Appendix D: Course List for Academic Calendar

Year 1			
Course	**Credits**	**Title**	**Brief Description**
LE/EECS 1011	**3**	**Computational Thinking Through Procedural Programming and Mechatronics**	The Objectives of 1011 are threefold: providing a first exposure to procedural programming, teaching students a set of soft computing skills (such as reasoning about algorithms, tracing programs, test-driven development), and demonstrating how computers are used in a variety of engineering disciplines. It uses problem-based pedagogy to expose the underlying concepts and an experiential laboratory to implement them. An integrated computing environment (such as MATLAB) is used so that students can pick up key programming concepts(such as variables and control flow) without being exposed to complex or abstract constructs. The problems are chosen with consultation with the various engineering disciplines in the Faculty with a view of exposing how computing is used in these disciplines. **Course credit exclusions:** LE/EECS1541 3.00. **As of Fall 2023, this course is offered as a Blended Learning Course**
LE/ENG 1101	**4**	**Renaissance Engineer 1: Ethics, Communication & Problem Solving**	Who is an engineer and what are their roles as creators of technology in an evolving world? This course explores ethical frameworks; equity, diversity & inclusion (EDI); academic integrity; communications strategies for technical subjects in oral and written forms; creative problem solving especially when dealing with ambiguity, uncertainties, and open-ended problems in a technical context; problem definition strategies. Students participate in experiential education activities and learn to reflect on their experiences.
SC/MATH 1013	**3**	**Applied Calculus I**	Introduction to the theory and applications of both differential and integral calculus. Limits. Derivatives of algebraic and trigonometric functions. Riemann sums, definite integrals and the Fundamental Theorem of Calculus. Logarithms and exponentials, Extreme value problems, Related rates, Areas and Volumes. **Prerequisite**: SC/MATH 1520 3.00, or 12U Calculus and Vectors (MCV4U) or equivalent. **Course credit exclusions:** SC/MATH 1300 3.00, SC/MATH 1506 3.0; SC/MATH 1530 3.00, SC/MATH 1550 6.00, GL/MATH/MODR 1930 3.00, AP/ECON 1530 3.00, SC/ISCI 1401 3.00 and SC/ISCI 1410 6.00.
SC/MATH 1025	**3**	**Applied Linear Algebra**	Topics include spherical and cylindrical coordinates in Euclidean 3-space, general matrix algebra, determinants, vector space concepts for Euclidean n-space (e.g. linear dependence and independence, basis, dimension, linear transformations etc.), an introduction to eigenvalues and eigenvectors. **Prerequisites:** 12U Advanced functions (MHF4U) or equivalent. **Course credit exclusions:** SC/MATH 1021 3.00, SC/MATH 2221 3.00, GL/MATH/MODR 2650 3.00.
SC/PHYS 1800	**3**	**Engineering Mechanics**	Survey of the fundamental concepts of statics and dynamics with an emphasis on engineering applications. This is a calculus-based course intended primarily for engineering students. **Prerequisites:** 12U Physics or OAC Physics or SC/PHYS 1510 3.00. MHF4U Advanced Functions and MCV4U Calculus and Vectors, or 12U Advanced Functions and Introductory Calculus, or OAC Algebra and OAC Calculus. Corequisites: SC/MATH 1013 3.00 or SC/MATH 1300 3.00 or SC/MATH 1505 6.00. **Course Credit Exclusions:** SC/PHYS 1010 6.0, SC/PHYS 1011 3.00, SC/PHYS 1410 6.0, SC/PHYS 1411 3.00, SC/PHYS 1420 6.0, SC/PHYS 1421 3.0, SC/ISCI 1310 6.0, SC/ISCI 1301 3.0.
LE/EECS 1021	**3**	**Object Oriented Programming from Sensors to Actuators**	Introduces student to computational thinking - a process-based approach to problem solving. It uses a problem-based pedagogy to expose the underlying concepts and an experiential laboratory to implement them. The programming language is chosen so that it is widely used in a variety of applications, is object-oriented, and is of industrial strength (Java is an example of such a language). The problems are chosen in order to expose abstract programming concepts by immersing them in relevant and engaging applications. The experiential laboratory is based on sensors and actuators that connect to a computer. The problems are chosen with consultation with the various engineering disciplines in the Faculty with a view of exposing how computing is used in these disciplines. **Prerequisites:** LE/EECS1011 3.00. **Course credit exclusions:** LE/EECS 1022 3.00. Previously offered as: LE/EECS1020 3.00, LE/CSE 1020 3.00.
