Network Technology (NET)

Network Technology (NET) Courses

School of Information Technology

Faculty of Engineering & Design

NET 1000 [0.5 credit]
Problem Solving
Introduction to systematic methods for problem solving in the context of object oriented programming. Defining and modeling problems, designing algorithms, testing, debugging and analysis of results. Numeric methods, data presentations, data abstraction, classes, class relationships, inheritance, error handling and program style and documentation.
Precludes additional credit for PLT 1000.
Prerequisite(s): restricted to students in the B.I.T. degree program.
Lectures three hours a week, tutorial/laboratory three hours a week.

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.
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.
Prerequisite(s): restricted to students in the B.I.T. degree program.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 1004 [0.5 credit]
Assembly and Machine Language
Structured approach to assembly language programming. Topics include data and address registers, data and address busses, condition code register and stack pointers, machine code format, instruction sizes, operand encoding, translation of source code into machine language, and how the processor executes instructions.
Prerequisite(s): restricted to students in the B.I.T. degree program.
Lectures three hours a week, tutorial/laboratory one hour a week.

NET 1005 [0.5 credit]
Network Routing
Interconnecting Local Area Networks. Introduction to routed protocols: IP, classless IP addressing and variable length subnetting; and routing protocols, both distance vector and link-state, using RIP, EIGRP and single area OSPF as examples.
Prerequisite(s): NET 1002.
Lecture two hours a week, tutorial/laboratory three hours a week.

NET 2000 [0.5 credit]
Intermediate Networking
Dealing with networks of greater complexity, particularly in the access layer. LAN switching (including VLANs, trunking, VTP, interVLAN routing, Spanning Tree and related protocols), network design considerations, and an introduction to wireless theory and implementation.
Prerequisite(s): NET 1005.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 2001 [0.5 credit]
Wide Area Networking
Theory and technologies extending LANs to WANs. Topics covered include WAN principles and standards, PPP, frame relay and ATM architecture and concepts, scaling IP addresses using NAT and DHCP, secure networking concepts including use of access control lists (ACLs) and virtual private networks.
Prerequisite(s): NET 2000.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 2002 [0.5 credit]
Desktop Operating Environments
DOS and Windows are used to illustrate desktop operating system concepts such as file system management, system utilities, memory management, boot process troubleshooting, and environment customizations. Client-server architecture; server configuration settings, connection to a domain, secure remote access including VPN; DHCP, DNS and Active Directory.
Prerequisite(s): restricted to students in the B.I.T. degree program.
Lecture two hours a week, tutorial/laboratory two hours a week.

NET 2003 [0.5 credit]
Linux Networking
Introduction to Unix and Linux operating systems, the command line, and network server operating environments. Students study Unix/Linux as a network server, including the configuration of services and protocols such as DNS, NTP, SSH, SMB, SMTP, POP3, IMAP, HTTP, and DHCP. Basic server security is introduced, including the creation of firewalls.
Prerequisite(s): NET 2002.
Lecture two hours a week, tutorial/laboratory two hours a week.

NET 2004 [0.5 credit]
Communication Skills for NET
Development of competence in written and oral communication in relation to network design, development, and management. Focus on technical reports, proposals, and other related project documents; formal and informal oral presentations.
Prerequisite(s): restricted to students in the B.I.T. degree program.
Lecture and tutorial three hours a week.

NET 2006 [0.5 credit]
Object Oriented Programming
Study of Object Oriented Programming principles, emphasizing the development of efficient and reusable systems. Topics include encapsulation, polymorphism, overloading, memory management, exception handling, and design templates and libraries.
Prerequisite(s): NET 1000.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 2007 [0.5 credit]
Basics of Transmission Systems
Introduction to the physical layer of digital communication. Coverage of the transmission media (copper, fiber, cable, wireless), modulation, coding, equalization and synchronization. Examples: dial up modems, ADSL, Ethernet, T-carrier, Cable modem, SONET and wireless LAN. Factors affecting transmission error rates. Lab and field test equipment.
Prerequisite(s): BIT 1003.
Lectures three hours a week, tutorial/laboratory three hours 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.
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.
Prerequisite(s): NET 1004 and NET 2006.
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.
Prerequisite(s): NET 2006.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 3006 [0.5 credit]
Network Management and Measurements
Network management fundamentals, standards, and protocols. The Simple Network Management Protocol (SNMP). Structure of Management Information and MIB. SNMP management challenges and the need for real-time measurements. Introduction to tools and applications for network measurements and monitoring.
Prerequisite(s): third-year standing in the Networking program.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 3007 [0.5 credit]
Network Security
Basics of Information Technology security. Students are introduced to the goals of IT security, common threats and countermeasures including firewalls, SSL technologies and IP Masquerading. Several operating environments will be studied as examples. This course will also include a section on computer ethics.
Prerequisite(s): third-year standing in the Networking program.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 3008 [0.5 credit]
Advanced Network Routing
Routing within, and between, autonomous systems. Advanced control and optimization of routing protocols and manipulation of traffic paths with a focus on EIGRP and OSPF. Branch/Home Office connectivity and Internet reachability via BGP. Routing of IPv6 within an enterprise.
Prerequisite(s): NET 2001.
Lectures three hours a week, tutorial/laboratory three hours a week.

