School	School of Engineering
Major	Masters of Science in Electronics Engineering

Major Requirements			
Code	**Title**	**Credits**	**Description**
EENG695A	Master Thesis(Part I)	3	The Master's Project course is six credits practical and research course. The master project is spread over two semesters. Students are requested to conduct a research relevant to the field of specialty; ending up with a thesis describing methodology; applications and results. The course also includes producing a prototype of the research subject (numerical model,__physical application).
EENG512	Electronics for Communication Systems	3	Introduction to Electronic Communication; Amplitude Modulation Fundamentals and Circuits; Frequency Modulation Fundamentals and Circuits; Digital Communication Techniques; Radio Transmitters; Communication Receivers; Multiplexing and Demultiplexing.
EENG515	Introduction to renewable Energy	3	This is an introductory course to the technologies of renewable energy (Wind, Solar, Biomass, Fuel cell, etc..) and their applications. Basic concepts and real-life examples will be covered throughout the course. Additional mathematical concepts will be covered such as Betz limit for wind, limit of efficiency of WEC point absorber, etc.
EENG602	Electromagnetic Wave Propagation	3	The applied topics covered are: Transmission lines, waveguides, antennas, electromagnetic interference, and microwave engineering.
EENG560	Transducers, Sensors and Actuators	3	This course explains and illustrates the principles of function and use of transducers associated with electronic circuits. Particularly, it introduces sensors and actuators constituting the main parts of transducers which are available In all aspects of control technology. Focus will be concentrated on the conversion of physical quantities into electronic signals and vice versa.
EENG585	Introduction to Mechatronics	3	This course offers a multidisciplinary approach to analyze and design advanced engineering systems. A combination of background and competencies referring to mechanical engineering, electrical and electronics engineering, wireless communication, control and programming is developed to describe complex systems. The course is based on several concrete application cases that are analyzed in details: modern automotive electronic systems, aircraft electronic systems, biomedical applications, production lines control, etc. A brief introduction to Micro-Electro-Mechanical devices is also presented in this course.

EENG612L	Introduction to VLSI Lab	1	This course provides basic applications in CMOS circuit design using adapted integration tools. It covers the main steps of schematic acquisition and simulation, layout placement and routing, and final check rules before fabrication. The course proposes many application examples going from a component level to a complete circuit simulation and implementation.
EENG612	Introduction to VLSI	3	CMOS Logic, Fabrication, Verification, and Testing. MOS Transistor Theory. Delay. Power. Interconnection. Combinational and sequential Circuit Design.
EENG695B	Master Thesis(Part II)	3	The Master's Project course is six credits practical and research course. The master project is spread over two semesters. Students are requested to conduct a research relevant to the field of specialty; ending up with a thesis describing methodology; applications and results. The course also includes producing a prototype of the research subject (numerical model,__physical application).

Core Requirements			
Code	**Title**	**Credits**	**Description**
EENG551L	Analog Integrated Circuit Design Lab	1	Design, simulation, and Layout of Analog Integrated Circuits using CAD tools.
EENG500L	Industrial Systems Automation and Control Lab	1	This lab introduces Programmable Logic Controllers__PLC's in both simulation and experimental environments. Starting with introduction and basic ON/OFF contacts, it switches to series and parallel circuits designed using the contacts. Two-way circuits are introduced, latching and self-latching circuits are discussed and impulse relays are tested. The students learn to pulse a cycle on rising oe falling edge as well as designing and using timers and counters in PLC projects. Multiple "real" applications are performed containing projects controlling heat of an oven, flashing lights, memory usage, conveyor belts and star-delta motor starters. The lab also teaches the student to use WinProladder software using both LADDER language and STEP instructions.
EENG500	Industrial Systems Automation and Control	3	After completing this course, the student will be able to understand the PLC (Programmable Logic Controllers), which are small computers, dedicated to automation tasks in an industrial environment. The PLC's are programmable power control systems dedicated for electromechanical and electrical systems control: relay control, analog (pneumatic, hydraulic) governors, timing, measurements, control and regulation.
EENG551	Analog Integrated Circuit Design	3	Integrated-circuits devices and modeling. Design of basic analog circuits, such as current sources and mirrors, differential amplifiers. Basic amplifier circuits, CMOS Opamps, opamp stability and frequency compensation. Feedback.EENG551 Analog Integrated Circuit Design Lab
CENG651L	Computer Interfacing Circuits Lab	1	Computer Interfacing Circuits Lab

CENG651	Computer Interfacing Circuits	3	This class is a course in computer interfacing which assumes no prior knowledge of the subject. The course begins with a discussion of signal processing techniques, including topics in noise reduction, A/D converters, and digital filters. These techniques are illustrated both in hardware as well as simulated in software using the LabVIEW graphical programming environment. The course will continue with the development of data acquisition applications with Graphical User Interfaces (including pop-ups, buttons, graphics, etc) using the LabVIEW development system, and topics regarding interfacing the software systems to physics hardware devices. The hardware information will be covered in a series of class note handouts. There is a small component of the course where we discuss the inner structure of the computer, central processor units, internal command structures, and interrupt/port structures. The course will consist of lectures and lab sessions. Lectures will cover theory and will provide concrete examples that will be useful in the lab. The Lab exercises are a mandatory part of the course and compromise a large fraction of the course grade.