LE/ENG 1102	**4**	**Renaissance Engineer 2: Engineering Design Principles**	This course will cover: engineering design methodology; features and elements of good design with environment and human interface considerations; aesthetics in design and idea communication using graphics and technical drawings. **Prerequisite:** LE/ENG 1101 4.00.
SC/MATH 1014	**3**	**Applied Calculus II**	Calculus in Polar Coordinates. Techniques of Integration. Indeterminate Forms. Improper Integrals. Sequences, infinite series and power series. Approximations. Introduction to ordinary differential equations. **Prerequisite(s):** One of SC/MATH 1013 3.00, SC/MATH 1300 3.00, GL/MATH 1901 3.00, or SC/ISCI 1401 3.00 ; for non-science students only, six credits from SC/MATH 1530 3.00 and SC/MATH 1540 3.00, SC/MATH 1550 6.00, AP/ECON 1530 3.00 and AP/ECON 1540 3.00. **Course Credit exclusions:** SC/MATH 1014 3.00, SC/MATH 1310 3.00, SC/MATH 1540 3.00, SC/MATH 1550 6.00, GL/MATH/MODR 1940 3.00, AP/ECON 1540, SC/ISCI 1402 3.00, SC/ISCI 1410 6.00, SC/MATH 1507 3.00.
SC/PHYS 1801	**3**	**Electricity, Magnetism and Optics for Engineers**	A survey of physics in which fundamental concepts in electricity, magnetism and optics are emphasized through engineering applications. This is a calculus-based course intended primarily for engineering students. **Prerequisite:** SC/PHYS 1800 3.00 and SC/MATH 1013 3.00 or equivalent. Corequisites: SC/MATH 1014 3.00 or SC/MATH 1310 3.00 or SC/MATH 1505 6.00. **Course Credit Exclusions:** SC/PHYS 1010 6.00, SC/PHYS 1012 3.00, SC/PHYS 1410 6.00, SC/PHYS 1412 3.00, SC/PHYS 1420 6.00, SC/PHYS 1422 3.00, SC/ISCI 1310 6.00, SC/ ISCI 1302 3.00.
LE/TRON 1000	**4**	**Mechatronics System Design and Implementation I**	This course is an introductory course in mechatronics. It introduces the topic through both in-class material and a laboratory-based component within which students participate in two team-based mini-projects. The course provides an overview of the subject area through specific case studies drawn from existing commercial systems, and uses two mini- projects to highlight mechatronics processes and technologies. The laboratory is also used to provide basic health and safety training, as well as hands-on training on specific electrical, electronic and mechanical technologies.
LE/TECL 1999	**0**	**Leadership & Teamwork I**	Each year of the Mechatronics program has a required Leadership and Teamwork component. This course is the mechanism used to manage that course requirement.

Year 2			
Course	**Credits**	**Title**	**Brief Description**
LE/TRON 2000	**4**	**Mechatronics System Design and Implementation II**	This course is an intermediate course in mechatronics. Building upon TRON 1000, the course develops uses the development of more advanced mechatronics system to introduce more complex electronics, sensing, control and mechanical vibration, and actuation principles. The laboratory provides basic health and safety training, as well as hands-on training on specific electrical, electronic, mechanical vibrations and mechanical technologies. Teamwork and team leadership is introduced through mentorship and review of TRON 1000 projects.
LE/ENG 2001	**3**	**Engineering Projects: Management, Economics and Safety**	This course builds on ENG 1101 and 1102 and provides an introduction to engineering project management, engineering economics and health & safety, to help you develop real world knowledge and skills that will help you succeed at University and subsequently. Key components of Project Management include project definition, defining scope, developing Gantt charts, teamwork and communication which will be taught using online resources and a term team project. Engineering economics will help you understand how people make (economic) decisions, especially those that relate to buying and selling technicalproducts, or when money is spent over an extended time period (time value of money). **Pre-requisites:** LE/ENG 1101 4.00, LE/ENG 1102 4.00.