NET 3009 [0.5 credit]
Software Engineering
Introduction to all phases of software lifecycle: requirement analysis, function specification, software design, design documentation, coding, unit testing, system integration, product verification, quality assurance and control. Project management aspects. Software reuse. Source code control (configuration management).
Prerequisite(s): third-year standing in the Networking program.
Lectures three hours a week, tutorial/laboratory one hour a week.

NET 3010 [0.5 credit]
Web Programming
Architectures, protocols and languages used to develop dynamic Web content, including HyperText Markup Language (HTML, DHTML), Universal Resource Identifiers (URI) and HyperText Transport Protocol (HTTP) and Common Gateway Interface (CGI). JavaScript and Java are used to model cross-platform Web programming.
Prerequisite(s): NET 2006, 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. Supporting advanced services including multicasting, and maintaining QoS for converged traffic (wireless, voice, video).
Prerequisite(s): NET 2001.
Lectures three hours a week, tutorial/laboratory three hours a week.

NET 3900 [0.5 credit]
Wireless Networks
Study of 802.11 protocol family, Wi-Fi, and authentication protocols. Security and other design issues for WLANs. Deployment considerations for mobile networks, hotspots, bridges and access points. Wireless network management challenges.
Prerequisite(s): third-year standing in the Networking program.
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.
Prerequisite(s): fourth-year standing in the Networking program or permission of the instructor.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 4001 [0.5 credit]
Network Simulation
Introduction to discrete event simulation; fundamental stochastic models for networking; queueing theory; deterministic algorithms for networking; confidence intervals; introduction to network modeling. Simulation exercises including traffic monitoring, congestion, routing protocols, resource utilization and growth planning using OPNET simulation tool.
Prerequisite(s): BIT 2000.
Lectures three hours a week, tutorial/laboratory two hours a week.

NET 4003 [0.5 credit]
Computer Systems Architecture
History and evolution of computers. Models and functional descriptions of CPU, bus, memory, I/O. Internal data transfer and storage concepts. Bus protocols. Memory organization and cache principles. Digital logic and simple logic designs of CPU, buses, memory. Concepts of virtual machines, parallel computing, cloud computing.
Prerequisite(s): third year standing in the Networking program, NET 2003 and NET 3001.
Lectures three hours a week, tutorial/laboratory one hour 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 CORBA, introduction to XML. Client-server and peer-to-peer models. Modern architectures such as publish-subscribe and web services.
Prerequisite(s): NET 3010.
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.Prerequisite: fourth-year standing in Networking program or permission of the instructor.
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, multimedia), culminating in problem resolution throughout a complex enterprise network.
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.
Prerequisite(s): fourth-year standing in Networking program or permission of the instructor.
Lectures three hours a week, tutorial/laboratory one hour a week.

NET 4900 [0.5 credit]
Network Technology 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.
Prerequisite(s): fourth-year standing in the Networking program.
Tutorial hours arranged.

NET 4901 [1.0 credit]
Network Technology 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.
Prerequisite(s): fourth-year standing in the Networking program.
Tutorial hours arranged.

Summer session: some of the courses listed in this Calendar are offered during the summer. Hours and scheduling for summer session courses will differ significantly from those reported in the fall/winter Calendar. To determine the scheduling and hours for summer session classes, consult the class schedule at central.carleton.ca

Not all courses listed are offered in a given year. For an up-to-date statement of course offerings for the current session and to determine the term of offering, consult the class schedule at central.carleton.ca