

M.Tech. in Digital Communication

University-Style Syllabus (2 Years / 4 Semesters)

Programmer Duration: 2 Years (4 Semesters)

Programmer Level: Postgraduate (M.Tech.)

Credits: 68–80 (Typical AICTE/NEP Pattern)

Semester I

Subject Code	Subject	L	T	P	Credits
MDC101	Digital Communication Systems	3	1	0	4
MDC102	Advanced Digital Signal Processing	3	1	0	4
MDC103	Probability, Random Processes and Information Theory	3	0	2	4
MDC104	Research Methodology	2	0	2	3
MDC105	Digital Communication Laboratory – I	0	0	4	2
MDC106	Seminar – I	0	0	2	1

Total Credits: 18

Semester II

Subject Code	Subject	L	T	P	Credits
MDC201	Wireless Communication Systems	3	1	0	4
MDC202	Error Control Coding	3	0	2	4
MDC203	Optical Communication	3	0	2	4

Subject Code	Subject	L	T	P	Credits
MDC204	RF and Microwave Engineering	3	0	2	4
MDC205	Digital Communication Laboratory – II	0	0	4	2
MDC206	Seminar – II	0	0	2	1

Total Credits: 19

Semester III

Subject Code	Subject	L	T	P	Credits
MDC301	MIMO and OFDM Communication Systems	3	1	0	4
MDC302	Mobile and Satellite Communication	3	0	2	4
MDC303	Software Defined Radio and Cognitive Radio	3	0	2	4
MDC304	Elective – I	3	0	0	3
MDC305	Dissertation Phase – I	0	0	12	8

Elective – I (Choose One)

- MDC311 – 5G and Beyond Wireless Networks
- MDC312 – Internet of Things (IoT)
- MDC313 – Antenna Design and Propagation
- MDC314 – Communication Network Security
- MDC315 – Digital Image Processing

Total Credits: 23

Semester IV

Subject Code	Subject	L	T	P	Credits
--------------	---------	---	---	---	---------

Subject Code	Subject	L	T	P	Credits
MDC401	Dissertation Phase – II	0	0	24	16
MDC402	Viva Voce	0	0	2	2
MDC403	Industrial Internship	0	0	8	4

Total Credits: 22

Laboratory Courses

Code	Laboratory
MDC105	Digital Communication Laboratory – I
MDC205	Digital Communication Laboratory – II
MDC305	Research and Dissertation Work
MDC401	Dissertation and Project Implementation

Detailed Unit-Wise Syllabus

MDC101 – Digital Communication Systems

Unit I

- Fundamentals of Digital Communication
- Sampling and Quantization
- Pulse Code Modulation (PCM)

Unit II

- Digital Modulation Techniques
- ASK, FSK, PSK and QAM

Unit III

- Baseband Transmission
- Passband Transmission

Unit IV

- Noise Analysis
- Channel Capacity
- Performance Evaluation

Unit V

- Modern Digital Communication Systems
- Applications and Emerging Technologies

MDC102 – Advanced Digital Signal Processing

Unit I

- Discrete-Time Signal Processing
- Z-Transform

Unit II

- FIR and IIR Filter Design

Unit III

- FFT Algorithms
- Adaptive Filters

Unit IV

- Multirate Signal Processing

Unit V

- DSP Applications in Communication Systems

MDC201 – Wireless Communication Systems

- Cellular Communication
- GSM, CDMA, LTE

- 5G Communication
- Wireless Channel Models
- Resource Management

MDC203 – Optical Communication

- Optical Fibers
 - Optical Sources and Detectors
 - WDM Systems
 - Optical Networks
 - Fiber Communication Applications
-

Practical List

Students should perform practical exercises such as:

- Digital Modulation and Demodulation
 - MATLAB Simulation of Communication Systems
 - DSP Filter Design
 - OFDM System Simulation
 - MIMO Communication Simulation
 - Optical Fiber Communication Experiments
 - Antenna Simulation using HFSS/CST
 - RF Circuit Design
 - SDR Implementation using GNU Radio
 - Wireless Network Planning
 - Error Control Coding Experiments
 - Capstone Research Project
-

Examination Scheme

Component	Marks
End Semester Examination	70
Internal Assessment	30
Practical Examination	100

Component	Marks
Seminar	100
Dissertation	300
Viva Voce	100

Recommended Reference Books

- Digital Communications
- Communication Systems
- Digital Signal Processing
- Wireless Communications
- Optical Fiber Communications

Programmer Outcomes

Upon successful completion of the programmed, graduates will be able to:

1. Design and analyze advanced digital communication systems.
2. Apply DSP techniques to solve communication engineering problems.
3. Develop wireless, optical, and satellite communication solutions.
4. Design modern communication systems using MIMO, OFDM, SDR, and 5G technologies.
5. Conduct research in digital communication and signal processing.
6. Use simulation and design tools for communication system analysis.
7. Lead research and development projects in the communication industry.
8. Pursue doctoral research or advanced professional careers in Digital Communication and allied fields.