Guru Gobind Singh Indraprastha University
Sector-16-C, Dwarka , New Delhi- 110078

Admissions in M.Tech. Programmes in University Schools of Studies
(Academic Session 2024-25 : January Session)

Guru Gobind Singh Indraprastha University announces admissions in various regular M.Tech. Programmes in University Schools of Studies in the Academic Session 2024-25 as per details below:-

1. Programmes Offered

Sl. No.	Name of University School of Studies	Name of Programme	Code	Admission through National Level Test / Common Entrance Test / CUET (Priority-wise)
1	University School of Information, Communication and Technology	M.Tech. (CSE) & M.Tech. (IT)	139	1. GATE Score 2. CET 3. CUET
2		M.Tech. (ECE)	140	
3		M.Tech. (Robotics & Automation)	156	1. GATE Score 2. CET
4	University School of Biotechnology	M.Tech. (Biotechnology)	148	
5		M.Tech. (Food Processing Tech)	147	
6	University School of Chemical Technology	M.Tech. (Chemical Engg)	152	

Note: GATE Score and marks of CUET of the Session 2024-25 will be accepted for determination of respective merits.

2. IMPORTANT DATES

(i)	Commencement of submission of offline Application Forms in the University Campus	-	06.01.2025
(ii)	Last date of submission of Application Forms	-	20.01.2025
(iii)	Date of Common Entrance Test	-	25.01.2025
(iv)	Declaration of result of Common Entrance Test	-	27.01.2025

(v)	Conduct of First Round of Counselling by respective University School of Studies	-	29.01.2025
(vi)	Further round of counseling (subject to availability of vacant seats)	-	To be notified later
(vii)	Commencement of classes	-	10.02.2025

3. **Eligibility Criteria for Admission in M.Tech. progammes**

Eligibility Criteria for admission in above mentioned courses shall be, as mentioned in the ***"Admission Brochure PG Programmes : Academic Session 2024-25"*** at point 2.3 in **Chapter 2** ***"Eligibility Criteria and Admission Criteria"*** on page nos. 39, 40, 41 & 42 (copy enclosed). The complete Brochure is available on the University website www.ipu.ac.in

4. **Admission through the Merit of CUET**

The details of Domain Specific Subjects of CUET, wherever applicable, shall be, as mentioned in the ***"Admission Brochure PG Programmes : Academic Session 2024-25"*** in **Chapter 1.3** ***"Admissions Through the Merit of CUET"*** on page no. 31 (copy enclosed). The complete Brochure is available on the University website www.ipu.ac.in

5. **Application Form and Application Fee**

The candidates can download the Application Form from the University Website from 02.01.2025 onwards. The duly completed Application Form alongwith a Demand Draft of Rs.1500/- (Rupees One Thousand Five Hundred only) in the name of "Registrar, Guru Gobind Singh Indraprastha University" shall be submitted at the Facilitation Centre, Guru Gobind Singh Indraprastha University, Sector 16C, Dwarka, New Delhi – 110078 from 06.01.2025 to 20.01.2025.

6. **Subject for Common Entrance Test (wherever applicable)**

The details of Subjects of Entrance Tests shall be, as mentioned in the ***"Admission Brochure PG Programmes : Academic Session 2024-25"*** in **Chapter 3** ***"Details pertaining to GGSIPU CET (Common Entrance Tests)"*** on page no. 54, 55 and 56 (copy enclosed). The complete Brochure is available on the University website www.ipu.ac.in

NOTE:- Candidates are eligible to participate in Admission Process on the basis of GATE / CUET Score itself. However, candidates not having GATE / CUET Score are mandatorily required to take Common Entrance Test (CET) to be eligible to participate in Counselling Process.

7. **Other Important Notes**

(i) If admissions made in any M.Tech. programme are not adequate in the respective branch, then the branch may be suspended for the respective Academic Session.

(ii) In such a case i.e. where admissions are not adequate and are suspended as per (i) above, the students have the provision to transfer their admission to another branch subject to their eligibility and availability of seats.

