

Master of Engineering in
Cybersecurity Policy &
Compliance

Master of Science in
Systems Engineering

Master of Science in
Engineering Management

Master of Science in
Electrical Engineering

THE GEORGE
WASHINGTON
UNIVERSITY

WASHINGTON, DC

Raytheon

***Classes begin
January 2020***

Shahram Sarkani, Ph.D., P.E.

Professor of Engineering Management & Systems Engineering
Academic Director & Faculty Advisor, SEAS/EMSE Online & Off-Campus Programs

October 9th, 2019

Information Session Agenda

- Overview of George Washington University
- Online Master's Degree Programs
 - M.Eng. Overview
 - M.S. Overview
 - Application Information
- Q & A Session

George Washington University

- Chartered in 1821 by an Act of Congress
- 10 colleges and schools, including the School of Engineering & Applied Science
- More than 15,000 graduate students
- Alumni network of 275,000 in 134 countries
- Accredited by the Middle States Commission on Higher Education
- Ranked #28 in US News Best Online Graduate Engineering Programs
- Ranked #16 US News Best Online Graduate Engineering Programs for Veterans



Raytheon

Our Online Programs

- Instructors, course content, and degree conferred are identical to the main campus programs
- Classes meet by synchronous distance learning technology (WebEx Meeting Center)
- Supported by Blackboard, GW's web-based course management software
- Exams are taken through a secure testing platform, RPNow
- Classes are recorded during the session for future review if needed
- Required textbooks and software are provided to students before the start of each course at no charge

Our Online Programs

Online Master of Engineering (M.Eng.)

Students major in Cybersecurity Policy & Compliance

- 10 courses | 3 credits each
- Planned completion May 2022

Online Master of Science (M.S.) Electrical Engineering

- 10 courses | 3 credits each
- Planned completion May 2022

Online Master of Science (M.S.) Engineering Management

Online Master of Science (M.S.) Systems Engineering

- 12 courses | 3 credits each
- Planned completion December 2022

All Programs

- Classes start January 2020
- 4 courses per year

Online Master of Engineering (M.Eng.)

Cybersecurity Policy and Compliance (CPC)

The CPC major incorporates multidisciplinary curriculum drawn from three departments in the School of Engineering and Applied Science:

1. Computer Science
2. Electrical & Computer Engineering
3. Engineering Management & Systems Engineering

Students in the program will learn new skills and become familiar with the latest methodologies and tools necessary to remain at the forefront of this fast-paced, ever-changing discipline.

M.Eng. Curriculum

- The M.Eng. program consists of 10 graduate courses
 - CSCI 6012 Cybersecurity and Privacy
 - CSCI 6013 Security in Mobile Computing
 - CSCI 6532 Information Policy
 - CSCI 6534 Information Security in Government
 - ECE 6132 Secure Cloud Computing
 - EMSE 6540 Management of Info & Systems Security
 - EMSE 6542 Cybersecurity Risk Mgt & Compliance
 - EMSE 6543 Mgg Protection of Info Assets & Systems
 - EMSE 6544 Audit, Monitor, Intrus Detect-Info Sec Mgrs
 - EMSE 6546 Cybercrime for Info Security Managers

Schedules, regulations and policies subject to change; course substitution in the curriculum is usual and should be expected.

Online Master of Engineering (M.Eng.)

- Next Session Begins January 2020 | Program Duration about 2.5 years
- Classes meet live online one night per week | 6:30p to 9:30p Eastern
- Standard schedule is 4 courses per year, 10 weeks per course

- 2020: Four Courses
(2 Spring, 2 Fall)
- 2021: Four Courses
(2 Spring, 2 Fall)
- 2022: Two Courses
(2 Spring)

Session	# Courses	# Credits	Approximate Timeframe
Spring-1	1	3	Early Jan to Mid-Mar
Spring-2	1	3	Late Mar to late May
Fall-1	1	3	Mid-Aug to mid-Oct
Fall-2	1	3	Late Oct to mid-Dec

* Optional accelerated 5-week Summer session also available

Online Master of Engineering (M.Eng.)

Admission Requirements

- Bachelor's Degree from an accredited institution
 - *Experience in IT field is required for those without a technical degree.*
- Undergraduate GPA of 2.7 (on a 4-point scale) or better

Online Master of Science (M.S.)

Engineering Management

Provides a technical, specialized alternative to a traditional business degree. Bridges gap between engineering and management to prepare students for the Project Management Professional (PMP)[®] certification exam and organizational leadership roles.