LE/MECH 2202	**3**	**Heat and Flow Engineering Principles**	This course covers introduction to modes of heat transfer, 1D heat conduction fluids, properties of fluids, principles of fluid mechanics, fluid statics and internal flows, surface tension and capillarity. **Prerequisites:** SC/MATH 1013 3.00, SC/MATH 1014 3.00, and SC/PHYS 1800 3.00.
SC/MATH 2015	**3**	**Applied Multivariate and Vector Calculus**	Topics covered include partial derivatives; grad, div, curl and Laplacian operators; line and surface integrals; theorems of Gauss and Stokes; double and triple integrals in various coordinate systems; extrema and Taylor series for multivariate functions. **Prerequisite:** One of SC/MATH 1010 3.00, SC/MATH 1014 3.00, SC/MATH 1310 3.00; or SC/MATH 1505 6.00 plus permission of the course coordinator. **Course credit exclusions:** SC/MATH 2010 3.00, SC/MATH 2310 3.00, GL/MATH 2670 3.00, GL/MODR 2670 3.00, GL/MATH 3200 3.00.

LE/EECS 2021	**4**	**Computer Organization**	Introduction to computer organization and instruction set architecture, covering assembly language, machine language and encoding, addressing modes, single/multicycle datapaths (including functional units and controls), pipelining, memory segments and memory hierarchy. **Prerequisites:** cumulative GPA of 4.50 or better over all major EECS courses (without second digit "5"); LE/EECS 1021 3.00 or LE/EECS 1022 3.00 or LE/EECS 1720 3.00 or LE/EECS 1030 3.00. Previously offered as: LE/CSE 2021 4.00, SC/CSE 2021 4.00.
SC/CHEM 1100	**4**	**Chemistry and Materials Science for Engineers**	The course is designed for Engineering students interested in refreshing and expending their general chemistry knowledge while exploring the relationship between structure of matter, properties and processing. This course will focus mainly at covering important introductory concept to understand solution chemistry including reactivity, thermochemistry, structure and properties of materials. The course is divided in six sections. The first section covers an introduction to the topic of Materials Science and its impact on our daily lives as well as future trends and review key chemistry concepts required for this course. The second section will present the states of matter (gas, liquid and solid), their physical characteristics and the forces holding materials together (bonding and intermolecular forces). The third section will expend on the liquid phase and properties of solutions including equilibrium, solubility, pH and pKa. The fourth section will deal with thermochemistry and its first law with an emphasis on enthalpy as well as phase changes and phase diagrams. Section six will present an introduction to the properties of solids (electronic and mechanical) and criteria in the selection of materials will also be discussed. Section seven will present in more details structure-properties and processing of soft materials (natural and artificial polymer) in the context of the material covered in the other sections. **Prerequisites:** 12U chemistry or equivalent. **Course credit exclusion:** SC/CHEM 1000 3.00.
SC/MATH 2930	**3**	**Introductory Probability and Statistics**	This is an applied probability and statistics course for engineering students. The aim is to provide an application oriented introduction to probability and statistics. The examples will be from a wide selection of engineering disciplines. The probability component is about 30% of the lectures. About 40% of the time, the lectures and tutorials focus on solving practical statistical problems that emerge from engineering problems. **Prerequisites:** SC/MATH 1014 3.00 or equivalent; SC/MATH 1025 3.00 or equivalent; LE/EECS 1011 3.00 or equivalent. **Course credit exclusions:** SC/MATH 1131 3.00; SC/MATH 2560 3.00; SC/MATH 2570 3.00; SC/MATH 2565 3.00.
LE/ENG 2003	**3**	**Effective Engineering Communication**	Students learn to effectively employ communication strategies essential to a successful engineering career, including the social, rhetorical, ethical, and practical aspects of professional communications. The course will focus on building individuals' confidence and judgment through numerous communication assignments. **Prerequisites:** LE/ENG 1101 4.00.
LE/EECS 2200	**3**	**Electrical Circuits**	This course covers the basic principles of linear circuits. Kirchhoff's laws, circuit equations, RL, RC, and RLC circuits, three-phase circuits, power analysis and power factor, and magnetically coupled circuits. **Prerequisites:** cumulative GPA of 4.50 or better over all major EECS courses (without second digit""5"), SC/PHYS 1010 6.00 or SC/PHYS 1801 3.00. **Course credit exclusions:** SC/PHYS 3050 3.00.