(iii) In case, the vacant seats are not available in the desired M.Tech. programme, 100% of the fee shall be refunded.

8. **Annual Programme Fee**

Fee Structure for M.Tech. Programmes		
Particular	**Fee in Academic Session 2024-25 (Winter Session January 2025)**	**Fee in Academic Session 2025-26 (Winter Session January 2026)**
Tuition Fee University per annum	120000	132000
University Charges/ Shares per Annum	20000	20000
Alumni Contribution Fund (onetime payment)	2000	0
Examination Fee per student (per annum)	3000	3000
Innovation & Incubation Fee (per annum)	500	500
Development and Infrastructural Charges	10000	10000
Total	**155500**	**165500**

9. **Reservation of Seats / relaxation in qualifying marks**

Reservation of seats, relaxation in qualifying marks etc shall be as per the Admission Brochure 2024-25.

The candidates are requested to visit the University Website www.ipu.ac.in/ www.ipu.admissions.nic.in for regular updates.

Director In-charge (Academics)

Guru Gobind Singh Indraprastha University

"A State University established by the Govt. of NCT of Delhi"
Sector 16C, Dwarka, New Delhi-110078
Website: www.ipu.ac.in

M.Tech. Programme in University Schools of Studies (Academic Session 2024-25: January Session)

Self Attested Photograph of the Student

S.No.	Particulars	To be filled by the Candidate		
1.	Programme applied	M.Tech _____ CET Code _____		
2.	Admission Through (please tick on the relevant box) Admission shall take place in order of priority of NLT/CET/CUET	GATE	CET	CUET
3.	Name of the Candidate			
4.	Father's Name			
5.	Mother's Name			
6.	Category (UR/SC/ST/EWS/OBC)			
7.	Sub Category (DEF/PWD/MINORITY/KM) ,if any			
8.	Region (To be tick by the candidate on the basis his/her of last qualifying degree)	Delhi	Outside Delhi	
9.	Aadhar Number of the Candidate			
10.	Date of Birth (as per 10th class certificate)			
11.	Contact No.(M)			
12.	Residential address			

S.No.	Particulars			To be filled by the Candidate	
13.	Details of Educational Qualification Remarks : Candidates are advised to refer PG Admission Brochure 2024-25 for detailed information regarding Eligibility Criteria, Admission Criteria and other information.				
	Sl.No.	Name of degree	Name of Institute/College	Name of University	Percentage of marks/CGPA
14.	Details of Demand Draft (Rs.1500/- non-refundable)			DD No_____/DD Date_____ Bank Name_____ Amount of Demand Draft_____	
15.	Signature of Applicant with date				

Note: please attach GATE/CUET Score card 2024 whichever applicable.

6. No employed / in-service candidate shall be allowed to join a course unless he/she has been relieved/sanctioned study leave from his/her employer.
7. Candidates who are already admitted to any Postgraduate Medical Degree/Diploma Course in any University/Institution as on the date of counselling will not be eligible for admission. Candidate will be required to give an undertaking/ Declaration in this respect at the time of counselling / admission.
8. Candidate, who has passed a Postgraduate Degree course, will not be given admission to Diploma Course in the same subject.
9. These conditions are as a supplement to the conditions of Section 7.2.
10. In case of any dispute, the decision of the Admission Committee shall be final. However, an appeal could be made to the Vice-Chancellor, Guru Gobind Singh Indraprastha University against such a decision. Rule/ Stipulation of MCC, DGHS shall govern the admissions in PGMC.

2.2.2 Detailed Eligibility Criteria for Super Speciality Medical Courses (SSMC)

1. Admission on the Basis of National Eligibility cum Entrance Test – 2024 (Super Speciality) (NEET SS).

2. For SSMC (DM /M.Ch.) programmes the applicants should apply for NEET – SSMC and the admissions are also to be carried out by the Govt. Of India / MCI / DGHS-MHFW. The candidates need not apply to the University.