Systems Engineering

Designed to help technology professionals advance their technical and project management skills to supervise the development and implementation processes, while maintaining quality and performance standards. Prepares students for the Certified Systems Engineering Professional (CSEP) exam.

Electrical Engineering (EE)

Both core engineering and specialized technical learning needed to plan, implement, and manage sophisticated electrical systems.

M.S. Curriculum

- Required (Core) Courses - SE & EM
 - EMSE 6001-The Mgt of Tech Organizations
 - EMSE 6020-Decision Making with Uncertainty
 - EMSE 6099-Problems in Engineering Management and Systems Engineering
 - EMSE 6410-Survey of Finance and Engineering Economics
 - EMSE 6505-Knowledge Management I
 - EMSE 6580-Information and Software Engineering
 - EMSE 6801-Systems Engineering I
 - EMSE 6820-Program and Project Management

M.S. Curriculum

- **Engineering Management** focus courses
 - EMSE 6005-Organizational Behavior for the Engineering Manager
 - EMSE 6014-Management of Engineering Contracts
 - EMSE 6070-Management of Research and Development
 - EMSE 6825-Project Cost and Quality Management
- **Systems Engineering** focus courses
 - EMSE 6805-Systems Engineering II
 - EMSE 6810-Systems Analysis and Management
 - EMSE 6815-Requirement Engineering
 - EMSE 6840-Applied Enterprise Systems Engineering

Schedules, regulations and policies subject to change; course substitution in the curriculum is usual and should be expected.

Online Master of Science (M.S.) EM/SE

- Next Session Begins January 2020 | Program Duration about 3 years
- Classes meet live online one night per week | 6:30p to 9:30p Eastern
- Standard schedule is 4 courses per year, 10 weeks per course

- 2020: Four Courses
(2 Spring, 2 Fall)
- 2021: Four Courses
(2 Spring, 2 Fall)
- 2022: Four Courses
(2 Spring, 2 Fall)

Session	# Courses	# Credits	Approximate Timeframe
Spring-1	1	3	Early Jan to Mid-Mar
Spring-2	1	3	Late Mar to late May
Fall-1	1	3	Mid-Aug to mid-Oct
Fall-2	1	3	Late Oct to mid-Dec

* Optional accelerated 5-week Summer session also available

Online Master of Science (M.S.)

Admission Requirements

- Bachelor's Degree from an accredited institution
 - *Major in Engineering, a physical science, mathematics, computer science, business administration, or information technology*
- Undergraduate GPA of 2.7 (on a 4-point scale) or better
- Grade of C or better in two college calculus courses
 - Applicants who do not meet this requirement but are otherwise qualified may be conditionally admitted and required to take an additional 3-credit hour course, during their first year of graduate study (EMSE 4197 – Special Topics: Quantitative Methods in Engineering Management)

M.S. Curriculum - EE

- Core Courses

- ECE 6045 Foundations of Electrical Engineering
- ECE 6010 Linear Systems Theory
- ECE 6025 Signals and Transforms in Engineering
- ECE 6800 Computational Technologies in Electrical Engineering
- EMSE 6820 Program and Project Management
- ECE 6015 Stochastic Processes in Engineering

M.S. Curriculum - EE

■ Electrical Power and Energy focus courses

- ECE 6610 Electrical Energy Conversion
- ECE 6620 Electrical Power Systems
- ECE 6662 Power Electronics
- ECE 6669 Smart Power Grids

■ Communications and Networks focus courses

- ECE 6035 Intro to Communication Networks
- ECE 6510 Communication Theory
- ECE 6520 Mobile & Wireless Comm. Systems
- ECE 6550 Network Architectures & Protocols

Schedules, regulations and policies subject to change; course substitution in the curriculum is usual and should be expected

Online Master of Science (M.S.) EE

- Next Session Begins January 2020 | Program Duration about 2.5 years
- Classes meet live online one night per week | 6:30p to 9:30p Eastern
- Standard schedule is 4 courses per year, 10 weeks per course
- 2020: Four Courses
(2 Spring, 2 Fall)
- 2021: Four Courses
(2 Spring, 2 Fall)
- 2022: Two Courses
(2 Spring)

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Fall-2	1	3	Late Oct to mid-Dec

* Optional accelerated 5-week Summer session also available

Online Master of Science (M.S.) EE

Admission Requirements

- Bachelor's Degree from an accredited institution
 - *Major in Electrical Engineering or closely related field*
- Undergraduate GPA of 2.7 (on a 4-point scale) or better
- Grade of C or better in two college calculus courses
 - Applicants who do not meet this requirement but are otherwise qualified may be conditionally admitted and required to take an additional 3-credit hour course, during their first year of graduate study (EMSE 4197 – Special Topics: Quantitative Methods in Engineering Management)

Tuition Rates

Raytheon employees who join this cohort receive a discounted tuition rate.

