

M.Tech. Signal Processing & Communications (SP&C)

An Industry–Academia Collaborative Programme with AVANTEL LIMITED

This innovative programme bridges the gap between academia and industry through **industry-aligned curriculum, hands-on laboratory training, real-world use cases, internship opportunities, and career pathways** in Signal processing and Communication **Engineering**.

M.Tech. Signal Processing & Communications (SP&C) programme offered in collaboration with **Avantel Limited**, Hyderabad a leading technology company specializing in **Electronics, Wireless & Satellite Communication Systems** serving the **Defence, Aerospace and Communication** sectors.

Programme Highlights:

- Industry-Oriented Curriculum jointly designed by **JNTUK & Avantel Limited, Hyderabad**.
 - Industry-integrated learning
 - Real-world project experience
 - Direct interaction with Avantel experts
 - Enhanced employability through practical training
 - Strong foundation in advanced communication systems
- **Centre of Excellence in Signal Processing and Communications** at JNTUK
- One-Year Industry Internship (III & IV Semesters) at Avantel Limited– Hyderabad / Visakhapatnam / Other Operational Locations
- Stipend of **₹25,000 per month during Internship**
- Expert Mentoring by Industry Professionals
- Advanced Training in Signal Processing & Communication Technologies
- Hands-on Industry Exposure & Real-Time Projects
- **Opportunity for Full-Time Employment with Avantel Limited (CTC: ₹9.00 LPA)** subject to performance and company policy

PROGRAMME DETAILS:

Programme	M.Tech. Signal Processing & Communications (SP&C)
Institution	University College of Engineering Kakinada, JNTU Kakinada
Industry Partner	Avantel Limited, Hyderabad
Duration	2 Years / 4 Semesters
Programme Type	Industry–Academia Collaborative Programme
Specialization	Signal Processing & Communications
Internship Stipend	₹25,000 per Month
Full – Time Employment Opportunity	₹9.00 Lakh Annual CTC
Industry Locations	Hyderabad/ Visakhapatnam / Other Locations as required by Avantel
Internship	III & IV Semester
Tuition Fee	₹75000 per Year

Career Pathway

M.Tech Admission → Industry-Oriented Learning → One-Year Internship → ₹25,000/Month Stipend → Opportunity for Full-Time Employment (₹9 LPA CTC)

Eligibility:

Candidates should possess:

1. B.Tech./B.E. in Electronics & Communication Engineering (ECE) or equivalent qualification awarded by any UGC-recognized University.

Selection Process:

1. Written Exam: 60% weightage will be given to the performance of written examination.
2. Interview: 40% weightage will be given to the performance in interview.

Syllabus:

EC	Electronics and Communication Engineering
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 Stokes' theorems.	
Complex Analysis: Analytic functions, Cauchy's integral theorem, Cauchy's integral formula, sequences, series, convergence tests, Taylor and Laurent series, residue theorem.	
Probability and Statistics: Mean, median, mode, standard deviation, combinatorial probability, probability distributions, binomial distribution, Poisson distribution, exponential distribution, normal distribution, joint and conditional probability.	
Section 2: Networks, Signals and Systems	
Circuit Analysis: Node and mesh analysis, superposition, Thevenin's theorem, Norton's theorem, reciprocity. Sinusoidal steady state analysis: phasors, complex power, maximum power transfer. Time and frequency domain analysis of linear circuits: RL, RC and RLC circuits, solution of network equations using Laplace transform.	
Linear 2-port network parameters, wye-delta transformation.	
Continuous-time Signals: Fourier series and Fourier transform, sampling theorem and applications.	
Discrete-time Signals: DTFT, DFT, z-transform, discrete-time processing of continuous-time signals. LTI systems: definition and properties, causality, stability, impulse response, convolution, poles and zeroes, frequency response, group delay, phase delay.	
Section 3: Electronic Devices	
Energy bands in intrinsic and extrinsic semiconductors, equilibrium carrier concentration, direct and indirect band-gap semiconductors.	
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.	
Section 4: Analog Circuits	
Diode Circuits: Clipping, clamping and rectifiers.	

BJT and MOSFET Amplifiers: Biasing, AC coupling, small signal analysis, frequency response, Current mirrors and differential amplifiers.

Op-amp Circuits: Amplifiers, summers, differentiators, integrators, active filters, Schmitt triggers and oscillators.

Section 5: Digital Circuits

Number Representations: Binary, integer and floating-point- numbers. 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.

Sequential Circuits: Latches and flip-flops, counters, shift-registers, finite state machines, propagation delay, setup and hold time, critical path delay.

Data Converters: Sample and hold circuits, ADCs and DACs.

Semiconductor Memories: ROM, SRAM, DRAM.

Computer Organization: Machine instructions and addressing modes, ALU, data-path and control unit, instruction pipelining.

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: Auto correlation 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, super heterodyne receivers.

Information Theory: Entropy, mutual information and channel capacity theorem.

Digital Communications: PCM, DPCM, digital modulation schemes (ASK, PSK, FSK, QAM), bandwidth, inter-symbol interference, MAP, ML detection, matched filter receiver, SNR and BER. Fundamentals of error correction, Hamming codes, CRC.