LE/MECH 2401	**3**	**Engineering Graphics & CAD Modeling**	This course discusses technical drawing principles, introduction and application of computer aided design tools, and solid modeling. A simple model part is fabricated in teams (e.g., using additive technology) to be fitted with parts subtractive fabricated from the co-req. course. Two lecture hours per week. Two computer laboratory/tutorial hours per week. **Prerequisites:** LE/ENG 1102 4.00 Co-requisites: LE/MECH 2501 2.00. Cross-listed: LE/ESSE 2401 3.00.
LE/COOP 2100	**2**	**Professional Development for Co-Op Students**	Developing an effective e-Portfolio for Lassonde students as a tool for professional development and job finding. Learning from, and adapting to, the transition from university to the workplace. Offered online. Estimated time in required learning activities: 3 hours per week.
LE/TECL 2910	**0**	**Mechatronics Work-Term I**	Mechatronics students enroll in this course during their work term. In addition to the work, students reflect on the relationship of their academic learning to the work experience. Employers also provide their evaluation of the student's performance. Successful completion of at least two work term courses is a requirement of the Mechatronics Engineering program. **Prerequisites:** Open only to students with good standing in the Mechatronics Engineering program. This will typically include completion of appropriate required courses in the program, and/or completion of a required number of credits with a specific GPA requirement. Students normally take LE/TECL 3910 0.0 during their second periods of work.
LE/TECL 2999	**0**	**Leadership & Teamwork II**	Each year of the Mechatronics program has a required Leadership and Teamwork component. This course is the mechanism used to manage that course requirement.

Year 3			
Course	**Credits**	**Title**	**Brief Description**
LE/ENG 3000	**3**	**Professional Engineering Practice**	An introduction to the legal and ethical frameworks of the engineering profession, preparing students for the Professional Practice Examination required for certification as a professional engineer. Also covered are associated professional issues such as lifelong learning, human rights, equity, diversity, inclusion, Indigeneity, and technology stewardship. **Prerequisites:** LE/ENG 2001 3.00. **Course credit exclusions:** LE/EECS 3000 3.00
LE/EECS 2030	**3**	**Advanced Object Oriented Programming**	This course continues the separation of concern theme introduced in LE/EECS 1020 3.00 and LE/EECS1021 3.00. While 1020 and 1021 focuses on the client concern, this course focuses on the concern of the implementer. Hence, rather than using an API (Application Programming Interface) to build an application, the student is asked to implement a given API. Topics include implementing classes (non-utilities, delegation within the class definition, documentation and API generation, implementing contracts), aggregations (implementing aggregates versus compositions and implementing collections), inheritance hierarchies (attribute visibility, overriding methods, abstract classes versus interfaces, inner classes); applications of aggregation and inheritance in concurrent programming and event-driven programming; recursion; searching and sorting including quick and merge sorts); stacks and queues; linked lists; binary trees. **Prerequisites:** cumulative GPA of 4.50 or better over all major EECS courses (without second digit "5"); LE/EECS1021 3.00 or LE/EECS 1020 (prior to Fall 2015) 3.00 or LE/EECS1022 3.00 or LE/EECS 1720 3.00. **Course credit exclusions:** AP/ITEC 2620 3.00. Previously offered as: LE/EECS1030 3.00, LE/CSE 1030 3.00.
LE/MECH 2302	**3**	**Dynamics**	This course covers kinematics and kinetics of rigid body motion based on concepts of force, work, momentum and energy methods; impact; engineering applications are emphasized. **Prerequisites:** SC/MATH 1013 3.00, SC/MATH 1014 3.00, and SC/PHYS 1800 3.00.
LE/ESSE 3380 (TRON 3001)	**4**	**Introduction to Mechatronics**	This course serves as an introduction to the fundamental concepts of mechatronics covering sensor and actuator technology. This course is concerned with different types of DC motors, how they are driven electrically, how their motion is measured, how they are controlled, and how they can be used to create motion systems. Co-requisites: LE/MECH 3302 3.00; **Prerequisites:** LE/MECH 2401 3.00; SC/PHYS3050 3.00 or LE/EECS 3505 3.00.
