Master of Science in Engineering Technology Degree Plan - Network Communications Track

The Master of Science in Engineering Technology with an emphasis in Network Communications provides an advanced knowledge of computer networks. The program has a diverse set of course offerings in networking fundamentals, security, network management, protocols, and algorithms. Furthermore, application areas such as optical networking, sensor networks, wireless networks and network programming are also available in the degree program. Advanced applied research opportunities provide an enriching academic experience. Competitive funding opportunities exist for outstanding candidates in research and instruction. Additionally, the program encourages practical experience through industry partnerships. Our graduates fill vital engineering management and supervisory roles in every industry where networking technologies are essential, including energy, chemical, healthcare, telecommunications and aerospace.

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<th>M.S. Engineering Technology (31/34 hours) Network Communications Track</th>
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<td>Core Courses: (7 hours)</td>
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<td>ELET 6100: Seminar in Network Communications</td>
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<td>ELET 6138: Analysis of Data Networks</td>
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<td>TEPM 6301: Project Management Principles</td>
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<td>Required Courses: (Choose 18 ELET hours)</td>
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<tr>
<td>Research: Choose Thesis (6 hours) or Project (9 hours)</td>
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<td>Thesis Option: ELET 6399 (6)</td>
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TEPM 6301: Project Management Principles
Cr. 3. (3-0). Prerequisite: Technical undergraduate degree or consent of graduate faculty advisor. Overview of project management for technology-intensive workplaces. The basic tools of project management, including breakdown structure, scheduling, contracting, earned value analysis, and risk management, are described, as well as the elements that are critical to a technical project's success.

ELET 6100: Network Communications Seminar
Cr. 1. (1-1). Prerequisites: None. This course covers areas of interest in network communications. Students are introduced to research methods and fields available in the MT program.

ELET 6300: Computer Network Programming
Cr. 3. (3-0). Prerequisites: Familiarity with UNIX and Windows operating systems, C/C++ and Java Programming languages or consent of instructor. This course covers and introduction to the programming aspects of computer networks. This will include an introduction to various network protocols and programming with UNIX sockets. The course is targeted for graduate students or other students who are interested in learning the basics of network programming for the internet.

ELET 6301: Applied Digital Signal Processing
Cr. 3. (3-0). Prerequisites: ELET 4308 and ELET 6301. Application of digital signal processing principles and techniques in modern digital communications and control systems.

ELET 6302: Advanced Wireless Networks
Cr. 3. (3-0). Prerequisites: ELET 4302, ELET 6315 and ELET 6325 or consent of instructor. Digital modulation techniques, multiplexing, and radio-wave propagation. Analysis and design of wireless data communication system. Performance evaluation of wireless networks.

ELET 6303: Applied Neural Networks
Cr. 3. (3-0). Prerequisites: Graduate standing and consent of instructor. Simple neural nets for pattern classification, pattern association, backpropagation neural network, adaptive resonance theory, other neural networks, and fuzzy-neural networks.

ELET 6304: Applied Digital Control Systems
Cr. 3. (3-0). Prerequisite: ELET 6340 or consent of the instructor. Analysis of sampled-data control systems. Discrete-time controller design, analysis and implementation techniques with applications.

ELET 6305: Analytical Methods in Engineering Technology
Cr. 3. (3-0). Prerequisites: Graduate standing or consent of the instructor. Coverage of selected mathematical analysis tools in engineering technology application areas.

ELET 6311: Applications of Information Theory
Cr. 3. (3-0). Prerequisites: ELET 6301 and TECH 6360, or consent of instructor. Basic information theory is used to study the transmission efficiency of various systems. Signals are analyzed in the time and frequency domains; sampling theory and data compression methods will be studied. Applications will include Spread Spectrum methods and optical and speech recognition.

ELET 6312: Network Management
Cr. 3. (3-0). Prerequisite: Technical undergraduate degree or consent of instructor. Introduction to network management with an emphasis upon current practices in managing the operation and maintenance of a computer network.

ELET 6313: Network Security
Cr. 3. (3-0). Prerequisite: Technical undergraduate degree or consent of instructor. Introduction to current security techniques for computer and other communications networks.

ELET 6314: Project Management in Communications
Cr. 3. (3-0). Prerequisite: Currently enrolled graduate student or consent of instructor. Introduction to project management with an emphasis upon current practices in the management of electronic communications systems. Topics include the Manager, the Organization, and the Team.

