



NATIONAL INSTITUTE OF TECHNOLOGY

(Established by Ministry of Human Resources Development, Govt. Of India)

Yupia, District Papum Pare, Arunachal Pradesh – 791112

Fax: 0360-2284972, E-mail: nitarunachal@gmail.com

NOTIFICATION (Regarding M.Tech Admission)

Admission notice (session 2017-18) for M.Tech in the following courses (**Proactive advertisement for unfilled/ remaining seats after CCMT-2017**)

Department	Specialization	Eligibility Criteria
Computer Science & Engineering	Computer Science & Engineering	i) BE/B.Tech in relevant branch ii) MCA
	Mobile Communication & Computing	i) BE/B.Tech in relevant branch of CSE or ECE
Electronics and Communication Engineering	VLSI Design and Embedded System	i) BE/B.Tech in relevant branch
Mechanical Engineering	Mechanical System Design and Innovation Technology	i) BE/B.Tech in relevant branch
Electrical Engineering	Renewable Energy & Energy Management	i) BE/B.Tech in EE or EEE
Management and Humanities	Appropriate Technology & Entrepreneurship	i) BE/B.Tech in any branch

1. IMPORTANT DATES:

Last date of receipt of completed application Forms	23rd June 2017
Tentative date of publication of shortlisted candidates for written test/ Interview in NIT, AP Website	30th June'2017
Date of written test/Interview (Non-GATE candidates only)	22nd July 2017.
Tentative date of publication of selected candidate in NIT, AP Website	25th July 2017

2. IMPORTANT NOTES:

- 2.1 If a candidate is interested to apply for M.Tech Admission in more than one discipline/specialization (Department), then he/she has to submit separate applications with requisite fees. In no case, any candidate shall be considered more than one department with one application.
- 2.2 No TA/DA are admissible for written test/interview. The shortlisted students are advised to make their own arrangements for travelling and lodging for attending written test/interview in NIT, Arunachal Pradesh.



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3. FEE:

Candidate should enclose non-refundable demand draft of Rs.500/- (Rs.150/- in case of SC/ST/Women candidates) in favor of “**Director NIT Arunachal Pradesh**” payable at SBI, Nurjuli or may be transfer by NEFT to A/C No. 32043127339.

4. ELIGIBILITY:

The minimum qualification for admission to any M.Tech programme is B.Tech/MCA in the relevant discipline.

5. SELECTION:

The following procedures shall be adapted for selection of candidates for admission into M.Tech Programmes in NIT, Arunachal Pradesh.

- 5.1 Candidates with valid GATE score and satisfying requirement as specified in eligibility can be given admission to M.Tech programme on the basis of their GATE scores.
- 5.2 When sufficient numbers of GATE qualified candidates are not available for admission to any M.Tech Programme, students meeting the rest of the admission criteria can be admitted on merit basis of the examination/viva.
- 5.3 Candidates who have appeared in their final B.E/B.Tech Examinations, but results have not been declared may also be provisionally admitted to the M.Tech programme if otherwise found suitable. However, they shall have to submit the final grade sheet and provisional pass certificate latest by 15th September 2017.
- 5.4 The authority reserves the right to accept/reject any or all the applications or the entire selection process without assigning any reason thereof.

6 SUBMISSION OF COMPLETED APPLICATION FORM:

Interested Candidates can download the application form from the institute website: www.nitap.in and send a hard copy of the completed application duly signed by the candidate along with self-attested documents mentioned below by speed post.

To, **CCMT Center Incharge**, NIT, Arunachal Pradesh, Yupia, District: Papumpare, Arunachal Pradesh, Pin 791112. The envelope containing the application should be super scribed as “Application for M.Tech Programme in”.

7 DOCUMENTS TO BE ENCLOSED:

- [1] Valid GATE score card
- [2] Photo ID proof as per Govt. of India norms
- [3] Birth certificate issued by competent authority/Class X (High School) Board Certificate as proof of date of birth
- [4] Mark sheet of Class XII
- [5] Grade/Mark sheets of qualifying examination for all semesters



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- [6] Provisional certificate, if degree is completed
- [7] Certificate of category (SC/ST/OB), if applicable, as per Government of India, issued by the competent authority.
- [8] Migration certificate of last Institute/ University attended
- [9] Conduct Certificate from the Head of the institution last attended
- [10] Transfer certificate from the Head of the institution last attended
- [11] Course completion certificate from the Head of the University/Institute in case result is awaited
- [12] Non-refundable demand draft of Rs.500/- (Rs.150/- in case of SC/ST/Women candidates) in favor of “Director NIT Arunachal Pradesh” payable at SBI, Nurjuli or copy of NEFT to A/C No. 32043127339.