2.3 Master of Technology (M.Tech.)

S.No.	Name of Programme	CET Code	Admission Through	ELIGIBILITY CRITERIA & ADMISSION CRITERIA
1.	M.Tech. CET for the following programmes of studies 1. M.Tech. (Computer Science & Engineering) (Regular) 2. M.Tech. (Information Technology) (Regular)	139	1.GATE Score 2. CET 3.CUET #	**Eligibility Criteria:** Minimum 60% or equivalent in the qualifying examination as under:- 1. B.Tech. / B.E. in Computer Science/Computer Science & Engineering / Computer Engineering / Information Technology /Electronics and Communication Engineering /Electronics & Instrumentation Engineering / Instrumentation & Control Engineering/ Electrical Engineering/Electrical & Electronics Engineering or equivalent. 2. Grad. IETE/AMIE (ECE/CSE/IT/EE). 3. M.Sc. (IT/ Electronics/ Computer Science/Informatics/ Information Science & Technology/ Physics/ Mathematics/ Statistics/ Operation Research/Applied Physics) 4. MCA or MCA (SE) **Admissions Criteria:** 1. Admission would be first given to candidates/ applicants on the basis of merit based on valid GATE score in Computer Science and Information Technology for the Academic Session 2024-25. 2. If seats remain vacant after the admission of the GATE qualified candidates, the seat would be offered to CET qualified candidates based on merit/ rank of CET. The vacant seats after exhausting the merit list of CET will be filled through the merit list of CUET#
2.	**M.Tech.** 1. M.Tech (Electronics & Communication Engineering) (Regular)	140	1.GATE Score 2. CET 3.CUET#	**Eligibility Criteria:** Minimum 60% or equivalent in the qualifying examination as under:- 1. B.Tech./B.E. in Electronics and Communication Engineering/ Electronics & Instrumentation Engineering/Instrumentation & Control Engineering/ Electrical Engineering/Electrical & Electronics Engineering Computer Science/Computer Science & Engineering/Computer

S.No.	Name of Programme	CET Code	Admission Through	ELIGIBILITY CRITERIA & ADMISSION CRITERIA
	2. M.Tech. (VLSI Design) (Regular)			Engineering/Information Technology or equivalent. 2. Grad. IETE/AMIE (ECE/CSE/IT/EE). 3. M.Sc. (IT/ Electronics/ Computer Science/Informatics/ Information Science & Technology/ Physics/ Mathematics/ Statistics/ Operation Research/Applied Physics). **Admissions Criteria:** 1. Admission would be first given to candidates/ applicants on the basis of merit based on valid GATE score in Electronics and Communication for the Academic Session 2024-25. 2. If seats remain vacant after the admission of the GATE qualified candidates, the seat would be offered to CET qualified candidates based on merit/ rank of CET. The vacant seats after exhausting the merit list of CET will be filled through the merit list of CUET #
3.	M.Tech (Artificial Intelligence & Data Science) (Regular)	141	1. GATE Score 2 On merit of qualifying Exam	**Eligibility Criteria:** Minimum 60% or equivalent in the qualifying examination as under:- 1. B.Tech. / B.E. in Computer Science/Computer Science & Engineering / Computer Engineering / Information Technology /Electronics and Communication Engineering /Electronics & Instrumentation Engineering / Instrumentation & Control Engineering/ Electrical Engineering/Electrical & Electronics Engineering or equivalent. 2. Grad. IETE/AMIE (ECE/CSE/IT/EE). 3. M.Sc. (IT/ Electronics/ Computer Science/Informatics/ Information Science & Technology/ Physics/ Mathematics/ Statistics/ Operation Research/Applied Physics) 4. MCA or MCA (SE) **Admissions Criteria:** 1. Admission would be first given to candidates/ applicants on the basis of merit based on valid GATE score in Computer Science and Information Technology for the Academic Session 2024-25. 2. If seats remain vacant after the admission of the GATE qualified candidates, the seat would be offered to Non-GATE Candidates shortlisted on the basis of a merit list prepared by the University based on the average percentage in the qualifying exam.
4.	M.Tech (Food Processing Technology)	147	1 GATE Score 2 CET	**Eligibility Condition:** First Class BE/ B.Tech (Food Technology/ Chemical Technology/ Biochemical Engg./ Biotechnology) equivalent First class Degree **OR** MS/M.SC.(Chemistry/ Biochemistry/ Food Science/ Microbiology/ Biotechnology) or equivalent first class degree. **Admission Criteria:** 1. Admission would be first given to candidates/applicants on the basis of merit based on valid GATE score. 2. If seat remain vacant after the admission of the GATE qualified candidates, the seat would be offered to CET qualified candidates based on merit/rank of CET.
5.	M.Tech. (Biotechnology) (Regular)	148	1. GATE Score 2. CET	**Eligibility Criteria:** Minimum 60% or equivalent in the qualifying examinations as: 1. BE/B.Tech (Biotechnology / Chemical Engineering/ Biochemical Engineering/ Food Technology or equivalent/or B.Pharma/MBBS

