UNIVERSITY DEPARTMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY (UDICT)

MGM Campus, N6, CIDCO, Aurangabad - 431003

Website: www.mgmu.ac.in, www.udict.mgmu.ac.in

Information Booklet

For

MGMU – CET 2024

for

Admission to First Year of Two-Years Full-Time Post Graduate Degree Program in Engineering & Technology

(For Academic Year 2024-25)

Help line number for Technical Assistance for Online application form filling for MGMU – CET 2024: 9404494299

website: www.udict.mgmu.ac.in, www.mgmu.ac.in

1. INTRODUCTION

(a) The MGM University Aurangabad has established "Admission regulating authority and In-charge engineering entrance exam cell" as per the Maharashtra Act No XXVI of 2019).

(b) The In-charge MGMU – CET 2024 Cell, appointed by competent authority is authorized to conduct MGMU – CET 2024 and selection of candidates for admission to two Years Duration Full Time Post Graduate Degree programs in "Engineering and Technology" for the academic year 2024-25.

(c) The Registrar, MGM University Aurangabad has notified the rules to regulate the admissions to the First Year of Full Time Professional Post-graduate programs in "Engineering and Technology". The admissions shall be carried out as per these Rules and its amendment from time to time.

2. DEFINITIONS

(a) "Act" means The MGM University, Aurangabad (Regulation of Admissions and Fees) Act, 2019 (Act XXVI of 2019);

(b) "All India Seats" means seats available to an eligible Indian National Candidate;

(c) "Application Form" means prescribed form filled up online by the Candidate for admission;

(d) "Competent Authority" means the Registrar, MGMU Aurangabad.

(e) "Program" means the postgraduate and undergraduate technical courses in "Engineering and Technology".

(f) "Eligible Candidates" means the candidates who are eligible for different professional courses as notified by the MGMU, Aurangabad.

(g) "SSC" means the Secondary School Certificate (Standard X) examination conducted by Maharashtra State Board of Secondary and Higher Secondary Education or its equivalent certificate awarded by a recognized Board;

(h) "HSC" means the Higher Secondary School Certificate (Standard XII) examination conducted by Maharashtra State Board of Secondary and Higher Secondary Education or its equivalent certificate awarded by a recognized Board;

(i) "Bachelor of Engineering" and/or "Bachelor of Technology" means A degree from AICTE approved Institute.

(j) "GATE" means the Graduate Aptitude Test which is conducted by the IIT.

(k) "Qualifying Examination" means examinations on the basis of which a candidate becomes eligible for admission or its equivalent examination;

(l) "CET" means Common Entrance Test.

3. PROGRAMS

MGM University Aurangabad invites applications to two years and one year on campus postgraduate programs MTech Data Science, MTech Geoinformatics and PG Diploma in Artificial Intelligence and Machine Learning resp. for the Academic year 2024-24. Admissions are open for the following programs to be offered in UDICT, MGM University Aurangabad:

Name of The Program	Approved Intake	Type of program	Duration
MTech in Data Science	18	Post-graduate	2 Years
MTech in AIML	18	Post-graduate	2 Years

4. ELIGIBILITY FOR ADMISSION TO FIRST YEAR

POST GRADUATE PROGRAMS

4.1 Eligibility Criterions for M.Tech. in Data Science and MTech in AIML

The candidate should fulfil the following eligibility criteria:
- The candidate should be an Indian National;
- Passed bachelor's degree in the BE/BTech (CSE/IT/ECT/Civil/EEP/Mech) of Engineering and Technology from All India Council for Technical Education or Central or State Government approved institutions (or equivalent) with at least 50% marks (at least 45% marks in case of candidates of Backward class categories and persons with disability belonging to Maharashtra State only).
- Candidates appearing for the final year of qualifying examination are also eligible to appear for MGMU – CET 2024.

5. SCHEME OF EXAMINATION

5.1 MGMU – CET 2024 (M.Tech.)
Based on the qualifications of the candidate, the entrance test shall be taken as per the following mechanism. Section A will consist of questions of general aptitude, and section B will have questions from Engineering Mathematics. Both sections A and B are compulsory. For section C, the applicant has to attempt the questions respective to the discipline of the candidate.

