ENGINEERING (ENGR)

ENGR 1101. Intro to Engineering Tech (3)
This course provides students with an overview of various engineering technology disciplines to assist them in making well-informed career choices in the profession, and learn fundamental skills needed for students to succeed academically and professionally. Topics may include exploring the nature of the field and career opportunities in computer, aviation, and biological engineering technology; tools of both written and verbal technical communication; using mathematics to solve engineering problems; and developing problem solving, design, and team work skills.
Prerequisites: (MATH 1111 or MATH 1113 or MATH 1501)

ENGR 2100. Basic Thermodynamics (3)
Introduction to thermodynamics. Property relations for ideal gases and incompressible liquids are introduced. Topics covered include thermodynamic properties, energy and mass conservation, entropy, and the first and second laws of thermodynamics.
Prerequisites: PHYS 2211 and PHYS 2211L and MATH 2502

ENGR 2200. Basic Fluid Mechanics (3)
This course presents fluid mechanics concepts and their applications. Topics covered include fluid properties, fluid statics, conservation principles, the Bernoulli Equation, flow in conduits, external flow, open channel flow, control-volume analysis, compressible flow.
Prerequisites: ENGR 2100 (may be taken concurrently)

ENGR 2301. Circuits and Electronics I (4)
This course is an introduction to the design and analysis of basic electrical and electric circuits. Topics include series circuits and parallel circuits, capacitors and inductors, RC and RL circuits, transformers, time response of reactive circuits. The basic circuit theories and the analysis methods of DC and AC circuits are presented. Resonance and Analogue filters are also studied in this course.
Prerequisites: PHYS 2211

ENGR 2501. Digital Logic (4)
This course introduces the basic principles of digital logic design. Topics covered are data representation, Boolean algebra, simplification of Boolean functions, and logic gates. Other topics include analysis and design of combinational circuits using logic gates, multiplexers, decoders, and programmable logic devices. Sequential components including latches and flip-flops, counters, registers, and memories are studied. Also studied is the use of basic combinational and sequential components in datapaths and control unit design.
Prerequisites: CSCI 2305

ENGR 2710. Engineering Graphics (3)
This course provides students with the fundamentals of engineering graphics and computer-aided design using a 3D solid modeling software package. Standards and techniques are introduced for communicating engineering designs through drawings and written communication. Engineering design will be introduced and practiced through a final graphics project.

ENGR 3020. Electronics (3)
This course introduces some of the basics of electrical circuits and electronics. Topics include series circuits and parallel circuits, capacitors and inductors, RC and RL circuits, and transformers. It explores devices like diodes and different types of transistors such as MOS transistors, CMOS amplifiers. Field effect transistors such as MOSFET and FET amplifiers and switches are also studied along with the operational amplifier (op-amp).
Prerequisites: CSCI 1301

ENGR 3040. Digit. Circuits & Comp. Design (3)
This course is a theoretical and hands-on study of the basic principles of digital logic circuit design. Topics included are data representation, Boolean algebra, simplification of Boolean functions, and logic gates. Other topics include design and analysis of combinational logic circuits such as multiplexers, decoders, shifters, adders, and programmable logic devices. Sequential components including latches and flip-flops, counters, registers, and memories are also studied. The design of data path and control unit of a small computer using VHDL will also be introduced.
Prerequisites: CSCI 1302

ENGR 3110. VHDL Design (4)
This course is an introduction to VHDL for the design of digital circuits. VHDL design with FPGAs will be explored in this course with the code structure and composition of the language. Topics include language syntax, datatypes, operators and attributes, concurrent code, sequential code, packages and subprograms. Several design examples using VHDL will be studied in this course. This course will also cover the test bench simulations to verify correctness of circuit design.
Prerequisites: ENGR 2501

ENGR 3160. AVIA Maintenance Engineering (3)
This course discusses and provides students with the fundamentals of aircraft maintenance management from an engineering perspective. Topics include: the role of the engineer, the role of the mechanic, technical documentation and certification, aircraft performance, line and hangar maintenance, production planning and control and finally, quality control and assurance and maintenance safety practices. In addition to lectures, this course will take a “hands-on” approach utilizing actual aircraft equipment. As a cross-listed course, Aviation Maintenance Engineering may not be taken more than once using a different letter prefix, given that only one completion will be counted toward degree requirements.