SC/MATH 2271	**3**	**Differential Equations for Scientists and Engineers**	Introduction to ordinary and partial differential equations, including their classification, boundary conditions, and methods of solution. Equations, methods, and solutions relevant to science and engineering are emphasized, and exploration is encouraged with the aid of software. Three lecture hours per week. One term. Three credits. **Prerequisites:** One of SC/MATH 2015 3.00, SC/MATH 2310 3.00 or equivalent; one of SC/MATH 1025 3.00, SC/MATH 2022 3.00, SC/MATH 2222 3.00 or equivalent. **Course Credit Exclusions:** SC/MATH 2270 3.00, GL/MATH 3400 3.00
LE/MECH3409	**3**	**Machine Element Design**	Introduces methodology for mechanical design of components. It discusses topics including design for static and dynamic loads, failure analysis. fatigue, component design and selection for materials and machine elements, e.g. threaded joints, springs, gears, belt, chain, bearings, etc. Prerequisites: LE/MECH 2301 3.00, LE/MECH 2401 3.00. Course Credit Exclusion: LE/MECH 2409 3.00. Mech to update pre-requisites
LE/EECS 2032	**4**	**Introduction to Embedded Systems**	This course introduces students to embedded systems. The students will learn basic features of embedded system architecture, as well as how to design, implement, and test programs for embedded systems. Topics include microcontrollers architectures, peripherals and communication protocols, interfacing, and program development, and testing. **Prerequisites:** General Prerequisite: Cumulative GPA of 4.50 or better over all major EECS courses (without second digit "5"), LE/EECS 1021 3.00 , or LE/EECS 1022 3.00, and LE/EECS 2021 4.00. **Course Credit Exclusion** LE/EECS 2031 3.00, LE/EECS 3215 4.00, LE/CSE 3215 4.00. Co-requsities: LE/EECS 2030 3.00.

LE/EECS 3451	**4**	**Signals and Systems**	An introduction to the mathematical background in signals and systems; signal and image processing: sampling, discrete Fourier transform, filtering; linear system theory; Kalman filtering; feedback. **Prerequisites**: cumulative GPA of 4.50 or better over all major EECS courses (without second digit "5"); LE/EECS 2030 3.00 or LE/EECS 1030 3.00; LE/EECS 2021 4.00, SC/MATH 1310 3.00. **Course credit exclusions:** SC/MATH 4130B 3.00, SC/PHYS 4060 3.00. Previously offered as: LE/CSE 3451 4.00. PRIOR TO FALL 2014: course credit exclusions: SC/MATH 4830 3.00. PRIOR TO SUMMER 2013: course credit exclusions: SC/CSE 3451 4.00, SC/EATS 4020 3.00.
LE/MECH 2502	**3**	**Modern instrumentation and Measurement Techniques**	This experiential learning course covers underlying physics as well as knowledge and skills needed for design and development of modern measurement systems for various phenomena. Weekly laboratories and final group projects (mentored by academic and industry experts) provide students with applied knowledge and hands-on skills for developing instrumentation systems involving various sensors and actuators, computerized data acquisition, and artificial intelligence (AI)-powered data/signal analytics and system control. **Prerequisites:** SC/MATH 1013 3.00, SC/MATH 1014 3.00, SC/MATH 1025 3.00, LE/EECS 1011 3.00.
LE/ENG 4550	**3**	**Introduction to control systems**	This course provides an introduction to classical control theory. From a base of dynamic system modeling the course will develop methods for modifying system behavior through feedback so as to produce desired performance and meet specifications in spite of disturbances and modeling errors. Students are expected to be versed in Linear Algebra, Ordinary Differential Equations, and Complex Variables. Signals and Systems would also be a definite asset. **Prerequisites:** SC/MATH 2015 3.00.
LE/TRON 3000	**4**	**Mechatronics System Design and Implementation III**	This course is an advanced course in mechatronics. Building upon TRON 2000, the course develops uses the development of more advanced mechatronics system to introduce more complex electronics, sensing, control, mechanical vibration and actuation principles. The laboratory provides basic health and safety training, as well as hands-on training on specific electrical, electronic and mechanical technologies. Teamwork and team leadership is introduced through mentorship and review of TRON 2000 projects.
LE/TECL 3999	**0**	**Leadership & Teamwork III**	Each year of the Mechatronics program has a required Leadership and Teamwork component. This course is the mechanism used to manage that course requirement.
LE/COOP 3100	**2**	**Critical Reflection on Work Experience using Professional Portfolios**	Learning from the work experience and integrating that knowledge into academic studies. Use of the e-Portfolio for targeted discussion topics focusing on professionalism, continuous learning, communications, and the workplace. Estimated time in required learning activities: three hours per week. **Prerequisite:** LE/COOP 2100 2.00.