- Tuition is \$2,500 per course. Textbooks and software are provided at no additional charge.
- Tuition is billed upon registration and due within 30 days. Payments can be made by credit card or e-check (processing fees may apply).
- Students seeking tuition assistance must submit a separate application through Raytheon

GW Application Process

Completed Application Packet includes:

- Online Application Form
- Current Resume
- Statement of Purpose (250 words or less)
- Official Academic Transcripts
- 3 Letters of Recommendation

Online application available at
emse.offcampus.gwu.edu/raytheon-admissions

All submitted materials remain property of EMSEOCP.

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GW Application Process

Academic Transcripts

Request that official transcripts be sent to our office directly from all colleges or universities attended, whether or not a degree was earned. Contact the institutions you attended previously to learn the process for requesting official transcripts.

Transcripts should be sent to applyoffcampus@gwu.edu (if sent electronically), or via mail to:

EMSE Online and Off-Campus Programs Office
The George Washington University
1 Old Oyster Point Rd., Ste 220
Newport News, VA 23602

GW Application Process

Letters of Recommendation

Three letters of recommendation are required for admission and at least one letter must come from a professional reference. Download the letter of recommendation form from application website, fill out the top portion, and email the form to the individual providing the recommendation.

GW Application Process

Application Deadline:

NOVEMBER 30, 2019

Admission decisions are made on a rolling basis and communicated via email.

Admitted applicants must complete and return a reply card by the deadline provided in admission letter.

Tuition deposit is waived for Raytheon employees.

GW Contact Information

SEAS EMSE Online & Off-Campus Programs Office

- Shahram Sarkani, Ph.D., P.E., Director
- SEAS EMSE Online and Off-Campus Programs Team
 - cohort@gwu.edu
 - Tel: 1-833-330-1454
 - Fax: 1-949-524-8638
- Shannon Finley, Senior Administrative Assistant, Admissions
 - applyoffcampus@gwu.edu
- Mark Griffith, Distance Learning Technologist
 - seasonline@gwu.edu
 - Tel: 202-422-2806



Any Questions?

Course Descriptions (M.Eng.)

CSCI 6012 Cybersecurity and Privacy

Overview of cybersecurity and privacy, including cryptography, authentication, malware, viruses, network security, anonymity, privacy and online privacy, risk management. Common cyberattacks and techniques for detection and defense. Policy and legal perspectives for managing cybersecurity missions supporting private sector and government. Cyber technologies as applied to the stability of global information and communications infrastructure; government cybersecurity policies

Course Descriptions (M.Eng.)

CSCI 6013 Security in Mobile Computing

Relationship between security strategic plan and business strategic plan. Mobile Device Solutions (MDS) to access enterprise corporate data. Bring Your Own Device (BYOD) paradigm. Mobile Device Management (MDM) best practices, policies, network controls to identify countermeasures and risk mitigation strategies against common threats. Overview of mobile security solutions for classified processing and communications. Prerequisite: CSCI 6012.

Course Descriptions (M.Eng.)

CSCI 6532 Information Policy

Roles, issues, and impacts of computer-based information systems in national and international arenas, focusing on privacy, equity, freedom of speech, intellectual property, and access to personal and governmental information. Professional responsibilities, ethics, and common and best practices in information use.

Course Descriptions (M.Eng.)

CSCI 6534 Information Security in Government

Information assurance policies and standards in the federal government as mandated by legislation; security processes following NIST standards; technical tests and validation methods used in the federal government; review of federal threats and vulnerabilities; and government positions in information assurance.

Course Descriptions (M.Eng.)

ECE 6132 Secure Cloud Computing

Security and privacy issues in cloud computing systems. Confidentiality, integrity, and availability of data and computations. Examination of cloud computing models, threat models, outsourcing, and security issues. Practical applications of secure cloud computing.

Course Descriptions (M.Eng.)

EMSE 6540 Management of Information and Systems Security

Development and management of effective security systems. Includes information, personnel, and physical security. Emphasis on risk analysis for information protection.

Course Descriptions (M.Eng.)