ENGR 3180. Foundations of Flight (3)
This course discusses and provides students with the fundamentals of the physics of flight. It is designed as a practical course for those with some limited engineering expertise. From the basics of forces and vectors to aircraft-specific applications, this course explains the mechanics behind the pilot's everyday operational tasks. In addition to lectures, this course will include a practical approach understanding and practicing flight principles. As a cross-listed course, Foundations of Flight may not be taken more than once using a different letter prefix, given that only one completion will be counted toward degree requirements.
Prerequisites: ENGR 2100 and ENGR 2200

ENGR 3301. Circuits and Electronics II (4)
This course introduces the solid-state electronics. In this course semiconductors, diodes, and transistors are studied in detail. Topics include BJTs, small signal transistor amplifiers, MOS transistors, and CMOS amplifiers. It explores the field effect transistors such as MOSFET and FET amplifiers and switches. The operational amplifier (op-amp) and its use as an inverting, non-inverting, and differential amplifier are examined. Active filter circuits are also covered.
Prerequisites: ENGR 2301

ENGR 3305. Operating Systems (3)
This course is a conceptual and hands-on study of operating systems; operating system design and theory including process/processor, memory, file, I/O and networking management; evaluation of system requirements. As a cross-listed course, Operating Systems may not be taken more than once using a different letter prefix, given that only one completion will be counted toward degree requirements.
Prerequisites: CSCI 2302 and CSCI 2305

ENGR 3306. Computer Networks & Security (3)
This course covers Network systems including transmission media, packet transmission, circuit/packet switching technology, LAN technology and network topology, TCP/IP, internetworking; Network applications and security issues are investigated. An overview of LANs, WANs, data communication, and routing methods will be provided using software simulation tools. As a cross-listed course, Computer Networks & Security may not be taken more than once using a different letter prefix, given that only one completion will be counted toward degree requirements.
Prerequisites: CSCI 2302 and CSCI 2305

ENGR 3310. Database Design & Implementati (3)
This course covers database modeling drawing distinctions between data modeling, process modeling, and implementation. Topics include Entity- Relationship Modeling, Relational Database Modeling to include Relational Algebra and Normalization and Object Modeling and Object Databases. Implementation topics include SQL, PL/SQL, and database access using Web interfaces. As a cross-listed course, Database Design and Implementation may not be taken more than once using a different letter prefix, given that only one completion will be counted toward degree requirements.
Prerequisites: CSCI 2302

ENGR 4120. Embedded Systems (4)
This course will introduce the basics of designing, interfacing, configuring, and programming embedded systems. The focus of the course is embedded system design, programming, and technologies used in embedded system design and construction. A series of labs will be designed to practice and implement the techniques learned in class.
Prerequisites: ENGR 2501 or ENGR 3040

ENGR 4160. The Gas Turbine Engine In AVIA (3)
This course provides a study of the fundamentals and evolution of the jet engine and jet propulsion. Topics include aircraft gas turbine engine theory, key components of gas turbine engines, and how they are properly maintained. In addition to lectures, this course will include some “hands on” activity utilizing standard assembly/disassembly of major components. As a cross-listed course, Gas Turbine Engine in Aviation may not be taken more than once using a different letter prefix, given that only one completion will be counted toward degree requirements.
Prerequisites: (ENGR 2100 and ENGR 2200)

ENGR 4180. Air Traffic Control in Action (3)
Air Traffic Control in Action is an applied course that provides a working knowledge of how, and why, the air traffic control system works. This course is appropriate for future air traffic controllers, as well as for pilots who need a better understanding of the air traffic control system. This course discusses the history of air traffic control, emphasizing the logic that has guided its development. It also provides current, in-depth information on navigational systems, the air traffic control system structure, control tower procedures, radar separation, national airspace system operation, and the FAA's future vision for air traffic management. As a cross-listed course, Air Traffic Control in Action may not be taken more than once using a different letter prefix, given that only one completion will be counted toward degree requirements.
Prerequisites: (AVIA 3180 and AVIA 4120)

ENGR 4308. System Engineering and Robotic (3)
This course principles and processes of systems engineering will be introduced and applied to the development of robotic devices. The focus is on robotic system engineered to perform complex behavior. The course is organized as a progression through the systems engineering process of requirements analysis, conceptualization, specification, functional and subsystem decomposition, design, prototyping, simulation and consideration of verification and validation.
Prerequisites: ENGR 3301

ENGR 4320. Software Engineering (3)
This course covers analysis of system requirements, software systems design techniques, software processes, software life-cycle models, software economics, configuration management, user interfaces, software testing, and software maintenance. Students gain experience in the team approach to medium-scale system development. As a cross-listed course, Software Engineering may not be taken more than once using a different letter prefix, given that only one completion will be counted toward degree requirements.
Prerequisites: ENGR 3306

ENGR 4900. Engineering Tech Snr Capstone (3)
This course provides a senior design capstone project for Engineering Technology majors in all concentrations. In teams, students will define design projects and write a proposal for the synthesis and analysis of an open-ended engineering design project related to their specific concentration, including written and oral communication. Normally taken in the student’s last semester of study.
Prerequisites: (ENGR 3110 and ENGR 3301) or (AVIA 3120 and AVIA 3180) or (BIOL 3200 and BIOL 3200L and BIOL 3201) and ENGL 3900