Pattern and Weightage of Examination for MTech (Geoinformatics):

Sections	Weightage in %	No. of questions	Marks per Questions	Max. Marks	Total Marks
A. General Aptitude	15%	9	1	9	9
B. Engineering Mathematics	15%	9	1	9	9
C. Discipline specific questions					
BE/BTech (CSE/IT)	70%	42	1	42	42
OR					
BE/BTech (Civil Engineering)	70%	42	1	42	42
OR					
BE/BTech (ECT/EEP/Mech)	70 %	42	1	42	42
Total	100%	60	1	60	60

Syllabus for MGMU – CET 2024 (Candidates from BE/BTech CSE/IT background)
Section 1: General Aptitude
Verbal Aptitude: Basic English grammar: Tenses, articles, adjectives, prepositions, conjunctions, verb-noun agreement, and other parts of speech Basic vocabulary: words, idioms, and phrases in context Reading and comprehension Narrative sequencing.
Quantitative Aptitude: Data interpretation: data graphs (bar graphs, pie charts, and other graphs representing data), 2- and 3-dimensional plots, maps, and tables Numerical computation and estimation: ratios, percentages, powers, exponents and logarithms, permutations and combinations, and series Mensuration and geometry Elementary statistics and probability.
Analytical Aptitude: Logic: deduction and induction; Analogy Numerical relations and reasoning.
Spatial Aptitude: Transformation of shapes: translation, rotation, scaling, mirroring, assembling, and grouping Paper folding, cutting, and patterns in 2 and 3 dimensions

Section2: Engineering Mathematics

Discrete Mathematics: Propositional and first order logic, Sets, relations, functions, partial orders and lattices. Monoids, Groups. Graphs: connectivity, matching, coloring. Combinatorics: counting, recurrence relations, generating functions.

Linear Algebra: Matrices, determinants, system of linear equations, eigenvalues and eigenvectors, LU decomposition.

Calculus: Limits, continuity and differentiability. Maxima and minima. Mean value theorem. Integration.

Probability and Statistics: Random variables. Uniform, normal, exponential, Poisson and binomial distributions. Mean, median, mode and standard deviation. Conditional probability and Bayes theorem.

Section 3: Computer Science & Engineering

Digital Logic: Boolean algebra. Combinational and sequential circuits. Minimization. Number representations and computer arithmetic (fixed and floating point).

Computer Organization and Architecture: Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining, pipeline hazards. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).

Programming and Data Structures: Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.

Algorithms: Searching, sorting, hashing. Asymptotic worst-case time and space complexity. Algorithm design techniques: greedy, dynamic programming and divide-and-conquer. Graph traversals, minimum spanning trees, shortest paths

Theory of Computation: Regular expressions and finite automata. Context-free grammar and push-down automata. Regular and context free languages, pumping lemma. Turing machines and undecidability.

Compiler Design: Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation. Local optimization, Data flow analyses: constant propagation, liveness analysis, common sub-expression elimination.

Operating System: System calls, processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU and I/O scheduling. Memory management and virtual memory. File systems.

Databases: ER-model. Relational model: relational algebra, tuple calculus, SQL. Integrity constraints, normal forms. File organization, indexing (e.g., B and B+ trees). Transactions and concurrency control.

Computer Networks: Concept of layering: OSI and TCP/IP Protocol Stacks; Basics of packet, circuit and virtual circuit-switching; Data link layer: framing, error detection, Medium Access Control, Ethernet bridging; Routing protocols: shortest path, flooding, distance vector and link state routing; Fragmentation and IP addressing, IPv4, CIDR notation, Basics of IP support protocols (ARP, DHCP, ICMP), Network Address Translation (NAT); Transport layer: flow control and congestion control, UDP, TCP, sockets; Application layer protocols: DNS, SMTP, HTTP, FTP, Email.

Syllabus for MGMU – CET 2024 (Candidates from BE/BTech Civil Engineering background)):

Section 1: General Aptitude:

Logical/ Abstract Reasoning: This shall include the questions to measure how quickly and logically you can think. This section will cover logical situations and questions based on the facts given in the passage. This test shall check the problem-solving capability of the candidate.

English comprehension and verbal ability: Questions in this section will be designed to test the candidate's general understanding of the English language. There will be questions on the topics such as Basic English grammar, Vocabulary, comprehension, synonyms antonyms, sentence correction, word &phrases, jumbled paragraph.

Section 2: Engineering Mathematics:

Linear Algebra: Matrix algebra; Systems of linear equations; Eigen values and Eigen vectors.