EMSE 6542 Cybersecurity Risk Management and Compliance

Cybersecurity threats and other risks to an organization's core business relative to people, processes, data, facilities, technology. Risk-based planning and risk management of cybersecurity at the enterprise level. Creating risk assessment and modeling approaches to cybersecurity issues that enable an enterprise to build security structures, sustain healthy cybersecurity posture, satisfy compliance with risk frameworks such as NIST's. Prerequisite: EMSE 6540.

Course Descriptions (M.Eng.)

EMSE 6543 Managing the Protection of Information Assets and Systems

Advanced topics in protection of information assets and systems, including authentication, asset control, security models and kernels, physical security, personnel security, operational security, administrative security, security configuration management, and resource control. Prerequisite: EMSE 6540.

Course Descriptions (M.Eng.)

EMSE 6544 Auditing, Monitoring, and Intrusion Detection for Information Security Managers

Methods for detecting problems with unauthorized activity in information systems and management challenges associated with those activities.

Prerequisite: EMSE 6540.

Course Descriptions (M.Eng.)

EMSE 6546 Cybercrime for Information Security Managers

Legal issues regarding information security actions related to and in response to criminal activity, including industrial espionage, back-hacking, cracking, and cyberterrorism. Transnational issues, cybercrime treaties and conventions, and cyberwar issues. Prerequisite: EMSE 6545.

Course Descriptions (M.S.)

Core Courses | Taken by students in Systems Engineering & Engineering Management

EMSE 6001. The Management of Technical Organizations

The practice of management as applied within technical organizations. Includes history of the tradition and current effective practices, research findings, and case studies, with objectives of enhanced understanding of external and internal factors influencing organizational performance and leadership requirements.

EMSE 6020. Decision Making with Uncertainty

Problem formulation. Concepts and techniques used in analyzing complex decision problems. Modeling decision problems using decision trees, probability models, multi-objective models and utility theory.

EMSE 6099. Problems in Engineering Management and Systems Engineering Capstone

Capstone project providing the opportunity to apply concepts and tools previously studied to the solution of a real-world problem. Students work in small groups, on a problem proposed by students and approved by the instructor. Open only to master's candidates in the department, preferably during the last semester of their program.

EMSE 6410. Survey of Finance and Engineering Economics

Survey of material relevant to financial decision making for engineering activity. Includes traditional engineering economy topics; fundamentals of accounting; and financial planning, budgeting, and estimating applicable to the management of technical organizations.

Course Descriptions (M.S.)

Core Courses | Taken by students in Systems Engineering & Engineering Management

EMSE 6505. Knowledge Management I (3 credits)

The foundations of knowledge management, including cultural issues, technology applications, organizational concepts and processes, management aspects, and decision support systems. Case studies.

EMSE 6580. Information and Software Engineering (3 credits)

Introduction to analysis and design of information systems including requirements analysis, project management, and software architectures. Introduction to CASE tools. (3 credits)

EMSE 6801. Systems Engineering I (3 credits)

Systems approach to the architecting and engineering of large-scale systems; elements of systems engineering; methods and standards; computer tools that support systems and software engineering; trends and directions; the integrative nature of systems engineering.

EMSE 6820. Program and Project Management (3 credits)

Problems in managing projects; project management as planning, organizing, directing, and monitoring; project and corporate organizations; duties and responsibilities; the project plan; schedule, cost, earned-value and situation analysis; leadership; team building; conflict management; meetings, presentations, and proposals.

Course Descriptions (M.S.)

Engineering Management Focus Courses

EMSE 6005. Organizational Behavior for the Engineering Manager

The behavior of individuals and groups in the context of technical organizations, focusing on relationships and interactions within the organization's operating activities. Individual and group development and motivation. Organizational structures and cultures.

EMSE 6014. Management of Engineering Contracts

Study of the total contracting process (including initial budget preparation and justification, execution of a contract, and administration of the contract to completion) considered from the viewpoints of the industrial and government buyer and the seller of technical materials and services.

Course Descriptions (M.S.)

Engineering Management Focus Courses

EMSE 6070. Management of Research and Development

Seminar on readings and classic and contemporary case studies in the strategic management of innovation and technology.

EMSE 6825. Project Cost and Quality Management

Developing project cost and resource estimates during the planning stages. Monitoring, forecasting, and controlling cost throughout the project life cycle. Project quality planning, assurance, and control. Relationships among project scope, time, cost, quality, human resources, communications, procurement, and risk. Preparation for the Project Management Professional examination. Prereq: EMSE 6820.