S.No.	Name of Programme	CET Code	Admission Through	ELIGIBILITY CRITERIA & ADMISSION CRITERIA
				OR 2. M.Sc. (Biotechnology / Biochemistry / Microbiology / Biosciences / Genetics / Life-Sciences) or equivalent. **Admissions Criteria:** 1. GATE qualified in any of the following: i. BT (Biotechnology)/BM (Biomedical Engineering)/AG (Agricultural Engineering)/CH (Chemical Engineering)/XL (Life Sciences)/XE (Engineering Sciences) with a valid and qualified score card of GATE valid for the Academic Session 2024-25. and ii.CET Qualified (for Non-GATE) candidates in CET Code-148 **Admission Process:** 1. Admission would be first given to candidates/applicants on the basis of merit based on valid GATE score. 2. If seat remain vacant after the admission of the GATE qualified candidates, the seat would be offered to CET qualified candidates based on merit/rank of CET.
6.	M.Tech. (Nano Technology) (Regular)	149	NLT	**Eligibility Criteria:** Minimum 55% or equivalent in the qualifying examinations: M.Sc.(Physics / Applied Physics / Electronics / Mathematics / Chemistry / Biotechnology / Biosciences/ Life Sciences / Material Science); B.E./B.Tech (Electronics / Computer Science / Electrical / Mechanical / Engineering Physics / Metallurgy / Material Engineering / Information Technology / Biotechnology / Biomedical / Chemical Engineering or Technology); or equivalentand Mathematics as one of the subjects at 10+2 or undergraduate level is a must. **Admissions Criteria:** 1. GATE qualified applicants will get first preference –the candidate should have qualified in the relevant discipline with a valid score card of GATE. 2. Non-GATE Candidates will be shortlisted on the basis of a merit list prepared by the University based on the average percentage in the qualifying exam.
7.	M.Tech (Industrial Bio Technology)	151	NLT	**Eligibility Criteria:** Candidates are required to have a B.Tech (Biotechnology/ Chemical Engg/ Biochemical Engg/ or related field), B. Pharma or MSc Biotechnology/Biochemistry or related field of life and natural sciences) with a minimum sciences) with a minimum of 60% (General, EWS & OBC category) or 55% (SC, ST & PwD) marks. **Admission Criteria:** Candidates with qualifying GAT-B score card valid for the Academic Session 2024-25. Admission to the M.Tech in Indutrial Biotechnology will be as per DBT guidelines and the students will be selected based on GAT-B scores. For further details please refer to : https://rcb.res.in/DBTPG/
8.	M.Tech. (Chemical Engineering) (Regular)	152	1. NLT. 2. CET	**Eligibility Criteria:** Minimum 60% or equivalent in the qualifying examinations as under: 1. B.Tech./B.E. in Chemical Engineering or equivalent. **Admissions Criteria:** 1. GATE qualified in the discipline specified in the eligibility conditions with a valid score card of GATE valid for the Academic Session 2024-25. 2. CET qualified (for Non-GATE) candidates in CET code 152.