8 CONTACT PERSONS:

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Application Form for Admission in Various M.Tech programmes

1. Application for M.Tech programme in: ATEP/CSE/MCC/MSDIT/REEM/VLSI

ATEP: Appropriate Technology and Entrepreneurship Programme

CSE: Computer Science and Engineering

MCC: Mobile Communication and Computing

MSDIT: Mechanical System Design and Innovation Technology

REEM: Renewable Energy and Energy Management

VLSI: VLSI Design and Embedded System

Affix your
recent color
passport size
photograph

2. Name (in block letters):
3. Date of Birth:
4. Gender: M/F
5. Marital Status:
6. Father's Name:
7. Mother's Name:
8. Cast: GEN/OBC/SC/ST
9. Nationality:
10. Mobile No.:
11. Email id:
12. Address for Correspondence:
13. DD Amount, DD No. and Date:
14. Parent's Contact No: (a) Mobile/Telephone No:
(b) Email-id:



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15. Particulars of Academic Career Class – XII onwards (self-attested copies of all mark-sheets and certificates should be attached along with the application form):

Sl. No.	Name of Examination	Year of Passing	Institute/University	Division	% of marks (If CGPA convert to %)

16. Gate Qualification: Yes/ No.

Valid Score with Year:

Self-declaration Certificate

I am not pursuing any course of study at any other university/institute in India or abroad at present. Particulars given above are true and correct to the best of my knowledge and belief. If any information furnished by me, found false at any point of time during the tenure of course my registration will be treated as cancel. I shall be abided by the rules and regulations of the NIT Arunachal Pradesh.

Date:

Place:

(Full Signature of the Applicant)



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9 Annexure-I

9.1 Syllabus for M.Tech (Renewable Energy & Energy Management) written examination for Non-GATE students

Hydro Power Generation

Classification of Hydropower Plants, Overview of micro, mini and small hydro systems, Status of Hydropower Worldwide Advantages and Disadvantages of Hydropower, Selection of site for hydroelectric plant, Hydrological cycle, Essential elements of a hydroelectric power plant.

Wind power Generation

Description and performance of the horizontal-axis wind machines, description and performance of the vertical-axis wind machines. Site Selection– Wind climatology, terrain features, surface roughness etc.

HVDC

Analysis of simple rectifier circuits, required features of rectification circuits for HVDC transmission, Analysis of HVDC converter:-Different modes of converter operation, Output voltage waveforms and DC voltage in rectification,

Solar Power Generation

Solar PV technologies overview-stationary and concentrated PV ,inverter and control technologies, master slave inverter system design, standalone systems, grid connected systems.

Power System

Transmission and Distribution Systems: DC 2-wire and 3-wire systems, AC single phase, three phase and 4-wire systems, and comparison of copper efficiency. Distribution Systems: primary and secondary distribution systems, concentrated & uniformly distributed loads on distributors one and both ends, ring distribution, sub mains and tapered mains, voltage drop and power loss calculations, voltage regulators.

Power Electronics

AC to DC Converters : Operation and analysis of Single phase and multi-phase uncontrolled and controlled rectifiers with R, RL and back EMF load, effect of source inductance, freewheeling effect, power factor improvement methods for phase controlled rectifiers, filters.



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9.2 Syllabus for M.Tech (Mechanical System Design & Innovation Technology) written examination for Non-GATE students

Section 1: Applied Mechanics and Design

Engineering Mechanics: Free-body diagrams and equilibrium; trusses and frames; virtual work; kinematics and dynamics of particles and of rigid bodies in plane motion; impulse and momentum (linear and angular) and energy formulations, collisions.

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; 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 2: Fluid Mechanics and Thermal Sciences

Fluid Mechanics: Fluid properties; fluid statics, manometry, buoyancy, 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.

