The Master of Science in Engineering Technology with an emphasis in Computational Health Informatics is a highly interdisciplinary degree that aims at preparing the next generation of engineers for a career in the technological transformation of healthcare. The program places specific emphasis on mobile computing, medical imaging and instrumentation, wearable sensors, multidimensional data mining, and information security as applied to health care delivery. Driven by a strong market demand, the program is designed to provide students with a solid background in analytical methodologies, computational tools, devices, physiological modeling and simulation, and biomedical devices relevant to healthcare applications for detecting diseases, assisting with treatment, and monitoring efficacy of therapeutic interventions.

| M.S. Engineering Technology (31/34 hours) - Computational Health Informatics Track |
| Core Courses: (7 hours) | Hours (7) |
| ELET 6100: MSET Seminars | 1 |
| ELET 6305: Analytical Methods in Engineering Technology | 3 |
| TEPM 6301: Project Management Principles | 3 |
| Block A Courses: (12 hours) | Hours (12) |
| Block B Courses: (6 hours for Thesis or 12 hours for Project) | Hours (6 or 12) |
| Research: | Hours (6 or 3) |
| Thesis Option: ELET 6399 (6) | 6 |
| Project Option: ELET 6396 (3) | 3 |

**CORE COURSES**

**ELET 6100: MS Engineering Technology Seminars**  
Cr. 1. (1-1). Prerequisites: None. This course covers areas of interest in engineering technology. Students are introduced to research methods and fields available in the MT program.

**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.

**TEPM 6301: Project Management for Technology Professionals**  
Cr. 3. (3-0). Prerequisites: Graduate standing 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.

**BLOCK A COURSES**

**ELET 6301: Applied Digital Signal Processing**  
Cr. 3. (3-0). Prerequisites: ELET 4308 and ELET 3301. Application of digital signal processing principles and techniques in modern digital communications and control systems.

**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 6397: Mobile Computing**  
Cr. 3. (3-0). Prerequisites: Graduate status or consent of instructor. Application design, development environment, application environment, wireless communication technologies, user experience, distributed computing.

**ELET 6397: Modern programming Practices and Applications**  
Cr. 3. (3-0). Prerequisites: Graduate status or consent of instructor. Fundamental principles and models of object-oriented programming, data structures (including lists, stacks, queues, binary search trees, hash tables, and sets), UML class diagrams and design principles that promote re-usability and maintainability of software.

**BLOCK B COURSES**

**ELET 6360: 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 6363: 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.

**BTEC 6304: Computational Methods in Biotechnology**  
Cr. 3.0 (3-0) Prerequisite: Graduate standing and consent of instructor. Application of computers to solve problems in biotechnology and medicine. Statistical analysis and inference (experimental design and analysis), biological modeling and simulation, and

**ELET 6397: Machine Learning**  
Cr. 3. (3-0). Prerequisites: Graduate standing or consent of instructor. Supervised learning, support vector machines, model and feature selection, learning theory, unsupervised learning, clustering, reinforcement learning and control.

**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, biological imaging.

**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 6397: Biomedical Sensors and Instrumentation**  
Cr. 3. (3-0). Prerequisite: Graduate standing or consent of instructor. Basic sensors and principles, amplifiers and signal processing, biopotentials, blood pressure and sound, flow and volume of blood, chemical biosensors, clinical laboratory instrumentation, therapeutic and prosthetic devices.

**ELET 6397: Mobile Application Development**  
Cr. 3. (3-0). Prerequisite: Graduate standing or consent of instructor. Application development fundamentals, mobile operating systems, basic interaction, language fundamentals, user interface components, human interface, collection and utility apps, tables, cloud services.

**ELET 6397: Quantitative Biology & Medicine**  
Cr. 3. (3-0). Prerequisite: Graduate standing or consent of instructor. Computational image analysis, statistical data analysis, and mathematical modeling to extract quantitative data on cellular and biological processes from optical imaging, and screening of medical images for anomaly detection.

**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 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 6325: Practicum in Computational Health Informatics**  
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.

**MECT 6310: Instrumentation and Measurement**  
Cr. 3. (3-0). Prerequisites: Graduate standing and consent of the graduate faculty advisor. Principles of measuring systems including electronic, pneumatic and mechanical feedback, interface and control systems as they are used in modern manufacturing automation.

**MECT 6360: Fundamentals of Biomechanics**  
Cr. 3. (3-0). Prerequisites: Graduate standing and consent of the graduate faculty advisor. Introduction to physiology, biomechanics historical perspective, mechanical measuring techniques, tissue engineering, growth & remodeling, biofluid mechanics, and solid mechanics applied to: skeletal muscle, bone & cartilage and cardiovascular system.

**MECT 6361: Cardiovascular Mechanics**  
Cr. 3. (3-0). Prerequisites: Healthy/diseased cardiovascular physiology, histology, cellular and extracellular matrix relations, solid mechanics, hemodynamics, applied thermodynamics (balance laws), constitutive formulations, stress/strain relationships, kinematics, mechanotransduction, growth and remodeling, and technological advancements to treat cardiovascular disease.

**CIS 6321: Introduction to Information Systems Security Cr. 3. (3-0).**  
Cr. 3. (3-0). Prerequisite: Graduate standing. Overview of information systems security issues for technology professionals from an applied perspective.

**CIS 6322: Secure Enterprise Computing Cr. 3. (3-0).**  
Cr. 3. (3-0). Prerequisite: CIS 6321 or consent of graduate faculty advisor. Enterprise security administration for technology professionals through server operating systems architecture and configuration; hands-on experience with UNIX and Windows operating systems.

**ELET 6319: The Principle and Application of Fuel Cell Technology**  
Cr. 3. (3-0). Prerequisites: 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 6396: Master's Project
Cr. 3. (3-0). Master's project.

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

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