S.No.	Name of Programme	CET Code	Admission Through	ELIGIBILITY CRITERIA & ADMISSION CRITERIA
9.	M.Tech. (Robotics and Automation) (Regular)	156	1.GATE 2. CET	**Eligibility Criteria:** Minimum 60% or equivalent in any one of the following qualifying examination: 1. B.Tech./B.E. in Computer Science/Computer Engineering / Computer Science and Engineering/Information Technology or equivalent. 2. B.Tech./B.E. in instrumentation and Control Engineering / Electronics Engineering/Electronics and Communication Engineering / Electrical Engineering/Electrical and Electronics Engineering or equivalent. 3. B.Tech./B.E. in Mechanical Engineering / Mechanical and Automation Engineering/Industrial Engineering/Production Engineering/Automobile Engineering / Mechatronics / Manufacturing Engineering or equivalent. 4. B.Tech./B.E. in Aerospace Engineering or equivalent. **Admissions Criteria:** 1. Admission would be first given to candidates/ applicants on the basis of merit based on valid GATE score in discipline specified in the eligibility conditions for the Academic Session 2024-25. 2. If seats remain vacant after the admission of the GATE qualified candidates, the seat would be offered to CET qualified candidates in CET Code 156
10.	M.Tech. (Computer Science & Engg.) (Weekend)	182	On merit of qualifying Exam	**Eligibility Criteria:** 1. B.E./B.Tech/AMIE or equivalent degree in CSE/IT/Computer Engineering/Software Engineering/Computer System with 60% marks (cumulative) **OR** 2. M.Sc. (Computer Science/Informatics) or equivalent with 60% marks (Cumulative) **OR** 3. MCA/MCA(Software Engineering) or equivalentwith 60% marks (Cumulative) **Note:** Meaning of equivalent degree shall be considered according to AICTE Gazette notification no. ADVT.-III/4/Exty./40/2317(162) published on 28th April,2017 for Major Disciplines of Engineering / Technology i.e. (CSE/IT). **Admission Criteria:** There shall be no Entrance Test for this programmes / CET. The admission shall be made on the basis of marks / percentage of the qualifying degree. See pt. 3 of the note below for details.
11.	M.Tech. (Electronics & Communications Engg.) (Weekend)	183	On merit of qualifying Exam	**Eligibility Criteria:** 1. B.E./B.Tech/AMIE or equivalent degree in Electronics & Communication Engineering/EEE/Electronics Engineering/Instrumentation & Control Engineering with 60% marks (cumulative) , **OR** 2. M.Sc. (Electronics/Physics-with specialization in Electronics or Solid State)with 60% marks (Cumulative) **Note:** Meaning of equivalent degree shall be considered according to AICTE Gazette notification no. ADVT.-III/4/Exty./40/2317(162) published on 28th April,2017 for Major Disciplines of Engineering / Technology i.e. (ECE) **Admission Criteria:** There shall be no Entrance Test for this programmes / CET. The admission shall be made on the basis of marks / percentage of the qualifying degree. See pt. 3 of the note below for details.