Section 8: Electromagnetics

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. Rectangular and circular waveguides, light propagation in optical fibers, dipole and monopole antennas, linear antenna arrays

M.Tech. Internet of Things (IoT)

JNTUK – EFFTRONICS INDUSTRY–ACADEMIA COLLABORATIVE PROGRAMME

A 2-Year Industry-Integrated M.Tech. Programme

M.Tech. Internet of Things (IoT) programme offered under the **JNTUK–Efftronics Systems Pvt. Ltd. Industry–Academia Collaborative Initiative.**

This innovative programme bridges the gap between academia and industry through **industry-aligned curriculum, hands-on laboratory training, real-world use cases, internship opportunities, and career pathways in IoT, Embedded Systems, and Digital Engineering.**

Programme Highlights:

- Industry-Aligned Curriculum jointly developed by **JNTUK & Efftronics Systems Pvt. Ltd, Mangalagiri, A.P**
 - Industry-Integrated Learning
 - Modern IoT Laboratories
 - Training by Industry Experts
 - Real-Time Industrial Projects
 - Internship with Stipend
 - Enhanced Employability
 - Career Opportunities in Emerging Technologies
- **Centre of Excellence in Internet of Things** at JNTUK
- Dedicated **IoT Laboratories** in ECE & EEE Departments
- **Efftronics Chair Professor** and Industry Mentoring
- Guest Lectures by Industry Experts
- Hands-on Laboratory Training & Use-Case-Based Learning
- Faculty & Student Industry Training Programmes
- **Second-Year Industry Internship** at Efftronics Systems Pvt.Ltd, with a stipend of **₹15,000 per Month during Internship**
- Industry-Oriented M.Tech. Thesis
- Joint Research, Publications & Patent Opportunities
- **Employment Opportunity with Efftronics Systems, Pvt.Ltd** for eligible students
- **Compensation up to ₹10 LPA** based on capability and performance

Programme Details:

Programme	M.Tech. Internet of Things (IoT)
Institution	University College of Engineering Kakinada, JNTU Kakinada
Industry Partner	Efftronics Systems Pvt. Ltd, Vijayawada.
Duration	2 Years
Programme Type	Industry–Academia Collaborative
Internship	Second Year
Internship Stipend	₹15,000 per Month
Employment Opportunity	For Eligible & Successful Students
Compensation	Up to ₹10 LPA
Focus Areas	IoT, Embedded Systems & Digital Engineering
Tuition Fee	₹75,000 per Year

Career Pathway:

M.Tech. Admission → Industry-Oriented Learning → Industry Internship → ₹15,000/Month Stipend → Employment Opportunity with Efftronics (Up to ₹10 LPA)

Eligibility

2. Candidates with **B.Tech./B.E.** awarded by any UGC-recognized University in:

- Electronics & Communication Engineering (ECE)
- Electrical & Electronics Engineering (EEE)
- Computer Science & Engineering (CSE)
- Allied Specializations

Selection Process:

1. Written Exam: 60% weightage will be given to the performance of written examination.
2. Interview: 40% weightage will be given to the performance in interview.

Syllabus: Will be uploaded

M. TECH PROGRAM IN SUSTAINABILITY ENGINEERING (ENERGY TECHNOLOGIES).

Industry Collaborated M.Tech program offered by the Department of Electrical and Electronics Engineering

M. Tech Program in Sustainability Engineering (Energy Technologies) programme offered in collaboration with Greenko School of Sustainability (GSS) at IIT Hyderabad and Greenko Group is a leading clean energy company that develops utility-scale wind, solar, hydro, and pumped-storage projects to accelerate decarbonization and provide dispatchable renewable power.

PROGRAM HIGHLIGHTS:

- **Expert Mentorship & Practical Exposure:** Personalized guidance and mentorship from senior most JNTUK faculty and experienced Greenko working professionals with practical exposure through internships, projects, workshops, and industry interactions. The curriculum aligned with real-world sustainable energy and industrial requirements.
- **Multidisciplinary Approach:** Covers extensive areas of sustainable engineering, focusing more on energy technologies.
- **Research Opportunities:** Focuses on cutting-edge technologies and innovation in sustainability.
- **Advanced Research & Laboratory Facilities:** Access state-of-the-art laboratories and modern research facilities for hands-on learning and innovation.
- **Monthly Stipend of ₹10,000:** TEN selected students will receive a stipend of ₹10,000 per month throughout the programme.
- **Career-Focused Opportunities:** Benefit from 100% placement assistance and opportunities for direct employment based on performance.

Programme Details:

Programme	M.Tech. Sustainability Engineering (Energy Technologies)
Institution	University College of Engineering Kakinada, JNTU Kakinada
Industry Partner	Greenko School of Sustainability (GSS) , Greenko Group, Hyderabad.
Duration	2 Years
Programme Type	Industry–Academia Collaborative
Stipend	₹10,000 per Month during the entire program for ten selected students
Focus Areas	Sustainability Engg, Renewable Energy, Green Hydrogen, Energy Technologies.
Tuition Fee	₹75,000/- per Year

ELIGIBILITY CRITERIA

1. B.E /B. Tech., in Electrical and Electronics Engineering (or) Mechanical Engineering (or) Chemical Engineering and equivalent branches with First Class (or equivalent CGPA) awarded by any UGC-recognized University.

Selection Process:

1. Written Exam: 60% weightage will be given to the performance of written examination.
2. Interview: 40% weightage will be given to the performance in interview.

Syllabus: 1. GATE 2026 syllabus for Electrical & Electronics Engineering for candidate having B.Tech EEE degree.

2. GATE 2026 syllabus for Mechanical Engineering for candidates having B.Tech Mechanical Engineering degree

3. Gate 2026 syllabus for Chemical Engineering for candidates having B.Tech Chemical Engineering degree