Programme: M.Tech. (Digital Communication)

Programme Educational Objectives (PEOs)

PEO1: Showcase communication engineering and research skills to design and develop solutions for complex engineering problems in the communication industry.

PEO2: Pursue doctoral studies from institutes of high repute to develop independent and lifelong learning skills for continuous professional development and be involved in research activities for the betterment of society and the nation.

PEO3: Exhibit leadership skills and apply technical knowledge and modern tools to become an entrepreneur thus creating employment opportunities locally and globally.

Programme Outcomes (POs)

PO1: Advanced Engineering Knowledge: Demonstrate in-depth knowledge of digital communication, with an ability to discriminate, evaluate, and analyse the existing knowledge to synthesise new knowledge, and integrate the same to enhance knowledge.

PO2: Problem Analysis: Analyse complex engineering problems globally and apply independent judgment for synthesising information to make intellectual and creative advances for conducting research in a wider theoretical, practical and policy context.

PO3: Collaborative Multidisciplinary Research: Recognize opportunities and contribute positively to collaborative-multidisciplinary scientific research, demonstrate a capacity for self-management and teamwork, decision-making based on open-mindedness, objectivity and rational analysis to achieve common goals and further the learning of themselves and others.

PO4: Modern Tool Usage: Select, learn and apply appropriate techniques, resources, and modern engineering tools and software to complex engineering activities with an understanding of the limitations.

PO5: The Engineer, Society and Environment: Think originally and provide optimal solutions considering public health and safety, cultural, societal and environmental factors related to communication systems.

PO6: Ethics and Sustainability: Aquire professional and intellectual integrity, professional code of conduct, research ethics, and an understanding of responsibility to contribute to the community

for sustainable development of society and the nation.

PO7: Individual and Teamwork: Apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyse and interpret data, and demonstrate higher-order skills to contribute individually/in group(s) to developing engineering knowledge.

PO8: Communication: Communicate with the engineering community, regarding complex engineering activities confidently and effectively, to comprehend and write effective reports and design documentation by adhering to appropriate standards, making effective presentations, and giving and receiving clear instructions.

PO9: Project Management and Finance: Demonstrate knowledge and understanding of engineering and management principles and apply the same as a member and leader in a team to manage projects efficiently considering the economic and financial aspects of the project.

PO10: Life-long Learning: Recognize the need for, and have the capability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously.

Programme Specific Outcomes (PSOs)

PSO1: Understand regional, national, and global needs and develop advanced wired/wireless digital communication systems.

PSO2: Comprehend and apply the technological advancements in signal processing to provide design solutions for the benefit of society and the nation.

PSO3: Apply the knowledge of software tools to provide design solutions for real-world problems in the global communication industry.

Course Outcomes

M.Tech. (Digital Communication) - First Semester			
Sr. No.	**Course Code**	**Course Title**	**Course Outcomes**
1	DC – 611	Advanced Digital Communications	CO1: Understand the basics of Digital Pulse Amplitude Modulation CO2: Analyse Coded Pulse Modulation schemes CO3: Analyse Digital CW modulation Schemes CO4: Examine the Spread Spectrum techniques used in communication
2	DC – 613	Satellite Communication	CO1: Understand the Evolution of Satellite Technology CO2: Understand the Satellite Channel analysis and the related parameters CO3: Interpret the Orbital parameters for the satellite communication CO4: Understand the Satellite multiple access methods CO5: Organise the Satellite applications and services
3	DC – 615	Mobile Communication	CO1: Classify the generations of wireless communication systems CO2: Interpret the Cellular communication fundamentals CO3: Understand the GSM architecture and interfaces, and GSM frequency bands CO4: Understand the radio propagation and cellular engineering concept
4	DC – 711	Network Protocol Design	CO1: Understand the Network Protocols Syntax and semantics CO2: Classify the Telephone Network Protocols CO3: Understand the Network Processes and transmission errors CO4: Examine the data encryption and data compression techniques in network protocol design
5	DC – 713	Low-Power VLSI Design	CO1: Understand the basics of low-power VLSI Design CO2: Discuss Power estimation and Simulation Power analysis CO3: Demonstrate Circuit level Low Power VLSI Design CO4: Demonstrate Low Power Architecture and Systems CO5: Demonstrate Low Power Clock Distribution and Algorithm & architectural level methodologies

6	DC – 715	Modern Telephone Switching Systems	CO1: Demonstrate the basics of Electronic Space Division switching CO2: Classify Time Division switching as Time Division Time switching, Time Division Space switching and combination switching CO3: Analyse Traffic Engineering, Grade of Service, and traffic Models CO4: Classify Subscriber Loop, Dialling Systems, Access Techniques and ISDN
7	DC – 721	RF and Microwave Circuit Design	CO1: Demonstrate the concepts of Wave Propagation in Networks CO2: Analyse Passive Circuit Design using Smith Chart CO3: Examine Basic Considerations in Active Networks CO4: Analyse Active Networks, Linear and Nonlinear Design, RF/MW Amplifiers, Oscillators, Rectifier, Detector, Mixers and RF/MW Integrated circuit
8	DC – 723	Design of Communication Networks	CO1: Examine the design considerations of Communication Networks CO2: Analyse the design features of a computer communication networks CO3: Examine the design of cellular mobile system CO4: Compare the Network planning for digital microwave and optical networks
9	DC – 725	Modeling and Simulation of Data Networks	CO1: Classify Delay Models in Data Networks CO2: Analyse Multi-access Communication systems CO3: Examine the Routing systems in Data Networks CO4: Analyse flow control schemes and algorithms