S.No	Programme	Eligibility/Admission Criteria for Academic Session 2024-25	Domain Specific Subjects/ Optional Language /General Test Under CUET UG 2024
		2. The applicant must have obtained at least 50% marks (45% marks in case of candidates belonging to reserved category) in the qualifying examination. **Note:** 1. In case any Board/University awards grades instead of marks, the calculation of equivalent marks would be based on the procedure prescribed by the Board /University awarding the qualifying degree. Document regarding the conversion must be provided by the candidate itself. 2. In case a University does not have any scheme for converting CGPA into equivalent marks, the equivalence would be established by dividing obtained CGPA with the maximum possible CGPA and multiplying the resultant with 100.	
10.	**M.Tech (CSG)**	**Eligibility Criteria:** Minimum 60% or equivalent in the qualifying examination as under:- 1. B.Tech. / B.E. in Computer Science/Computer Science & Engineering / Computer Engineering / Information Technology /Electronics and Communication Engineering /Electronics & Instrumentation Engineering / Instrumentation & Control Engineering/ Electrical Engineering/Electrical & Electronics Engineering or equivalent. 2. Grad. IETE/AMIE (ECE/CSE/IT/EE). 3. M.Sc. (IT/ Electronics/ Computer Science/Informatics/ Information Science & Technology/ Physics/ Mathematics/ Statistics/ Operation Research/Applied Physics) 4. MCA or MCA (SE)	Data Science, Artificial Intelligence, Cyber Security MTQP04
11.	**M.Tech (EG)**	**Eligibility Criteria:** Minimum 60% or equivalent in the qualifying examination as under:- 1. B.Tech./B.E. in Electronics and Communication Engineering/ Electronics & Instrumentation Engineering/Instrumentation & Control Engineering/ Electrical Engineering/Electrical & Electronics Engineering Computer Science/Computer Science & Engineering/Computer Engineering/Information Technology or equivalent. 2. Grad. IETE/AMIE (ECE/CSE/IT/EE). 3. M.Sc. (IT/ Electronics/ Computer Science/Informatics/ Information Science & Technology/ Physics/ Mathematics/ Statistics/ Operation Research/Applied Physics).	Electronics, Communication & Information Engg, MTQP05

CHAPTER - 3: Details pertaining to GGSIPU CET (Common Entrance Tests)

3.1 Master of Technology (M.Tech.) Common Entrance Test

S. No.	Name of Programme	CET Code	Subjects of Entrance Test*
1.	MTECH (CSE)	139	As per the Syllabus of GATE -Computer Science & Information Technology
2.	MTECH (ECE)	140	As per the Syllabus of GATE -Electronics & Communication Engineering
3.	MTECH (FPT)	147	See Section 3.2
4.	MTECH (BT)	148	See Section 3.2
5.	MTECH (CE)	152	As per Syllabus of GATE of Chemical Engineering
6.	MTECH (RA)	156	See Section 3.2.1

3.2 Syllabus for CET for M.Tech. (Biotechnology) CET Code-148 & M.Tech (FPT)

Biochemistry and Enzymology: Organization of life; Importance of water; Structure and function of biomolecules: Amino acids, Carbohydrates, Lipids, Proteins and Nucleic acids; Protein structure, folding and function,Metabolic pathways and their regulation: glycolysis, TCA cycle (Krebs' cycle), glycolysis, electron transport chain; gluconeogenesis, glycogen and fatty acid metabolism, Enzyme classification, kinetics including its regulation and inhibition, active sites, Factors influencing enzyme activity, Enzyme assays, cofactors and coenzymes, immobilization of enzymes, enzyme engineering.

Microbiology: Size, shape and arrangement of bacterial cells, Structure of the cell and cell wallNutritional requirements for growth, nutrients uptake by microbial cells, Culture media, Isolation of pure cultures, cultivation and preservation of cultures, Microbial growth Kinetics, Physical and chemical methods of microbial control, Action of microbial control agents and evaluation of effectiveness of antimicrobial agents, Metabolic diversity and pathways of energy use, unique pathways of microbial fermentation and photosynthesis, Microbial diseases and their control, Mechanism of microbial pathogenicity, action of antibiotics and other antimicrobial drugs, Superbugs and opportunistic infections, Biosecurity, Microbiome.

Cell Biology: Cell structure and organelles; Biological membranes; Transport across membranes; Signal transduction; Hormones and neurotransmitters.Prokaryotic and eukaryotic cell structure; Cell cycle, cell division and cell growth control; Cell-Cell communication, Cell signaling and signal transduction.

Molecular Biology and Genetics: Molecular structure of genes and chromosomes; Mutations and mutagenesis; Eukaryotic genome organization and Complexity; Nucleic acid replication, transcription, translation in prokaryotes and eukaryotes; RNA processing, regulation of gene expression, Mendelian inheritance; organization of genome, sex determination and sex-linked characteristics, cytoplasmic inheritance, linkage, recombination and mapping of genes in eukaryotes, population genetics. Gene interaction; Complementation; Linkage, recombination and chromosome mapping; Extra chromosomal inheritance; Microbial genetics (plasmids, transformation, transduction, conjugation); Epigenetics.