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, behaviour 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,



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basic psychrometric processes. Turbomachinery: Impulse and reaction principles, velocity diagrams, Pelton-wheel, Francis and Kaplan turbines.

Section 3: 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, design of jigs and fixtures.

Metrology and Inspection: Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly.

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

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

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.



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9.3 Syllabus for M.Tech (Computer Science & Engineering) written examination for Non-GATE students

Section 1: Digital Logic

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

Section 2: Computer Organization and Architecture

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

Section 3: Programming and Data Structures

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

Section 4: Algorithms

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

Section 5: Theory of Computation

Regular expressions and finite automata. Context-free grammars and push-down automata. Regular and context-free languages, pumping lemma. Turing machines and undecidability.

Section 6: Compiler Design

Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation.

Section 7: Operating System

Processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU scheduling. Memory management and virtual memory. File systems.

Section 8: 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.

Section 9: Computer Networks

Concept of layering. LAN technologies (Ethernet). Flow and error control techniques, switching. IPv4/IPv6, routers and routing algorithms (distance vector, link state). TCP/UDP and sockets, congestion control. Application layer protocols (DNS, SMTP, POP, FTP, HTTP). Basics of Wi-Fi. Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls.

9.4 Syllabus for M.Tech (VLSI Design and Embedded System) written examination for Non-GATE students



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Section 1: Engineering Mathematics

Linear Algebra: Vector space, basis, linear dependence and independence, matrix algebra, eigen values and eigen vectors, 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 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 2: Networks, Signals and Systems

Network solution 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. Continuous-time signals: Fourier series and Fourier transform representations, sampling theorem and applications; Discrete-time signals: discrete-time Fourier transform (DTFT), DFT, FFT, Z-transform, interpolation of discrete-time signals; LTI systems: definition and properties, causality, stability, impulse response, convolution, poles and zeros, parallel and cascade structure, frequency response, group delay, phase delay, digital filter design techniques.

Section 3: 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, photo diode and solar cell; Integrated circuit fabrication process: oxidation, diffusion, ion implantation, photolithography and twin-tub CMOS process.

Section 4: Analog 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, mid-frequency small signal analysis and frequency response; BJT and MOSFET amplifiers: multi-stage, differential, feedback, power and operational; Simple op-amp circuits; Active filters; Sinusoidal oscillators: criterion for oscillation, single-transistor and opamp configurations; Function generators, wave-shaping circuits and 555 timers; Voltage reference circuits; Power supplies: ripple removal and regulation.

Section 5: Digital Circuits



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Number systems; Combinatorial circuits: Boolean algebra, minimization of functions using Boolean identities and Karnaugh map, logic gates and their static CMOS implementations, arithmetic circuits, code converters, multiplexers, decoders and PLAs; Sequential circuits: latches and flip-flops, counters, shift-registers and finite state machines; Data converters: sample and hold circuits, ADCs and DACs; Semiconductor memories: ROM, SRAM, DRAM; 8-bit microprocessor (8085): architecture, programming, memory and I/O interfacing.

Section 6: 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.

Section 7: Communications

Random processes: autocorrelation and power spectral density, properties of white noise, filtering of random signals through LTI systems; Analog communications: amplitude modulation and demodulation, angle modulation and demodulation, spectra of AM and FM, superheterodyne receivers, circuits for analog communications; Information theory: entropy, mutual information and channel capacity theorem; Digital communications: PCM, DPCM, digital modulation schemes, amplitude, phase and frequency shift keying (ASK, PSK, FSK), QAM, MAP and ML 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.

Section 8: Electromagnetics

Electrostatics; Maxwell's equations: 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; Transmission lines: equations, characteristic impedance, impedance matching, impedance transformation, S-parameters, Smith chart; Waveguides: modes, boundary conditions, cut-off frequencies, dispersion relations; Antennas: antenna types, radiation pattern, gain and directivity, return loss, antenna arrays; Basics of radar; Light propagation in optical fibers.

9.5 Syllabus for M.Tech (Mobile Communication and Computing) written examination for Non-GATE students

9.5.1 For CSE candidate the syllabus of CSE (annexure 9.3) will be followed.

9.5.2 For ECE candidate the syllabus of VLSI Design and Embedded System (annexure 9.4) will be followed.