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M.Tech Communication & Networks/ (M.Tech(CN))

OVERALL STRUCTURE

The programme requires 36 units of coursework and 28 units of project work with a Major and Minor Structure.

MAJOR AND MINOR STRUCTURE

MINORS

(a) A new feature of the programme is that it give the students the option to graduate with one of 4 "Minors":
  - (i) Minor in Integrated Circuits & Systems,
  - (ii) Minor in Photonics,
  - (iii) Minor in Radio-Frequency Systems
  - (iv) Minor in Signal Processing

(b) The selection of a Minor is not however, mandatory.

(c) A student qualifies for a Minor if he/she takes at least 3 courses belonging to a basket of courses specific to each area.

(d) This basket of courses is further divided into two pools, Pool X and Pool Y and a student is required to take a total of 3 courses from Pool X and Pool Y combined and
  - (i) at least two courses from Pool X in the case of a Minor in Integrated Circuits & Systems,
  - (ii) at least one course from Pool X in the case of a Minor in either Photonics, Radio-Frequency Systems or Signal Processing.

(e) The selection of a minor takes place during the course of the programme by the student in consultation with his Faculty Advisor.

(f) It is understood that the default Major of all students enrolled in the programme is Communication & Networks.

(g) A student who does not opt for a Minor, can either choose to specialize further in the Major by taking 3 additional courses in the area of Communication & Networks or else choosing amongst the many electives available (in consultation with his/her Faculty Advisor).

SAMPLE COURSE-UNIT BREAKUP

Here is a sample breakup of course units for a student opting for one of the Minors and taking two courses with placement in mind.

Core	4 courses	12 units
Soft Core	3 courses	9 units
Electives	2 courses	6 units
Minor or Electrives	3 courses	9 units
Total		36 units

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THE CORE

The following courses are required of every student in the programme and hence constitute the Core

(a) E2 202 (AUG) 3:0 Random Processes
(b) E2 211 (AUG) 3:0 Digital Communication
(c) E2 221 (AUG) 3:0 Communication Networks
(d) E1 244 (JAN) 3:0 Detection and Estimation Theory

SOFTCORE

(a) Students are required to take a total of 3 courses from the two pools, Pool A and B below.
(b) At least 2 of these courses must be from Pool A.

Pool A (in no particular order)
E2 201 (AUG) 3:0 Information Theory
E2 205 (AUG) 3:0 Error-Correcting Codes
E2 223 (AUG) 3:0 Communication Protocols
E2 242 (JAN) 3:0 CDMA & Multiuser Detection
E2 204 (JAN) 3:0 Stochastic Processes and Queueing Theory
E8 203 (AUG) 3:0 RF & Optical Engineering
E2 203 (JAN) 3:0 Wireless Communication
E2 241 (JAN) 3:0 Wireless Networks

Pool B (in no particular order)
E0 259 (AUG) 3:1 Data Analytics
E1 251 (AUG) 3:0 Linear and Nonlinear Optimization
E2 212 (AUG) 3:0 Matrix Theory
E9 201 (AUG) 3:0 Digital Signal Processing
E1 254 (AUG/JAN) 3:1 Game Theory
E9 211 (JAN) 3:0 Adaptive Signal Processing
E9 221 (AUG) 3:0 Signal Quantization and Compression
E9 202 (JAN) 3:0 Advanced Digital Signal Processing : Non-linear Filters

REQUIREMENTS FOR EACH MINOR

A. **Minor in Integrated Circuits and Systems (ICS)**

Requirements:
- Any 3 of the courses listed below under Pools X & Y
- with at least two courses from Pool X will qualify a student for a "Minor in Integrated Circuits and Systems".

Pool X
NE 205 (Aug) 3:0 Semiconductor Devices and Integrated Circuit Technology
E3 238 (AUG) 2:1 Analog VLSI Circuits
E0 284 (AUG) 2:1 Digital VLSI Circuits
E7 211 (JAN) 3:0 Photonics Integrated Circuits

Pool Y
E3 237 (JAN) 3:0 Integrated circuits for Wireless Communication
E3 239 (JAN) 2:1 Advanced VLSI Circuits
E8 262 (JAN) 3:0 CAD for High Speed Chip-Package-Systems

B. **Minor in Photonics**

Requirements:
- Any 3 of the courses listed below under Pools X & Y
- with at least one course from Pool X will qualify a student for a "Minor in Photonics".

Pool X
NE 213/E7 213 (Aug) 3:0 Introduction to Photonics
E8 203 (AUG) 3:0 RF & Optical Engineering
E7 231 (JAN) 3:0 Fiber-Optic Networks

Pool Y
E7 211 (JAN) 3:0 Photonics Integrated Circuits
E3 214 (AUG) 3:0 Microsensor Technologies)
IN 247 (JAN) 3:0 Principles of Tomographic

C. **Minor in Radio-Frequency Systems**

Requirements:
- Any 3 of the courses listed below under Pools X & Y
- with at least one course from Pool X will qualify a student for a "Minor in Radio-Frequency Systems".

Pool X
E8-242 (JAN) 2:1 Radio Frequency Integrated Circuits and Systems
E3 237 (JAN) 3:0 Integrated circuits for Wireless Communication

Pool Y
E8 202 (AUG) 2:1 Computational Electromagnetics
E8 203: (AUG) 3:0 RF & Optical Engineering (proposed new course)
E8 262 (JAN) 3:0 CAD for High Speed Chip-Package-Systems

D. **Minor in Signal Processing**

Requirements:
- Any 3 of the courses listed below under Pools X & Y
- with at least one course from Pool X will qualify a student for a "Minor in Signal Processing".

Pool X
E9 202 (JAN) 3:0 Advanced Digital Signal Processing : Non-linear Filters
E9 211 (JAN) 3:0 Adaptive Signal Processing
E9 212 (JAN) 3:0 Spectrum Analysis
E9 213 (JAN) 3:0 Time-Frequency Analysis
E9 221 (AUG) 3:0 Signal Quantization and Compression

Pool Y
E1 213 (JAN) 3:1 Pattern Recognition and Neural Networks
E1 216 (JAN) 3:1 Computer Vision
E9 203 (JAN) 3:0 Compressed Sensing and Sparse Signal Processing
E9 262 (JAN) 3:0 Stochastic Models for Speech/Audio
E9 231 (AUG) 3:0 Digital Array Signal Processing
E9 241 (AUG) 2:1 Digital Image Processing
E9 252 (AUG) 3:0 Mathematical methods and techniques in signal processing
E9 261 (AUG) 3:1 Speech Information Processing