Immunology: Active and passive immunity; Innate, humoral and cell mediated immunity; Antigen; Antibody structure and function; Molecular basis of antibody diversity; Synthesis of antibody and secretion; Antigen-antibody reaction; Complement; Primary and secondary lymphoid organ; B and T cells and macrophages; Major histocompatibility complex (MHC); T cell receptor; Antigen processing and presentation; Polyclonal and monoclonal antibody; Regulation of immune response; Immune tolerance; Hypersensitivity; Autoimmunity; Graft versus host reaction. Immunological techniques: Immunodiffusion, immunoelectrophoresis, RIA and ELISA, Flow cytometry.

Bioinformatics: Major bioinformatic resources and search tools; Sequence and structure databases; Sequence analysis (biomolecular sequence file formats, scoring matrices, sequence alignment, phylogeny).

Recombinant DNA Technology: Restriction and modification enzymes; Vectors-plasmid, bacteriophage and other viral vectors, cosmids, Ti plasmid, yeast artificial chromosome; mammalian and plant expression vectors; cDNA and genomic DNA library; Gene isolation, cloning and expression; Transposons and gene targeting; DNA labeling; DNA fingerprinting; Southern and northern blotting; In-situ hybridization; RAPD, RFLP, AFLP, SSRs, SNPs; Gene transfer techniques; Microarray, PCR, site directed mutagenesis, DNA sequencing; molecular probes, Gene therapy.

Plant and Animal Biotechnology: Totipotency; Regeneration of plants; Tissue culture and Cell suspension culture system; Production of secondary metabolites by plant suspension cultures; transgenic plants; Plant products of industrial importance; Animal cell culture, media composition and growth conditions; Animal cell and tissue preservation; Anchorage and non-anchorage dependent cell culture; Hybridoma technology; Stem cell technology; Animal cloning; Transgenic plants and animals.

Bioprocess Engineering and Process Biotechnology: Upstream production and downstream; Bioprocess design and development from lab to industrial scale; Microbial, animal and plant cell culture platforms, Chemical engineering principles applied to biological system, Principle of reactor design, mass and heat transfer; Media formulation and optimization; Kinetics of microbial growth, substrate utilization and product formation; Sterilization of air and media; Batch, fed-batch and continuous processes; Various types of microbial and enzyme reactors.

Biosafety, Bioethical and Intellectual Property Right Issues in Biotechnology: Biosafety- Concept, Concerns and Regulations; Safety considerations in Laboratories; Ethical issues and conflicts in biotechnology; Kinds of IPR; Protection of traditional knowledge and Genetic Resources; Patents in Biotechnology.

Techniques in Biotechnology: Colorimetry and Spectroscopy, Flow cytometry, Microscopy, Centrifugation, Chromatography, Electrophoresis, X-ray crystallography, Nuclear Magnetic Resonance (NMR) spectra, Magnetic Resonance Imaging (MRI), lasers in biology and medicine, Mass spectrometry.

Environmental Biotechnology: Sewage and waste water treatment, Solid waste management, Biodegradation of xenobiotic compounds, Bioremediation and biorestoration, Natural resource recovery, Environmental biotechnology in agriculture, Biofuel, Environmental genetics.

Biostatistic: Measures of central tendency and dispersal; probability distributions (Binomial,Poisson and normal); Sampling distribution; Difference between parametric andnon-parametric statistics; Confidence Interval; Errors; Levels of significance; Regression and Correlation; t-test; Analysis of variance; Chi squared test; Basic introduction to multivariate statistics, etc.

3.2.1 Syllabus for CET for M.Tech. (Robotics & Automation) CET Code-156

ENGINEERING MATHEMATICS

Mathematical Logic: Propositional Logic, First Order Logic.

Complex Variables: Analytic functions, Cauchy's integral theorem and integral formula, Taylor's and Laurent' series. Residue theorem, solution integrals.

