Network Technology (NET)

Network Technology (NET) Courses

NET 1001 [0.5 credit]
Computer Technology Basics
Construction and function of PCs. Introduces technical concepts and terminology relating to system boards, system busses, input/output devices, memory, microprocessors and peripherals. Interaction of software and hardware; data storage; performance issues.
Includes: Experiential Learning Activity
Prerequisite(s): restricted to students in the B.I.T. degree program.
Lectures two hours a week, tutorial/laboratory two hours a week.

NET 1002 [0.5 credit]
Networking Fundamentals
Foundation knowledge for computer networks and communications. Topics include basic network design, layered communications models, IP addressing and subnets, and industry standards for networking media and protocols, with an emphasis on TCP/IP protocol suite and Ethernet environments.
Includes: Experiential Learning Activity
Prerequisite(s): restricted to students in the B.I.T. degree program.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 1006 [0.5 credit]
Routing and Switching
Introduction to routing and switching concepts including, static and dynamic routing, trunking and VLANs. Topics include configuring routers and switches and resolving common configuration and reachability issues.
Includes: Experiential Learning Activity
Prerequisite(s): NET 1002.
Lecture three hours a week, tutorial/laboratory three hours a week.

NET 2000 [0.5 credit]
Intermediate Networking
Architecture, components and operations of routers and switches in Enterprise networks. Topics include configuration and troubleshooting of OSPF, including Multi-area, redundancy, NAT and troubleshooting techniques.
Includes: Experiential Learning Activity
Prerequisite(s): NET 1006.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 2007 [0.5 credit]
Basics of Transmission Systems
Introduction to the fundamentals of information transmissions systems used in physical layer of the Internet. Covers time- and frequency-domain concepts, digital and analog transmission, signal encoding, sampling, modulation, demodulation, error detection and correction. Examples: DSL, Cable modem, and wireless LAN. Includes: Experiential Learning Activity.
Includes: Experiential Learning Activity
Prerequisite(s): BIT 1001 and BIT 1007.
Lectures three hours a week, tutorial/laboratory three hours a week.

NET 2008 [0.5 credit]
DevOps
Exposure to unifying software development (Dev) and software operation (Ops). Use of Python to monitor and automate network management tasks.
Prerequisite(s): BIT 2400.
Lectures three hours a week, tutorial/laboratory three hours a week.

NET 2010 [0.5 credit]
Desktop and Server Environments I
Using Linux and Windows Server, study of the basic features such as file system, system utilities, memory management, boot process troubleshooting and UI customizations. Client-Server architecture is examined with a focus on basic Server configuration and administration. Includes: Experiential Learning Activity.
Includes: Experiential Learning Activity
Precludes additional credit for NET 2002 (no longer offered).
Prerequisite(s): NET 1001.
Lecture two hours a week, tutorial/laboratory two hours a week.

NET 2011 [0.5 credit]
Desktop and Server Environments II
Using Unix and Linux Operating systems, study of the command line and network Server operating environments. Configuring Services and Protocols such as DNS, NTP, SSH, SMB, SMTP, POP3, IMAP, HTTP, and DHCP. Basic Server security using firewalls is also introduced. Includes: Experiential Learning Activity.
Includes: Experiential Learning Activity
Precludes additional credit for NET 2003 (no longer offered).
Prerequisite(s): NET 2010.
Lecture two hours a week, tutorial/laboratory two hours a week.

NET 2012 [0.5 credit]
Networking Technologies and Automation
Enterprise technologies and QoS mechanisms used for networks access. Topics include virtualization, and automation concepts. Software-defined networking, controller-based architectures and how application programming interfaces (APIs) enable network automation.
Includes: Experiential Learning Activity
Precludes additional credit for NET 2001 (no longer offered).
Prerequisite(s): NET 2000.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 2013 [0.5 credit]
Computer Systems Foundations
Introduction to the design and implementation of digital circuits and microprocessors. Topics include: binary numbers and arithmetic, fundamentals of boolean algebra, combinational circuits, sequential circuits, computer architecture and organization: CPU, cache, memory, input/output, bus structures, interrupts, computer arithmetic, CPU assembly instruction sets.
Includes: Experiential Learning Activity
Precludes additional credit for NET 1004 (no longer offered), PLT 1007 (no longer offered), NET 2009 (no longer offered), PLT 2009 (no longer offered), OSS 2009.
Prerequisite(s): BIT 2400.
Lectures three hours a week, tutorial/laboratory one hour a week.