Calculus: Functions of single variable; Limit, continuity and differentiability; Mean value theorems, local maxima and minima; Taylor series; Evaluation of definite and indefinite integrals, application of definite integral to obtain area and volume; Partial derivatives; Total derivative; Gradient, Divergence and Curl, Vector identities; Directional derivatives; Line, Surface and Volume integrals.

Ordinary Differential Equation (ODE): First order (linear and non-linear) equations; higher order linear equations with constant coefficients; Euler-Cauchy equations; initial and boundary value problems.

Partial Differential Equation (PDE): Fourier series; separation of variables; solutions of one- dimensional diffusion equation; first and second order one-dimensional wave equation and two-dimensional Laplace equation.

Probability and Statistics: Sampling theorems; Conditional probability; Descriptive statistics - Mean, median, mode and standard deviation; Random Variables – Discrete and Continuous, Poisson and Normal Distribution; Linear regression.

Numerical Methods: Error analysis: Numerical solutions of linear and non-linear algebraic equations; Newton's and Lagrange polynomials; numerical differentiation; Integration by trapezoidal and Simpson's rule; Single and multi-step methods for first order differential equations.

Section 3: Civil Engineering

Engineering Mechanics: System of forces, free-body diagrams, equilibrium equations; Internal forces in structures; Frictions and its applications; Centre of mass; Free Vibrations of undamped SDOF system. Solid Mechanics: Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; Simple bending theory, flexural and shear stresses, shear center; Uniform torsion, Transformation of stress; buckling of column, combined and direct bending stresses.

Structural Analysis: Statically determinate and indeterminate structures by force/ energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods; Influence lines; Stiffness and flexibility methods of structural analysis.

Construction Materials and Management: Construction Materials: Structural Steel - Composition, material properties and behavior; Concrete - Constituents, mix design, short-term and long-term properties. Construction Management: Types of construction projects; Project planning and network analysis - PERT and CPM; Cost estimation.

Concrete Structures: Working stress and Limit state design concepts; Design of beams, slabs, columns; Bond and development length; Prestressed concrete beams.

Steel Structures: Working stress and Limit state design concepts; Design of tension and compression members, beams and beam- columns, column bases; Connections - simple and eccentric, beam-column connections, plate girders and trusses; Concept of plastic analysis - beams and frames.

Geotechnical Engineering: Soil Mechanics: Three-phase system and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability - one dimensional flow, Seepage through soils – two - dimensional flow, flow nets, uplift pressure, piping, capillarity, seepage force; Principle of effective stress and quicksand condition; Compaction of soils; One- dimensional consolidation, time rate of consolidation; Shear Strength, Mohr's circle, effective and total shear strength parameters, Stress-Strain characteristics of clays and sand; Stress paths.

Foundation Engineering: Sub-surface investigations - Drilling bore holes, sampling, plate load test, standard penetration and cone penetration tests; Earth pressure theories Rankine and Coulomb; Stability of slopes – Finite and infinite slopes, Bishop's method; Stress distribution in soils – Bossiness's theory; Pressure bulbs, Shallow foundations – Terzaghi's and Meyerhoff's bearing capacity theories, effect of water table; Combined footing and raft foundation; Contact pressure; Settlement analysis in sands and clays; Deep foundations - dynamic and static formulae, Axial load capacity of piles in sands and clays, pile load test, pile under lateral loading, pile group efficiency, negative skin friction.

Water Resources Engineering: Fluid Mechanics: Properties of fluids, fluid statics; Continuity, momentum and energy equations and their applications; Potential flow, Laminar and turbulent flow; Flow in pipes, pipe networks; Concept of boundary layer and its growth; Concept of lift and drag.

Hydraulics: Forces on immersed bodies; Flow measurement in channels and pipes; Dimensional analysis and hydraulic similitude; Channel Hydraulics - Energy-depth relationships, specific energy, critical flow, hydraulic jump, uniform flow, gradually varied flow and water surface profiles.

Hydrology: Hydrologic cycle, precipitation, evaporation, evapo-transpiration, watershed, infiltration, unit hydrographs, hydrograph analysis, reservoir capacity, flood estimation and routing, surface run-off models, ground water hydrology - steady state well hydraulics and aquifers; Application of Darcy's Law. Irrigation: Types of irrigation systems and methods; Crop water requirements - Duty, delta, evapo-transpiration; Gravity Dams and Spillways; Lined and unlined canals, Design of weirs on permeable foundation; cross drainage structures.

