ENGINEERING, MECHATRONIC SYST (ENMT)

Courses

ENMT 3210 Mechatronics I (4 Credits)
This course provides basic concepts from electrical, mechanical, and computer engineering as applied to mechatronic systems and is intended to serve as a foundation course for further exploration in the area of mechatronics. Prerequisite: senior or graduate standing in engineering.

ENMT 3220 Mechatronics II - Real-Time Systems (4 Credits)
Real-time systems require timely response by a computer to external stimuli. This course examines the issues associated with deterministic performance including basic computer architecture, scheduling algorithms, and software design techniques including data flow diagrams, real-time data flow diagrams, stat transition diagrams, and petri nets. In the lab portion of this class, students program a microcontroller to interact with mechatronic devices. Prerequisite: ENMT 3210, ENCE 3210 or COMP 3354.

ENMT 4000 Space Systems Design I (4 Credits)
The application of advanced theory and concepts as they relate to the development of spacecraft and missile subsystems, and how those subsystems are related under the umbrella of systems engineering. The course emphasizes practical aspects of space systems design and integration, and is team-taught by faculty and functional experts in the various fields. Lecture topics include aerospace materials, mechanics, thermal control, embedded systems, distributed sensor networks and aerospace probability and statistics.

ENMT 4010 Space Systems Design II (4 Credits)
The continuation of Space Systems Design I. Lecture topics include payload communications, guidance and control, spacecraft electric power, propulsion systems, radiation and avionics and sensor subsystems. Prerequisite: Space Systems Design I.

ENMT 4100 Systems Engineering (4 Credits)
Provides a framework for understanding and acquiring the knowledge, tools and skills needed by explicitly "systems-trained" engineers, to effectively interact with specialist engineers and project managers in the engineering of complex, large scale systems. Emphasis is on the development of a life-cycle model for systems engineering processes, to reduce the risk inherent in each life-cycle stage.

ENMT 4220 Mechatronics II (4 Credits)
This course combines systems design and integration with a real world project involving the design and fabrication of an integrated system. Prerequisite: Mechatronics I or equivalent.

ENMT 4730 Advanced Ground Robotics (4 Credits)
Introduction to path planning and sensing and estimation for robotic manipulations and mobile robots. Review of the mathematical preliminaries required to support robot theory. Topics include advanced sensors, mobile robot mechanisms, advanced manipulator mechanisms, path planning in 2-D and 3-D, and simultaneous localization and mapping. Applications include task and motion planning for idealized and real robots. Prerequisite: ENGR 3730.

ENMT 4734 Unmanned Aerial Systems (4 Credits)
Unmanned Aerial Vehicles (UAVs), or Unmanned Aircraft Systems (UAS) as is the preferred term by the US DOD, have seen unprecedented levels of growths in military and civilian application domains. Fixed-wing aircraft, heavier or lighter than air, rotary-wing (rotocraft, helicopters), vertical take-off and landing (VTOL) unmanned vehicles are being increasingly used in military and civilian domains for surveillance, reconnaissance, mapping, cartography, border patrol, inspection, homeland security, search and rescue, fire detection, agricultural imaging, traffic monitoring, to name just a few application domains. This course offers a very comprehensive study of UAS that includes: history of unmanned aviation, including evolution of designs and models for application-specific domains; modeling, control and navigation fundamentals for both teleoperation, semi-autonomous and fully autonomous flights; see-and-avoid-systems for different classes of UAS; integration of UAS into the National Airspace System (NAS); applications and case studies. Prerequisite: ENGR 3730.

ENMT 4800 Adv Topics (Mechatronics) (1-5 Credits)
Various topics in Mechatronics System Engineering as announced. May be taken more than once. Prerequisite: varies with offering.

ENMT 4991 Independent Study (1-5 Credits)

ENMT 4995 Independent Research (1-18 Credits)