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 each from at least 2 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 each from at least 2 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

AREA	SUBJECTS / DESCRIPTION	RECOMMENDED CONTACT HOURS
7. Microelectronic Technology and Quantum Engineering	- selected topics on quantum mechanics, semiconductor device physics on potential steps, barriers and wells, quantum confinement, and tunneling, basic concepts on quantum information processing, power semiconductor devices, etc.	30
8. Integrated Circuit and Systems	- selected topics on digital very-large-scale-integration VLSI) circuit design principle and practice, analogue circuits for microwave communication, semiconductor devices and applications, semiconductor device fabrication theory, model, and practice, emerging memory and logic devices, data conversion, and artificial intelligence applications etc.	30