Environmental Engineering: Water and Waste Water Quality and Treatment: Basics of water quality standards – Physical, chemical and biological parameters; Water quality index; Unit processes and operations; Water requirement; Water distribution system; Drinking water treatment. Sewerage system design, quantity of domestic

wastewater, primary and secondary treatment. Effluent discharge standards; Sludge disposal; Reuse of treated sewage for different applications.

Air Pollution: Types of pollutants, their sources and impacts, air pollution control, air quality standards, Air quality Index and limits.

Municipal Solid Wastes: Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal).

Transportation Engineering: Transportation Infrastructure: Geometric design of highways - cross-sectional elements, sight distances, horizontal and vertical alignments. Geometric design of railway Track – Speed and Cant. Concept of airport runway length, calculations and corrections; taxiway and exit taxiway design. **Highway Pavements: Highway materials** - desirable properties and tests; Desirable properties of bituminous paving mixes; Design factors for flexible and rigid pavements; Design of flexible and rigid pavement using IRC codes. Traffic **Engineering:** Traffic studies on flow and speed, peak hour factor, accident study, statistical analysis of traffic data; Microscopic and macroscopic parameters of traffic flow, fundamental relationships; Traffic signs; Signal design by Webster's method; Types of intersections; Highway capacity.

Geoinformatics Engineering: Principles of surveying; Errors and their adjustment; Maps scale, coordinate system; Distance and angle measurement - Levelling and trigonometric levelling; Traversing and triangulation survey; Total station; Horizontal and vertical curves. Photogrammetry and Remote Sensing - Scale, flying height; Basics of remote sensing and GIS.

Syllabus for MGMU – CET 2024 (Candidates from BE/BTech ECT/EEP/Mech background):

Section-1 General Aptitude

Verbal Ability: English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.

Numerical Ability: Numerical computation, numerical estimation, numerical reasoning and data interpretation.

Section-2 Engineering Mathematics

Linear Algebra: Vector space, basis, linear dependence and independence, matrix algebra, eigenvalues and Eigenvectors, rank, solution of linear equations – existence and uniqueness.

Calculus: Mean value theorems, theorems of integral calculus, evaluation of definite and improper integrals, partial derivatives, maxima and minima, multiple integrals, line, surface and volume integrals, Taylor series.

Differential Equations: First order equations (linear and nonlinear), higher-order linear differential equations, Cauchy's and Euler's equations, methods of solution using a variation of parameters, complementary function and particular integral, partial differential equations, variable separable method, initial and boundary value problems.

Vector Analysis: Vectors in plane and space, vector operations, gradient, divergence and curl, Gauss's, Green's and Stoke's theorems.

Complex Analysis: Analytic functions, Cauchy's integral theorem, Cauchy's integral formula; Taylor's and Laurent's series, residue theorem.

Numerical Methods: Solution of nonlinear equations, single and multi-step methods for differential equations, convergence criteria.

Probability and Statistics: Mean, median, mode and standard deviation; combinatorial probability, probability distribution functions - binomial, Poisson, exponential and normal; Joint and conditional probability; Correlation and regression analysis.

Section-3 Electronics and Communication Engineering

Network Methods: Nodal and mesh analysis; Network theorems: superposition, Thevenin and Norton's, maximum power transfer; Wye-Delta transformation; Steady state sinusoidal analysis using phasors; Time-domain analysis of simple linear circuits; Solution of network equations using Laplace transform; Frequency domain analysis of RLC circuits; Linear 2-port network parameters: driving point and transfer functions; State equations for networks.

Electronic Devices: Energy bands in intrinsic and extrinsic silicon; Carrier transport: diffusion current, drift current, mobility, and resistivity; Generation and recombination of carriers; Poisson and continuity equations; P-N junction, Zener diode, BJT, MOS capacitor, MOSFET, LED, photodiode, and solar cell; Integrated circuit fabrication process: oxidation, diffusion, ion implantation, photolithography, and twin-tub CMOS process.

Analog and Digital Circuits: Small signal equivalent circuits of diodes, BJTs and MOSFETs; Simple diode circuits: clipping, clamping and rectifiers; Single-stage BJT and MOSFET amplifiers: biasing, bias stability, BJT and MOSFET amplifiers: multi-stage, differential, feedback, power and operational; Simple op-amp circuits; Active filters; 555 timers; Power supplies.