Course Descriptions (M.S.)

Systems Engineering Focus Courses

EMSE 6805. Systems Engineering II

Application of systems engineering tools to provide hands-on experience with essential elements of practice. Processes of requirements engineering, functional analysis and allocation, risk management, architecting; architectural heuristics, axiomatic design, analytical assessment of alternative architectures. Prereq: EMSE 6801.

EMSE 6810. Systems Analysis and Management

The systems or holistic approach as a methodology for making decisions and allocating resources. Analysis by means of objectives, alternatives, models, criteria, and feedback. Prereq: EMSE 6801.

Course Descriptions (M.S.)

Systems Engineering Focus Courses

EMSE 6815. Requirements Engineering

Requirements in systems engineering, including requirement types, quality factors, elicitation methods, analysis, derivation of implicit requirements, management, traceability, verification, cross-requirement assessments, and validation. Focus on writing and managing quality requirements in complex systems. Prereq: EMSE 6801.

EMSE 6840. Applied Enterprise Systems Engineering

Applications of systems engineering in the DoD, other parts of the federal government, and commercial sectors. Architectural frameworks and enterprise architecting concepts and practices, including JCIDS/DODAF, Federal Enterprise Architecture Framework, and Zachman™ Framework. Enterprise architecting and advanced modeling tools. Prereq: EMSE 6801.

Course Descriptions (M.S.)

Systems Engineering Focus Courses

EMSE 6805. Systems Engineering II

Application of systems engineering tools to provide hands-on experience with essential elements of practice. Processes of requirements engineering, functional analysis and allocation, risk management, architecting; architectural heuristics, axiomatic design, analytical assessment of alternative architectures. Prereq: EMSE 6801.

EMSE 6810. Systems Analysis and Management

The systems or holistic approach as a methodology for making decisions and allocating resources. Analysis by means of objectives, alternatives, models, criteria, and feedback. Prereq: EMSE 6801.

Course Descriptions (M.S.) EE

Core Courses | Taken by all Electrical Engineering Students

ECE 6045. Foundations of Electrical Engineering

Circuit elements and circuit analysis techniques. Circuit theorems for performing such fundamental computations for electrical engineering as sinusoidal steady-state analysis and maximum power or power dissipation calculations. Hands-on experience with CAD tools for designing circuits.

ECE 6010. Linear Systems Theory

Introduction to linear systems theory. Topics include linear vector spaces and linear operators, mathematical representation of dynamic linear systems, concept of state and solution of the state equation, controllability and observability, canonical forms of the state equation, state feedback, and state estimation.

ECE 6025. Signals and Transforms in Engineering

Signal spaces and approximation. Orthogonal functions. Fourier series and transform. Bandpass signals and modulation. Hilbert transform and analytic signals. Time frequency analysis. Short-time Fourier transform. Linear systems properties. Laplace transform. Sampling and discrete-time signals. Discrete-time Fourier transform and z-transform. Wavelets.

ECE 6800. Computational Technologies in Electrical Engineering

Introduction to linear algebra and vector spaces as applied to networks and electrical systems. Orthogonal bases, projections, and least squares. Fast Fourier transforms. Eigenvalues and eigenvectors with applications. Computations with matrices. Constrained optimization in electrical systems. Network models and applications. Special relativity.

EMSE 6820. Program and Project Management

Problems in managing projects; project management as planning, organizing, directing, and monitoring; project and corporate organizations; duties and responsibilities; the project plan; schedule, cost, earned-value and situation analysis; leadership; team building; conflict management; meetings, presentations, and proposals.

ECE 6015 Stochastic Processes in Engineering

Axioms of probability; conditional probability; independent events; sequential experiments. Single and multiple random variables. Discrete-valued and continuous-valued stochastic processes; discrete-time and continuous-time stochastic processes; mean, auto-correlation and autocovariance functions; multiple random processes; stationary stochastic processes and linear time-invariant systems; ergodicity; Markov chains. Examples from engineering applications

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Course Descriptions (M.S.) EE

Electrical Power and Energy Focus Courses

ECE 6610. Electrical Energy Conversion

Three-phase and single-phase AC rotating machines and transformers, DC machines, rotating machines as circuit elements, power semiconductor converters. Renewable generation, utility grid integration, smart grid applications. May be taken for graduate credit by students in fields other than electrical engineering.

ECE 6620. Electrical Power Systems

AC power grids, transmission line parameters, load flow, economic dispatch voltage, frequency, and power flow control. Voltage, current, and power limitations. Fault analysis and stability considerations. Effect of independent power producers and variable energy sources and energy storage.

