

Date: 21th January 2025

NAME OF THE POST: Assistant Professor (Grade –II) Level-10) [On Contract]

Department Name: Mechanical Engineering

Schedule for Reporting, written Test/Verification/Seminar/Interview

	Assistant Professors (Grade II) (level-10)	
Reporting	14 th February 2025 at 8.30 AM	<ul style="list-style-type: none">Reporting at the Venue.Submission of one set of signed application, Self-attested certificates and other essential documents.
Written Test	14 th February 2025 (9.00AM to 11.00 AM)	<ul style="list-style-type: none">Written Test (only MCQs) based on the GATE syllabus.
Verification	14 th February 2025 12:30 PM onwards	<ul style="list-style-type: none">Verification of documents for only candidates shortlisted based on the written test performance.
Seminar	14 th February 2025 from 2:00 PM onwards	<ul style="list-style-type: none">Seminar presentation for only the shortlisted candidates based on the written test performance.
Interview	15 th February 2025 from 9.00 AM onwards	<ul style="list-style-type: none">Interview only for candidates shortlisted based on Seminar performance.

Venue for Written Test/Seminar/Interview:

Written Test Venue: Manipur Public Service Commission, North AOC, Imphal West
Seminar/Interview : HOTEL IMPHAL, North AOC, Imphal West, MANIPUR

Provisionally shortlisted candidates

S.No	Application Number	8.	R222410ME008	17.	R222410ME017
1.	R222410ME001	9.	R222410ME009	18.	R222410ME018
2.	R222410ME002	10.	R222410ME010	19.	R222410ME019
3.	R222410ME003	11.	R222410ME011	20.	R222410ME020
4.	R222410ME004	12.	R222410ME012	21.	R222410ME021
5.	R222410ME005	13.	R222410ME013	22.	R222410ME022
6.	R222410ME006	14.	R222410ME014	23.	R222410ME023
7.	R222410ME007	15.	R222410ME015	24.	R222410ME024
		16.	R222410ME016	25.	R222410ME025

26.	R222410ME026
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228.	R222410ME230
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231.	R222410ME233
232.	R222410ME234

INELIGIBLE CANDIDATES

S. No.	Application No.	Reason for not Shortlisting
1.	R222410ME201	B.Tech Metallurgy
2.	R222410ME203	B.Tech Civil Engg

Note:

- 1) Any grievance/objection w.r.t the non-eligible candidates only are to be sent through e-mail: recruit_faculty@nitmanipur.ac.in on or before January 24, 2025.
- 2) The grievance/objection sent to the above mentioned email-id within the stipulated date will **ONLY** be considered.
- 3) Correspondence sent to any other email Id of the institute will not be entertained.
- 4) Syllabus for written Test for **Assistant Professor (Grade –II) Level-10) [On Contract]** is enclosed in **Annexure I**.

Annexure I: Syllabus for Written Test:

ME	Mechanical Engineering
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Section 1: 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, 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.

Section 2: 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.

Section 3: 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.

Section 4: 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.