

MINIMUM CORE SUBJECT AREAS: ELECTRONICS ENGINEERING

| AREA | SUBJECTS / DESCRIPTION | RECOMMENDED CONTACT HOURS |
|---|--|---------------------------|
| A recommendation of 30 hours from each area in Group 1 and 30 hours from at least 1 out of 6 areas in Group 2. | | |
| Group 1: 30 hours from each area below: | | |
| 1. Analogue and digital circuits | - selected topics on circuit principles and design, diodes and transistors, analog circuits such as amplifiers, digital circuits such as logic circuits, integrated circuits (IC), microelectronics, etc. | 30 |
| 2. Signal processing, instrumentation and control | - selected topics on Fourier and Laplace transforms, analog and digital filters, computer vision, image/video coding and processing, control systems, automation, sensors, robotics, etc. | 30 |
| 3. Telecommunication, digital communication, and mobile technology | - selected topics on principles of digital communications, telecommunication systems and networks, data networks, next-generation mobile systems such as small-cell networks, multi-antenna communications, millimeter-wave communications, etc. | 30 |
| 4. Data communication, information processing, and network computing | - selected topics on Internet protocols, TCP/IP, process communications, wireless networks, computer networks, distributed systems, Internet of Things, internet security, etc. | 30 |
| 5. Embedded system and chip design | - selected topics on digital logic, analog circuits, hardware architecture, Verilog, VHDL, FPGA, IC design, timing schemes, VLSI, ASIC, embedded system design and programming, embedded system architecture, portable device drivers, etc. | 30 |
| 6. Computer programming and system architecture | - selected topics on computer organization, computer architecture, operating system, programming, internet applications development, mobile applications development, sensor network, etc. | 30 |
| Group 2: 30 hours total from at least 1 out of 6 areas below: | | |
| 1. Photonics | - selected topics on laser physics and materials, displays and lighting, semiconductor optoelectronic devices, fibre optic communications, optical imaging, etc. | 30 |
| 2. Multimedia technology | - selected topics on multimedia computing and communications, signal representation, digital image processing, information indexing and retrieval, authoring and integration, etc. | 30 |
| 3. Power electronics | - selected topics on power electronics in utility applications, inverters, harmonic elimination techniques, reactive power compensations, HVDC conversion, flexible AC transmission devices, unified power flow controller, analysis and control strategies, DC-DC converters, lighting control, power semiconductors, renewable energy technologies, electric vehicle, etc. | 30 |
| 4. Robotics and automation | - selected topics on robotics and automation systems, microcontrollers, sensors, systems dynamics and control, mechatronics, computer vision, artificial intelligence, self-organizing systems, etc. | 30 |
| 5. Machine learning | - selected topics on neural networks, classification, regression, predictive modeling, fuzzy logic, supervised and unsupervised learning, etc. | 30 |
| 6. Biomedical technology | - selected topics on biomaterials, biomechanics, bioelectronics, medical devices, biomedical instrumentation, tissue engineering, etc. | 30 |