NET 3000 [0.5 credit]
Database Concepts and SQL
Concepts and fundamentals of relational database systems. Students learn how to design relational databases starting from a conceptual data model, following accepted logical and physical design principles. Topics include normalisation, referential integrity, SQL, DDL and SQL DML & ODBC and data extraction/filtering techniques.
Includes: Experiential Learning Activity
Prerequisite(s): second-year standing in the Networking program.
Lecture two hours a week, tutorial/laboratory two hours a week.

NET 3001 [0.5 credit]
Real-time Systems
Principles of event-driven systems, review of computer organization; parallel and serial interfaces; programmable timer; I/O methods; polling and interrupts. Real-time kernels. Critical design consideration: concurrency, dead lock, synchronization. Maintaining and improving system performance. Programming exercises in low and high level languages.
Includes: Experiential Learning Activity
Also listed as OSS 3001.
Prerequisite(s): NET 2013.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 3004 [0.5 credit]
Data Structures
Specification and design of abstract data types and their implementation as stacks, queues, trees, tables and graphs. Common and useful examples. Parsing and finite state machines. Analysis of algorithms, recursion, re-entrance. Special focus: abstraction, interface specification and hierarchical design using object-oriented programming.
Includes: Experiential Learning Activity
Also listed as OSS 3004.
Precludes additional credit for PLT 3010 (no longer offered).
Prerequisite(s): BIT 2400.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 3006 [0.5 credit]
Network Management and Machine Learning
Key network management models, protocols, and standards (such as SNMP, NETCONF, NetFlow). Introduction to machine learning (topics may include decision trees, numerical computations for learning, deep feedforward networks, etc.) and its application in network management. Security issues in networking management.
Includes: Experiential Learning Activity
Prerequisite(s): BIT 2000, NET 3000 and NET 3004.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 3007 [0.5 credit]
Network Security
Basics of network security. Students are introduced to the goals of IT security, common threats and countermeasures including firewalls, intrusion detection and prevention systems (IDPS) and virtual private networks. Several operating environments will be studied as examples. Also includes a section on computer ethics.
Includes: Experiential Learning Activity
Prerequisite(s): NET 2012.
Lectures two hours a week, tutorial/laboratory three hours a week.

NET 3008 [0.5 credit]
Advanced Network Routing
Routing IP at the enterprise level, within and between, autonomous systems. Advanced control and optimization of routing protocols and manipulation of traffic paths with multiple routing protocols. Working knowledge of Internet reachability via BGP.
Includes: Experiential Learning Activity
Prerequisite(s): NET 2012.
Lectures three hours a week, tutorial/laboratory three hours a week.

NET 3010 [0.5 credit]
Web Programming
Architectures, protocols, and languages used to develop dynamic Web content, including Hypertext Markup and Hypertext Formatting Languages (HTML, XML, CSS), Universal Resource Identifiers (URI), and the Hypertext Transport Protocol (HTTP). JavaScript and PHP are used to model cross-platform web programming.
Includes: Experiential Learning Activity
Prerequisite(s): BIT 2400, NET 3000.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 3011 [0.5 credit]
Advanced Network Switching
VLANs and inter-VLAN routing in a multilayer switched environment. Variants of STP and the use of related enhancements. Techniques for network redundancy and load balancing. Securing a switched infrastructure. Architectures and techniques for delivering converged traffic in an enterprise environment.
Includes: Experiential Learning Activity
Prerequisite(s): NET 2012.
Lectures three hours a week, tutorial/laboratory three hours a week.

NET 3012 [0.5 credit]
IP Architectures and Solutions
An exploration of various deployment options that can be implemented atop an IP network core. The focus is on technologies including MPLS and Segment Routing that serve to enhance IP service delivery and connectivity leveraging the IP infrastructure. Includes Layer 2 and 3 tunneling techniques.
Includes: Experiential Learning Activity
Prerequisite(s): NET 3008.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 3900 [0.5 credit]
Wireless Networks
Design and configuration of Wi-Fi networks as used in commercial and enterprise venues. Topics include 802.11 family of protocols, wireless transmission, RF design, security methods and protocols, and system design. Topologies include campus, bridge and remote access.
Includes: Experiential Learning Activity
Prerequisite(s): NET 2007.
Lectures two hours a week, tutorial/laboratory three hours a week.