LE/TECL 3910	**0**	**Mechatronics Work-Term II**	Mechatronics students enroll in this course during their work term. In addition to the work, students reflect on the relationship of their academic learning to the work experience. Employers also provide their evaluation of the student's performance. Successful completion of at least two work term courses is a requirement of the Mechatronics Engineering program. **Prerequisites:** Open only to students with good standing in the Mechatronics Engineering program who have completed TRON 3000 and who are in good standing.

Year 4			
Course	**Credits**	**Title**	**Brief Description**
LE/ENG 4000	**6**	**Engineering Project**	The project will include significant elements of design and implementation. The format is intended to resemble engineering projects in practice, including specifications, background research, innovative solutions, analysis, testing and communication. 2 terms. Prerequisite(s): 21 3000-level science or engineering credits in the Engineering Program, exclusive of LE/ENG 3000 3.00. **Prerequisite** or corequisite: LE/ENG 3000 3.00. **Course credit exclusions:** CIVL4000 , ESSE4000.
LE/MECH 3302	**3**	**Mechanisms for Mechanical Systems**	This course covers topics including classifications of mechanisms; velocity, acceleration and force analysis (e.g., for linkages, cranks, sliders, and cams); balancing of rotating and reciprocating machinery; gears and gear-trains; graphical and computer-oriented methods of analysis for mechanisms; applications of different mechanisms in mechanical systems (e.g., engines, manufacturing systems). NOTE: **Course credit exclusion:** LE/ESSE 3340 3.0. **Prerequisites:** LE/MECH 2302 3.0.
LE/TRON 4001	**4**	**Mechatronic System and Design(cross-listing ESSE 4380)**	This course covers the principles and applications of sensor and actuator technology in a mechatronics application. This course is concerned with mechatronics systems design for a robotic arm including motor, sensor, and microcontroller selection, kinematics and inverse kinematics, fabrication and assembly, positioning and path planning tasks. Throughout the course, students will construct a robotic arm from components and use it to solve an industrial task. **Prerequisites:** LE/ESSE 3380 4.00 and LE/PHYS 3150 3.00.
Gen Ed	**12**	**General Education Requirement**	N/A
LE/ENG 4650	**3**	**Feedback Control Systems**	This course teaches fundamentals of control design and analysis using state-space methods. This includes both the practical and theoretical aspects of the topic. The students are expected to design controllers using state-space methods and evaluate the control performance and validate if these controllers are robust to system uncertainties and external disturbances. **Prerequisites:** LE/ENG 4550 3.00 or the following combination of courses: SC/MATH 3410 3.00; SC/MATH 2270 3.00 or SC/MATH 2271 3.00; SC/MATH 2022 3.00.
LE/TECL 4999	**0**	**Leadership & Teamwork IV**	Each year of the Mechatronics program has a required Leadership and Teamwork component. This course is the mechanism used to manage that course requirement.
LE/TRON 4002	**4**	**Mechatronics and Robotics**	This course introduces robotics, the underling problems involved in making intelligent machines perform in their environment, and the use of traditional and AI-based technology to solve those problems. How can robots move and interact with the environment. Robotic hardware systems. Kinematics and inverse kinematics. Sensors, sensor data interpretation and sensor fusion. Path planning. Configuration spaces. Position estimation. Intelligent systems. Spatial mapping. Multi-agent systems. Applications.Note: 4002/4003/400x are electives. 8 credits of electives are required.
LE/TRON 4003	**4**	**AI for Mechatronics**	AI has transformed many aspects of mechatronics, from low-level control to system interaction to end-to-end system design. This course introduces basic computational aspects of advanced AI systems including supervised and unsupervised learning, reinforcement learning and foundational models, and their application to fundamental problems in mechatronics. Each of the AI approaches presented are described and evaluated in terms of specific mechatronics tasks. Note: 4002/4003/400x are electives. 8 credits of electives are required.
LE/TRON 400x	**4**	**Mechatronics Control**	Note: 4002/4003/400x are electives. 8 credits of electives are required.
LE/TRON 400x	**4**	**TBD**	Note: 4002/4003/400x are electives. 8 credits of electives are required.

Total Credits	**143**