heat, wave and

			Laplace's equations.
			Complex variables: Analytic functions; Cauchy-Riemann equations; Cauchy's integral theorem and integral formula; Taylor and Laurent series.
			Probability and Statistics: Definitions of probability, sampling theorems, conditional probability; mean, median, mode and standard deviation; random variables, binomial, Poisson and normal distributions.
			Numerical Methods: Numerical solutions of linear and non-linear algebraic equations; integration by trapezoidal and Simpson's rules; single and multi-step methods for differential equations.
			Applied Mechanics and Design
			Engineering Mechanics: Free-body diagrams and equilibrium; friction and its applications including rolling friction, belt-pulley, brakes, clutches, screw jack, wedge, vehicles, etc.; trusses and frames; virtual work; kinematics and dynamics of rigid bodies in plane motion; impulse and momentum (linear and angular) and energy formulations; Lagrange's equation.
			Mechanics of Materials: Stress and strain, elastic constants, Poisson's ratio; Mohr's circle for plane stress and plane strain; thin cylinders; shear force and bending moment diagrams; bending and shear stresses; concept of shear centre; deflection of beams; torsion of circular shafts; Euler's theory of columns; energy methods; thermal stresses; strain gauges and rosettes; testing of materials with universal testing machine; testing of hardness and impact strength.
			Theory of Machines: Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of linkages; cams; gears and gear trains; flywheels and governors; balancing of reciprocating and rotating masses; gyroscope.

Vibrations: Free and forced vibration of single degree of freedom systems, effect of damping; vibration isolation; resonance; critical speeds of shafts.

Machine Design: Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints; shafts, gears, rolling and sliding contact bearings, brakes and clutches, springs.

Fluid Mechanics and Thermal Sciences

Fluid Mechanics: Fluid properties; fluid statics, forces on submerged bodies, stability of floating bodies; control-volume analysis of mass, momentum and energy; fluid acceleration; differential equations of continuity and momentum; Bernoulli's equation; dimensional analysis; viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends and fittings; basics of compressible fluid flow.

Heat-Transfer: Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, Heisler's charts; thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, heat transfer correlations for flow over flat plates and through pipes, effect of turbulence; heat exchanger performance, LMTD and NTU methods; radiative heat transfer, Stefan-Boltzmann law, Wien's displacement law, black and grey surfaces, view factors, radiation network analysis

Thermodynamics: Thermodynamic systems and processes; properties of pure substances, behavior of ideal and real gases; zeroth and first laws of thermodynamics, calculation of work and heat in various processes; second law of thermodynamics;

thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations.

Applications:
Power Engineering: Air and gas compressors; vapour and gas power cycles, concepts of regeneration and reheat. *I.C. Engines*: Air-standard Otto, Diesel and dual cycles.

Refrigeration and air-conditioning: Vapour and gas refrigeration and heat pump cycles; properties of moist air, psychrometric chart, basic psychrometric processes.

Turbomachinery: Impulse and reaction principles, velocity diagrams, Pelton-wheel, Francis and Kaplan turbines; steam and gas turbines.

Materials, Manufacturing and Industrial Engineering

Engineering Materials: Structure and properties of engineering materials, phase diagrams, heat treatment, stress-strain diagrams for engineering materials.

Casting, Forming and Joining Processes: Different types of castings, design of patterns, moulds and cores; solidification and cooling; riser and gating design. Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy. Principles of welding, brazing, soldering and adhesive bonding.

Machining and Machine Tool Operations: Mechanics of machining; basic machine tools; single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of non-traditional machining processes; principles of work holding, jigs and fixtures; abrasive machining processes; NC/CNC machines and CNC programming.

Metrology and Inspection: Limits, fits and tolerances; linear and angular measurements; comparators; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly; concepts of coordinate-measuring machine (CMM).

Computer Integrated Manufacturing: Basic concepts of CAD/CAM and their integration tools; additive manufacturing.

Production Planning and Control: Forecasting models, aggregate production planning, scheduling, materials requirement planning; lean manufacturing.

Inventory Control: Deterministic models; safety stock inventory control systems.

Operations Research: Linear programming, simplex method, transportation, assignment, network flow models, simple queuing models, PERT and CPM.

9.	**Master of Computer Application (M.C.A.)**	Bachelor's degree in any discipline with minimum 50% aggregate marks or equivalent grade point, where applicable. Also, candidates should have Mathematics at 10+2 Standard with pass marks or equivalent grade point. Relaxation of 5% marks or equivalent grade point for reserved category candidates as per Rules.	Logical Reasoning, Basic Mathematical Ability, Mathematics (10+2 Level), Fundamentals of Computer Science, Fundamental programming concepts, English Vocabulary and composition.
10.	**Master of Design (M. Des.)**	Bachelor's Degree in Design/Engineering/Architecture/Planning/Interior Design (10+2+4)years / 4 YearsDiploma in Design/4 Years BFA/Any recognized degrees (AICTE/UGC approved) in Design related field (10+2+4) years/Master Degree in Art/Science/MCA/MSc (Computer Sciences/Electronics) with minimum 50% marks in graduation/ and Post-graduation/Equivalent CGPA/CPI in qualifying degree.	**1. Visualization and spatial ability** - Pictorial and diagrammatic questions to scrutinize students' capability of transformation/ manipulation of 2D shapes and 3D objects followed by their spatial relationships. **2. Environmental and social awareness** - General awareness related to environmental factors, such as climate, population, water, vegetation, pollution, weather, natural resources, and their implications on the design of products, images, infrastructure, and environment. Design terminologies, social and cultural connection with the design, the history of the designed artifact, and socially responsible and environmentally sustainable design responses.

Candidates with CEED/GATE will be preferred (60% seat will be based on TUEE/Portfolio/Interview and 40% will be filled up from CEED/GATE). If sufficient CEED qualified candidates are not available for a particular year, then the University may opt for npn CEED canddates with TUEE/Portfolio/PI.	**3. Analytical and logical reasoning** – To have ability to probe the opinions, arguments, or solutions against relevant norms. Logical and structured thinking to deduce from a short passage, which statements are apt responses to the posed question. **4. Language and creativity** - To understand the passages in a commonly used English language. Candidates must think creatively in the matter of alternatives, facility to differentiate innovative options, and think out of the box. **5. Design thinking and problem solving** – To understand the context, the user, and the constraints and select the most relevant solution for the given design problem. **6. Observation and design sensitivity** - Ability to observe the hidden properties in day-to-day life and think rigorously about them. To have capability to notify the variance in visual properties and aesthetic outcomes.