NET 4000 [0.5 credit]
Emerging Network Technologies
Overview of technologies, protocols and techniques related to Information Technology networking that are either in their early stage of adoption or are not yet mainstream (i.e. beta or prototype stage). Focus will vary from year to year to reflect the evolutionary nature of this domain.
Includes: Experiential Learning Activity
Prerequisite(s): fourth-year standing in the Networking program or permission of the instructor.
Also offered at the graduate level, with different requirements, as ITEC 5110, for which additional credit is precluded.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 4001 [0.5 credit]
Network Simulation
Introduction to discrete event simulation and network modeling; fundamental stochastic models for networking; introduction to queueing theory; random numbers; analysis of simulation data; confidence intervals. Use of different software tools to plan and perform simulations.
Includes: Experiential Learning Activity
Prerequisite(s): BIT 2000.
Also offered at the graduate level, with different requirements, as ITEC 5113, for which additional credit is precluded.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 4005 [0.5 credit]
Networked Applications
Architectures for computing in modern data networks that adopt the Internet architecture. Topics covered include socket programming, RPC and RMI. Client-server and peer-to-peer models. Emerging application architectures.
Includes: Experiential Learning Activity
Prerequisite(s): NET 3004 and NET 3010.
Also offered at the graduate level, with different requirements, as ITEC 5114, for which additional credit is precluded.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 4007 [0.5 credit]
Multimedia Networking
Audio and video compression. H.261, JPEG, MPEG and DVI. Accessing audio and video from a web server. Real Time Streaming Protocol (RTSP). Multimedia operating systems. Multimedia database. Network support for multimedia applications. Multimedia synchronization.
Includes: Experiential Learning Activity
Prerequisite(s): fourth-year standing in Networking program or permission of the instructor.
Also offered at the graduate level, with different requirements, as ITEC 5111, for which additional credit is precluded.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 4009 [0.5 credit]
Troubleshooting IP Networks
Integrates planned maintenance and troubleshooting techniques, including, tools, applications and formalized methodologies. Study of issues in focused areas (such as routed vs. switched environments, addressing services, performance, security, VPN), culminating in problem resolution throughout a complex enterprise network.
Includes: Experiential Learning Activity
Prerequisite(s): NET 3011, NET 3008.
Lectures three hours a week, tutorial/laboratory three hours a week.

NET 4010 [0.5 credit]
Secure Mobile Networking
The concept, principle and rationale of mobile networking. Mobile network architecture, protocols, mobility management, routing and mobile TCP/IP; Security challenges, vulnerabilities and threats in mobile networks; Security defense techniques and countermeasures in mobile networks.
Includes: Experiential Learning Activity
Prerequisite(s): fourth-year standing in Networking program or permission of the instructor.
Also offered at the graduate level, with different requirements, as ITEC 5112, for which additional credit is precluded.
Lectures three hours a week, tutorial/laboratory one hour a week.

NET 4011 [0.5 credit]
Advanced Topics in Network Security
Understanding classes of advanced attacks. Building secure networks. Adversarial Machine Learning. Security in clouds, virtualized networks, and IoT. Understanding impact of OS and software security issues. Security in next generation networks such as 5G.
Prerequisite(s): NET 3007.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 4012 [0.5 credit]
Cloud Computing and Virtualization
The basics of cloud computing and its driving technology behind: virtualization. Topics include how virtual machines and containers are deployed and orchestrated; how various resources and networks are virtualized and managed; hypervisor technology; virtual network management and micro-segmentation; cloud service provisioning; cloud security.
Includes: Experiential Learning Activity
Prerequisite(s): NET 2013 and NET 3006.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 4901 [1.0 credit]
NET Capstone Project
This course provides the opportunity to apply knowledge gained in previous courses towards the design and implementation of a major Networking related project. Working in teams or as individuals under the direction of faculty members, students undertake projects internally or in collaboration with industry.
Includes: Experiential Learning Activity
Prerequisite(s): fourth-year standing in the Networking program.
Tutorial hours arranged.