ELET 6315: Sensor Networks
Cr. 3. (3-0). Prerequisite: Graduate standing or consent of instructor. Sensor networking: wireless sensor communications, location awareness, power management, ad hoc routing, sensor networking standards, and applications.

ELET 6316: Network Routing Algorithms and Protocols
Cr. 3. (3-0). Prerequisite: ELET 4325 or equivalent graduate standing or consent of instructor. This course explores network routing algorithms and protocols for various networking environments. Interior gateway protocols as well as exterior gateway protocols will be studied. Emphasis will be on analysis, design and implementation.

ELET 6317: Optical Networks
Cr. 3. (3-0). Prerequisite: Graduate standing or consent of instructor. Optical fiber transmission fundamentals, passive optical components, optical transmitters, receivers, optical amplification, and all-optical networking.

ELET 6318: Analysis of Data Networks
Cr. 3. (3-0). Prerequisites: Graduate status or consent of instructor. Introduction to network performance analysis concepts and tools, including statistical data summarization, queuing and simulation techniques.

ELET 6319: The Principle and Application of Fuel Cell Technology
Cr. 3. (3-0). Prerequisite: Graduate status or consent of instructor. Systematic development of fuel cells addressing fundamental principles, current and potential applications, and technology challenges in making fuel cells a clean energy option in the society.

ELET 6320: Smart Grid Essentials
Cr. 3. (3-0). Prerequisites: Graduate status or consent of instructor. Introduction to power systems, focusing on the fundamentals such as conventional generation, transmission and distribution. Power system control aspects and changes in the electrical grid will change in the future.

ELET 6325: Practicum in Network Communications
Cr. 3. (3-0). Prerequisites: Completion of 12 graduate credits, a 3.25 GPA and consent of advisor. Work experience in a pre-approved industrial site/research facility. Analyze, integrate, improve, organize, and manage a complex system relevant to the program. With faculty advisor consent, course may be repeated twice.

ELET 6331: Fundamentals of Medical Imaging
Cr. 3. (3-0). Prerequisites: Graduate status or consent of instructor. Physical principles underlying current medical imaging procedures, including X-Ray Imaging, Computed Tomography, Magnetic Resonance Imaging, Positron Emission Tomography, Ultrasound Imaging, Electro-and Magneto-encephalography, Near Infrared Spectroscopy and Thermal Imaging.

ELET 6332: Physiological Systems Modeling and Simulation
Cr. 3. (3-0). Prerequisites: Graduate status or consent of instructor. Basic aspects of human physiology. Introduction of engineering and computational approaches for modeling physiological systems. Hands-on experience with elementary physiological measurements.

ELET 6334: Information Processing in Sensor Networks
Cr. 3. (3-0). Prerequisites: ELET 6315. Sensor network hardware/software co-design; implications of energy on otherwise resource-constrained nodes; algorithms for network self-configuration and adaption; collaborative data aggregation and processing; tasking and programming.

ELET 6340: Electromechanical Systems Control
Cr. 3. (3-0). Prerequisites: Graduate standing or consent of the instructor. Electromechanical systems models, sensors and actuators. Classical control design, analysis and implementation techniques with applications.

ELET 6342: Modern Control Systems Applications
Cr. 3. (3-0). Prerequisites: ELET 6305 and ELET 6340. State-space representation of systems models, state-space system properties (controllability, observability, stability), regulation and tracking with applications.

ELET 6346: Process Control Technology
Cr. 3. (3-0). Prerequisites: ELET 6340 or consent of the instructor. Process identification, control modes and enhancements to PID controllers. Model Predictive and dynamic matrix control applications to install processes.

ELET 6348: Power Systems Control Technology
Cr. 3. (3-0). Prerequisites: ELET 6340 or consent of the instructor. Electric power systems modeling and analysis. Grid integration of intermittently distributed energy resources. Power system control fundamentals.

ELET 6396: Master's Project
Cr. 3. (3-0). Master's project. May be repeated for six semester hours credit.

ELET 6397: Selected Topics in Network Communications
Cr. 3. (3-0). Prerequisite: approval of department chair. May be repeated for credit when topics vary.

ELET 6399: Master's Thesis
Cr. 3. May be repeated for six semester hours credit. 

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