**M.Tech. (Digital Communication) - Second Semester**			
Sr. No.	**Course Code**	**Course Title**	**Course Outcomes**
10	DC – 612	Information Theory and Coding	CO1: Analyse the basics of Information theory CO2: Organise Shannon's theorem, Shannon-Hartley theorem and Selection of channels CO3: Analyse Coding efficiency, Shannon- Fano code, Huffman code, error detection and correction codes CO4: Classify Channel encoding, Cryptography and basic ARQ strategies
11	DC – 614	Digital Signal Processing and its Applications	CO1: Demonstrate Discrete Time signals, Discrete Time systems and their properties CO2: Examine Z- Transform, DFT and DCT CO3: Analyse F.I.R and I.I.R Systems CO4: Analyse the Design of F.I.R filters CO5: Examine Advanced signal processing techniques and transforms
12	DC – 616	Data Communication and Computer Networks	CO1: Discuss Data Communications & Networking CO2: Classify Network Hardware Components and High-Speed Network CO3: Analyse Internet Routing, Congestion & Traffic Management CO4: Analyse Network Security Issues, Threat Assessment, Authentication & Access Control Measures
13	DC – 712	Digital Image Processing	CO1: Understand the Digital Image Processing System CO2: Analyse image transformation techniques CO3: Demonstrate Image Smoothing and Image Restoration CO4: Analyse Image Encoding & Segmentation, Edge linking & boundary detection and Thresholding CO5: Classify Image compression techniques
14	DC - 714	Photonic Network and Switching	CO1: Understand the evolution of Optical Communication Networks CO2: Analyse Optical Multiplexing Techniques and Optical Networks CO3: Examine Optical Switching and Routing in photonic networks
15	DC – 716	Micro-Electro-Mechanical-Systems	CO1: Understand MEMS origin and MEMS fabrication technologies CO2: Analyse deposition and switching processes in MEMS

		(MEMS)	CO3: Examine fundamentals MEMS devices and their physics CO4: Organise MEMS-based microwave circuit and system and RF MEMS, Optical MEMS, Future of MEMS
16	DC – 722	Microwave Communication	CO1: Classify Microwave radio system and Microwave links CO2: Organise Microwave sources CO3: Classify Solid State Microwave Devices and their applications CO4: Analyse Microwave components and their functioning
17	DC – 724	VLSI Design	CO1: Demonstrate MOS Transistor Theory, Fabrication and Modeling CO2: Analyse MOS Inverter, CMOS Logic, MOS Capacitor CO3: Examine Symbolic and Physical Layout Systems for MOS CO4: Analyse Combinational and Sequential MOS Logic Circuits CO5: Demonstrate CMOS Subsystem Design: Memories
18	DC – 726	Internet and Intranet	CO1: Demonstrate Internet development, Internetworking architecture and services CO2: Analyse network layer structure and internet protocol standards CO3: Analyse web fundamentals, Web protocols, and web tools CO4: Examine Internet components and Internet application

Sr. No.	Course Code	Course Title	Course Outcomes
			M.Tech. (Digital Communication) - Third Semester
19	DC – 621	Optical Communication	CO1: Analyse the fundamentals of optical communication CO2: Analyse the Optical sources and Optical Detectors CO3: Analyse the transmission of signal in the optical fibers CO4: Optical Fiber Link Design, WDM concepts and components and Optical Amplifiers
20	DC – 623	Antenna and Wave Propagation	CO1: Analyse the Antenna Fundamentals and Definitions CO2: Analyse Arrays, Broadband Antennas and Aperture Antennas CO3: Examine the Different modes of propagation
21	DC – 625	Research Methodology	CO1: Understand the concepts of Educational Research CO2: Demonstrate the process of Identifying and defining the research problem and methods of research CO3: Apply the methods of Data Collection and Descriptive statistics CO4: Design a research proposal and develop strategies for evaluating it
22	DC – 627	Dissertation (Phase-I)	CO1: Gather, form and critique knowledge from research studies CO2: Identify and investigate a research problem CO3: Analyse research design and associated methods rigorously CO4: Draw appropriate conclusions and indicate the significance of the findings
23	DC – 629	Seminar	CO1: Understand the relevance of the chosen topic related to Digital Communication in the real world. CO2: Illustrate effective presentation skills through presentation aids, style and speaking skills CO3: Demonstrate the knowledge gained during the process by answering questions CO4: Create an effective seminar report taking care of professional ethics of report writing

M.Tech. (Digital Communication) - Fourth Semester			
Sr. No.	Course Code	Course Title	Course Outcomes
24	DC – 628	Dissertation (Phase II)	CO1: Perform the related investigation with the help of available software and hardware tools CO2: Deduce the relevant/ substantial technical content from the compiled data and compose research publications CO3: Communicate the research outcomes through an effective report.