Differential equations: First order equation (linear and non-linear), Higher order linear differential equations with constant coefficients, Methods of variation of parameters, Cauchy's and Euler's equations. Initial and boundary value problems, Partial Differential Equations and variable separable method.

Probability and Statistics:-Sampling theorems, Conditional probability, Mean, Median, mode and standard deviation, Random variables, Discrete and continuous distributions, Poisson, Normal and Binomial distribution, Correlation and regression analysis.
Set Theory & Algebra:- Sets: Relations; Functions; Groups; Partial Orders; Lattice; Boolean Algebra.
Combinatorics: Permutations; Combinations; Counting; Summation; generating functions; recurrence relations, asymptotics.
Graph Theory: Connectivity: spanning trees; Cut vertices & edges; covering; matching; independent sets; Colouring; Planarity; Isomorphism.
Linear Algebra:- Algebra of matrices, determinants, systems of linear equations, Eigen values and Eigen vectors.
Numerical Methods:- LU decomposition for systems of linear equations; numerical solutions of non-linear algebraic equations by Secant, Bisection and Newton- Raphson Methods; Numerical integration by trapezoidal and Simpson's rules.
Calculus:- Limit, Continuity & differentiability, Mean value Theorems, Theorems of Integral calculus, evaluation of definite & improper integrals, Partial derivatives, Total derivatives, maxima & minima,
Multiple integrals, Fourier series. Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems.
ENGINEERING SUBJECTS
Network theorems: Superposition, Thevenin and Norton's maximum power transfer.
Electric Circuits and Fields: Network graph, KCL, KVL, node and mesh analysis, transient response of dc and ac networks.
Programming in C, Functions.
Electrical Machines: Single phase transformer- equivalent circuit, phasor diagram , tests, regulations and efficiency, DC machines- types, windings, generator characteristics, armature reaction and commutation, starting and speed control of motors; three phase induction motors- principles, types, performances characteristics, starting and speed control; single phase induction motors; synchronous machines- performances, regulation and parallel operation of generators, motor starting, characteristics and application; servo and stepper motors.
Electronic Devices: Generation and recombination of carriers. P-n junction diode, Zener diode, BJT, JFET, MOS capacitor, MOSFET, LED, p-I-n and available photo diode, Basics of LASERs. Device technology.
Basics of Measurement Systems:- Static and dynamic characteristics of Measurement Systems. Error and uncertainty, analysis, statistical analysis of data and curve fitting.
Transducers, Mechanical Measurement and Industrial Instrumentation: Resistive, Capacitive, Inductive and piezoelectric transducers and their signal conditioning. Measurement of displacement, velocity and acceleration (translational and rotational), force, torque, vibration and shock. Measurement of pressure, flow, temperature and liquid level. Measurement of pH, conductivity, viscosity and humidity.
Control System:- Principles of feedback, transfer function; block diagrams; steady- state errors, Basic control system components; block diagrammatic description, reduction of block diagrams. Open loop and closed loop (feedback) systems and stability analysis of these systems.
Applied Mechanics:- Free body diagrams and equilibrium, trusses and frames; virtual work; kinematics and dynamics of particles and of rigid bodies in plane motion, including impulse and momentum (linear and angular) and energy formulations, impact, strength of materials- stress, strain and their relationship, Mohr's circle, deflection of beams, bending and shear stress, Euler's theory of columns.
Theory of Machines: Acceleration of a point on a link, Acceleration diagram, Coroilis component of acceleration, Crank and slotted lever mechanism, Klien's construction for Slider Crank mechanism and Four Bar mechanism, Analytical method for slider crank mechanism, Mechanisms with Lower Pairs Pantograph, Exact straight line motion mechanisms- Peaucellier's Hart and Scott Russell mechanism, Approximate straight line motion mechanisms- Peaucellier's, Hart and Scott Rusell mechanism. Approximate straight line motion mechanism- Grass-Hopper, Watt and Tchebicheff mechanism, Analysis of Hooke's joint, Davis and Ackermann steering gear mechanisms