ECE 6662. Power Electronics

The application of electronics to energy conversion. Principles of operation, analysis, and control of circuits including solid-state electronic switches. Methods of solving power electronic circuits and finding the steady-state values of important quantities. Deriving the linear model of the studied power electronic circuits and designing controllers for these devices. A general knowledge of electric circuits and linear control theory is required.

Course Descriptions (M.S.) EE

Electrical Power and Energy Focus Courses

ECE 6669. Smart Power Grids

Overview of probability theory. Overview of basic power market reliability modeling and evaluation. Generation supply reliability techniques, modeling and evaluation. Reliability of transmission system and delivery of supply. Loss of load probability evaluation. Forced and maintenance outages and impact on system reliability. Load forecasting and probability of interconnected systems. Risk evaluation in power system operation. Operating reserve techniques and indices. Distribution system reliability including substations. Composite system reliability modeling. Reliability worth and value.

Course Descriptions (M.S.) EE

Signal and Image Processing: Systems and Control Focus Courses

ECE 6015. Stochastics Processes in Engineering

Axioms of probability; conditional probability; independent events; sequential experiments. Single and multiple random variables. Discrete-valued and continuous-valued stochastic processes; discrete-time and continuous-time stochastic processes; mean, auto-correlation and autocovariance functions; multiple random processes; stationary stochastic processes and linear time-invariant systems; ergodicity; Markov chains. Examples from engineering applications.

ECE 6830. System Optimization

Parameter optimization problems, theory of minima and maxima. Optimization problems for dynamic systems, calculus of variations, the maximum principle and the Hamilton-Jacobi equation. Optimization problems with constraints, optimal feedback systems. Numerical solution of optimal problems. Prerequisite: ECE 6010.

ECE 6835. Nonlinear Systems

Definition of linear and nonlinear systems; introduction to approximate analysis of nonlinear systems: describing functions, Krylov and Bogoliubov asymptotical method, and Tsytkin locus. Forced oscillations: jump resonance. Stability analysis: Liapunov criterion. Luré problem and Popov's method. Prerequisite: ECE 6010.

Course Descriptions (M.S.) EE

Signal and Image Processing: Systems and Control Focus Courses

ECE 6850. Pattern Recognition

Random vectors, transformations; hypothesis testing, error probability, sequential methods. Bayes, other linear classifiers; discriminant functions, parameter estimation, learning, and dimensionality reduction; nonparametric methods; clustering; feature selection and ordering; computer applications and projects. Students should have completed at least one prior course in probability and statistics, such as ECE 6015 or equivalent, prior to enrollment. Contact the instructor if uncertain as to whether this requirement has been met. Prerequisite: ECE 6015.

ECE 6855. Digital Signal Processing Techniques

Signal and system representation, sampling and quantization, transform techniques. Recursive and nonrecursive digital filter design, recursive estimation, linear predictive filtering. Fast algorithms for signal processing. Current topics. Prerequisite: ECE 6015.

Course Descriptions (M.S.) EE

Communications & Networks Focus Courses

ECE 6035. Introduction to Communication Networks

Layered protocol architectures. Digital transmission, fundamental limits. Error detection and ARQ protocols. Data link layer and control. Multiple access protocols. Circuit and packet switching. Multiplexing. Routing. Flow and congestion control, queue management. LAN standards. TCP/IP. Next-generation Internet.

ECE 6510. Communication Theory

Principles of digital communications. Channels, digital modulation; optimum receivers and algorithms in the AWGN; coherent, non-coherent, and fading channels. Correlation detectors, matched filters; diversity. Bounds on performance of communications, comparison of communications systems and implementation issues. Prerequisite: ECE 6015.

Course Descriptions (M.S.) EE

Electrical Power and Energy Focus Courses

ECE 6520. Mobile and Wireless Communication Systems

Characterization of mobile and wireless channels. Indoor and outdoor path loss models. Multipath propagation. Fading and fading countermeasures: coding, equalization. Power control. Cellular design and frequency reuse. Modulation and coding techniques. Spread Spectrum and OFDM. Random access methods. Code and Space Division Multiple Access, MIMO. Prerequisite: ECE 6510.

ECE 6550. Network Architectures and Protocols

The course will cover network topologies and control structures; Switching and routing of information streams; Internet transmission protocols; Data representations and codes; Application protocols; Mail and file transfer protocols; and Network management systems. Prerequisite: ECE 6035.