

Networks & Communication Engineering Program- Course Description

Course ID / Code	Brief Course Description
Computer Network Protocols 0105400 (3 Cr. H.)	This course introduces concepts and principles in today's networks and various aspects of computer networking, including layered network architecture, TCP/IP suite, client-server and P2P paradigms, application layer protocols application layer protocols (e.g. HTTP, FTP, SMTP, POP3, IMAP, and DNS), packet delay, packet loss, throughput in packet switched networks, transport layer protocols (TCP/UDP), reliable data transfer, flow control and congestion control, IPv4/IPv6 addressing, subnetting, CIDR, IP packet delivery and routing, Internet Control Message Protocol (ICMP), Dijkstra algorithm, and OSPF.
Network Lab 0105401 (1 Cr. H.)	This lab introduces basic practical concepts of networking. Topic Included: Introduction of OSI layers, TCP/IP and IP addressing and subnet masking; hands-on configuration experience on various network devices including Cisco routers and switches; Use multiple networking tools including Packet Tracer, Wireshark, Putty software, to simulate and troubleshoot basic networks; learn various networking skills including static and dynamic routing, Inter-VLAN routing, Network Address Translation (NAT), Access Control List (ACL), implementing socket programming and traffic analysis.
Computer Network Management 0105411 (3 Cr. H.)	Introduction to methods, techniques and tools for the management of computer networks. Topics include: SNMP network management architecture; Abstract Syntax Notation (ASN) and Basic Encoding Rules (BER); Network management messaging, Network management tools, Remote Monitoring (RMON).
Network Programming 0105420 (3 Cr. H.)	This course introduces the students to the basic concepts of networks programming using Java programming language and its network libraries. The course covers the TCP/IP protocol stack, Internet Addressing and URL, Client-Server Model, Peer-to-Peer Model, I/O Streams, TCP Sockets, UDP Sockets, Multithreading and Multiplexing, Secure sockets, File Handling, Non-Blocking I/O, RMI, CORBA, Servlets, and Web Services.
Emerging Wireless Networking 0105422 (3 Cr. H.)	This course covers the analysis of the enabling physical-layer technologies for emerging wireless networks, wireless networking trends, resources allocation techniques, cognitive and software defined wireless networks, IoT architectures, IoT-based Wireless Sensor Networks, broadband wireless technologies, high throughput WiFi, HSDPA, EVO, UWB, 5G, mobile ad hoc networks, Wireless Networking Evolution, and emerging topics and advances in wireless networking area.
Data and Computer Communications 0106320 (3 Cr. H.)	This course provides an overview of data communication and networks. Topics include: Network topologies, Network models and devices, Data transmission and mediums, Multiplexing, Signal encoding, Error detection and correction techniques, Physical and Data Link Control layers' issues
Signals and Systems Analysis 0106330 (3 Cr. H.)	This course covers the following topics: Continuous- and discrete- time signals and systems, Continuous and discrete linear time-invariant systems. Fourier Analysis: Fourier series and Fourier Transform. Laplace Transform and Z- transform. Matlab is used to study the behavior of signals.
Probability and Random Processes 0106331 (3 Cr. H.)	This course includes discussion of probabilistic models, conditional probability; random variables; distributions and density functions; expectations and characteristic functions; independence; laws of large numbers; central-limit theorem; random process concepts; random signal analysis concepts.
Introduction to Communications Systems 0106340 (3 Cr. H.)	This course includes a review of signals, linear systems and Fourier theory, signals bandwidth and spectra, an analysis of analogue modulation systems (AM, PM and FM), synchronizations, characterization and effect of noise, transceiver architectures of analog systems, and overview of pulse code modulation.
Communication Lab 0106341 (1 Cr. H.)	This course is an introduction to the most common modulation-demodulation techniques for analog and digital signals. The course provides experiments on AM, FM, PM and quadrature AM modulation/demodulation. It also covers digital modulation techniques such as pulse width modulation (PWM), pulse position modulation (PPM), frequency shift keying (FSK), phase shift keying (PSK) and amplitude shifting key (ASK) and Quadrature Phase Shift Keying (QPSK).
Electromagnetic Theory 0106350 (3 Cr. H.)	This course introduces the basic concepts of classical Electromagnetic Theory. Topics include electrostatic fields, Electric Fields in Material Space, Boundary-value problems, magnetostatic fields, waves and propagation, and transmission lines.
Digital Signal Processing 0106430 (3 Cr. H.)	This course includes a review of discrete-time signals and systems properties and representation, sampling of continuous time signals. The course will cover digital processing of continuous-time signals, a review of Ztransform, frequency response and impulse response for linear time invariant systems. It also covers the design of Finite impulse response (FIR) filters and infinite impulse response (IIR) filters. Discrete Fourier Series and Discrete Fourier Transform (DFT). Fast Fourier Transform (FFT). Fourier analysis of signals using Discrete Fourier Transform.
Digital Communication 0106440 (3 Cr. H.)	This course reviews probability, random variables and signal representation. It also introduces Quantization, Delta modulation, Noise analysis in PCM and DM systems. The course introduces the concept of digital Modulation/Demodulation techniques for baseband and band-pass signals, Inter-symbol-interference (ISI) and equalization. The course also introduces the concept of error probability analysis for passband digital systems (ASK, PSK, DPSK, FSK and QAM), signal space representation, receiver model and an introduction to error control coding.
Wireless Communications Fundamentals 0106441 (3 Cr. H.)	Introduction, wireless communication systems and standards, mobile radio propagation, large scale path loss and small-scale multi-path fading, Doppler Spread, delay spread and coherence bandwidth, coverage techniques and cellular concept, modulation techniques for mobile radio, access techniques spread spectrum and diversity.
Communication Circuits 0106442 (3 Cr. H.)	This course covers the analysis and design of different communications circuits, including low noise amplifiers, oscillators, passive and active mixers, phase-locked loops, frequency synthesizers and power amplifiers.
Antennas 0106450 (3 Cr. H.)	The course introduces the fundamental principles of antenna theory and electromagnetic radiation. Topics include: Antenna parameters; Radiation Integrals; Dipole and Loop antennas; Travelling-wave antennas; Aperture and Microstrip patch antennas; Linear and planar antenna arrays.

NCE Internship 0106580 (3 Cr. H.)	The Bachelor of Science in Networks and Communications Engineering internship course is designed to enable students to apply their knowledge of networks and communications engineering in real world professional situations. The students work as interns and practice team-based activities related to networks and communication engineering. The internship experience provides the students with an industrial training opportunity through cooperation between the university and the local industry, which can help them in choosing their career path based on hands-on industrial experience. The student should work on site for at least 480 hours (equivalent to 12 weeks of full-time work).
NCE Capstone project I 0106590 (2 Cr. H.)	The capstone I provides the undergraduate engineering students with imperative design experience to prepare them for the Networks and Communication Engineering industry. The capstone project is intended to integrate and draw on the knowledge that students have acquired during their study. It also gives students an opportunity to improve their communication skills and work in a team.
NCE Capstone Project II 0106591 (2 Cr. H.)	This course is a continuing step for NCE Capstone I (0106590). This course provides our undergraduate engineering students with imperative design experience to prepare them for the Networks and Communication Engineering industry. The capstone project is intended to integrate and draw on the knowledge that students have acquired during their study. It also gives students an opportunity to improve their communication skills and work in a team.