Number systems; Combinatorial circuits: Boolean algebra, minimization of functions using Boolean identities logic gates, multiplexers, decoders, and PLAs (Programmable Logic Array); Sequential circuits: latches and flip-flops, counters, shift-registers, and finite state machines; Data converters: sample and hold circuits, ADCs and DACs (Departmental Advisory Committee); Semiconductor memories: ROM (Read Only Memory), SRAM (Static Random Access Memory), DRAM (Dynamic Random Access Memory); 8-bit microprocessor (8085): architecture, programming, memory and I/O interfacing.

Control Systems: Basic control system components; Feedback principle; Transfer function; Block diagram representation; Signal flow graph; Transient and steady-state analysis of LTI systems; Frequency response; Routh-Hurwitz and Nyquist stability criteria; Bode and root-locus plots; Lag, lead, and lag-lead compensation; State variable model and solution of state equation of LTI systems.

Communications: Analog communications: amplitude modulation and demodulation, angle modulation and demodulation, spectra of AM and FM, super heterodyne receivers, circuits for analog communications; Information theory: entropy, mutual information, and channel capacity theorem.

PCM, DPCM, digital modulation schemes, amplitude, phase, and frequency shift keying (ASK, PSK, FSK), QAM, MAP and ML (Machine Learning) decoding, matched filter receiver, calculation of bandwidth, SNR and BER for digital modulation; Fundamentals

of error correction, Hamming codes; Timing and frequency synchronization, inter-symbol interference and its mitigation; Basics of TDMA, FDMA and CDMA.

Electromagnetics: differential and integral forms and their interpretation, boundary conditions, wave equation, Poynting vector; Plane waves and properties: reflection and refraction, polarization, phase and group velocity, propagation through various media, skin depth;

5.2 Important Instructions to the MGMU – CET 2024 candidates.

- The Online Question Paper will contain Multiple Choice Questions (MCQs) with Four options (answers) for each question.
- Each question will have Four alternatives (answers) out of which only one alternative/answer will be the correct.
- There is no Negative Marking.
- The Questions will be displayed on the computer screen one at a time. Candidates are advised not to spend too much time on any question.
- Questions will be available in English language only.

6. EXAMINATION SCHEDULE FOR MGMU – CET 2024

Important Information for MGMU UDICT PG Entrance Examination

Schedule	M.Tech. Data Science/ M.Tech. AIML
Online registration of Admission and MGMU CET 2024 Form on website	Already Started
Application fees for Admission and MGMU CET 2024 for all programs	Rs. 1500/- (to be paid online)
Date	From 18th May 2024
Duration of Examination	1 hour
Declaration of Result	The result will be communicated to the candidate on the registered email id.

7. ONLINE APPLICATION FORM

Application Form for MGMU – CET 2024 will be filled through Online Mode only. For submission of online application form the candidates should visit www.mgmu.ac.in, www.udict.mgmu.ac.in websites.

The online entrance examination application submission is a three steps process:
1. Applicant needs to fill entrance examination application Form on www.mgmu.ac.in/admissions/, www.udict.mgmu.ac.in
2. Applicant needs to pay application fees for admission and MGMU CET 2024 of Rs. 1500/-.
3. Applicant will get entrance exam link to his/her login.

Fees once paid will not be refundable under any circumstances.

Download Hall ticket:

The candidate can download his/her hall ticket, for MGMU – CET 2024 from his/her Log-In ID. Issue of Hall ticket is merely an enabling document for appearing the MGMU – CET 2024 and does not imply that the candidate satisfies all the requirements of eligibility conditions of admission.

Important Note:
a) Incomplete application forms will be rejected. Application form sent by post/courier will not be entertained and hence be rejected. The candidate shall

submit one and only one application form.

b) In any case, the candidate has cancelled his/her application, the fees paid for the same will not be refunded under any circumstances.

c) The email id and mobile number entered in the application form for validation will be treated as primary contact details and all communications will be sent to the same.

d) In case of mail is not received in INBOX, candidate should check the Spam / Junk Folder of his/her E-mail.

e) Candidates are advised to check their emails regularly.

8. CONDUCT AND DISCIPLINE

- Failure of the candidate in entering full and correct information in the online application form and/or suppression of any information would lead to disqualification of the candidate for MGMU – CET 2024 or even later. Such a candidate will be debarred from the examination / entire selection process.

- Adopting an unfair means or engaging in malpractice in the examination shall render a candidate liable for punishment under and disqualify the candidate for MGMU – CET 2024 examination.

- Any issue not dealt here-in above will be dealt with, when arising, fully and finally by the competent authority. Any amendments made by Registrar, MGM University Aurangabad from time to time will be implemented.