ENGINEERING SCIENCES (ESCI)

ESCI 1010 - Freshman Engineering I
Credit(s): 1 Credit
An introduction to the philosophy of engineering and engineering design. Introduction to the various laboratory and computing facilities on campus. Introduction to engineering drawing and computer aided drafting techniques.

ESCI 1011 - Prototyping
Credit(s): 1 Credit
This course exposes students to the shop environment and the use of common hand and machine tools found in a typical fabrication shop in a safe manner. Emphasis is on using the right processes and right tools for the job. Safety in a fabrication shop is introduced and practiced.

ESCI 1020 - Computer Aided Design
Credit(s): 1 Credit
Further topics in the philosophy of engineering and engineering design. Further topics in skills and tools used in engineering.
Prerequisite(s): ESCI 1010

ESCI 1700 - Engineering Fundamentals
Credit(s): 2 Credits
The course introduces engineering problem solving process. Algorithmic and visual skills and computer tools are introduced. It also exposes students to the engineering career paths. (Offered in Fall)
Attributes: Core:Ignite Seminar

ESCI 1701 - Engineering Fundamentals Studio
Credit(s): 1 Credit
Companion course to Engineering Fundamentals. (Offered in Fall)

ESCI 1702 - Engineering Studio: Self and Community
Credit(s): 1 Credit
The course combines the key elements of ESCI 1701 (Engineering Fundamentals Studio) with the requirements of Cura Personalis 1. Students will learn the concepts and tools used for computer modeling of mechanical systems. They will apply those concepts to the exploration of self and the SLU community. This course complements the content of ESCI 1700 but can be taken independently.
Attributes: Core:Self in Community

ESCI 1709 - Introduction to Engineering
Credit(s): 2 Credits
The course introduces the engineering profession and problem solving process. Algorithmic and visual skills and computer tools are introduced.

ESCI 2100 - Statics
Credit(s): 3 Credits
Study of force systems acting on particles and rigid bodies, 2-D and 3-D equilibrium, trusses, frames machines, shear and moment diagrams, friction, centroids, area moment of inertia. Pre/Corequisite(s): PHYS-1610.
Prerequisite(s): PHYS 1610
* Concurrent enrollment allowed.

ESCI 2150 - Dynamics
Credit(s): 3 Credits
Particle kinematics and kinetics in rectangular, cylindrical and normal-tangential coordinates; projectiles; relative motion using translating axes; work; conservative forces; conservation of energy; linear and angular impulse and momentum, conservation of momentum, rigid body kinematics and kinetics.
Prerequisite(s): ESCI 2100; (MATH 1520, Math Waiver per Advisor with a minimum score of 1520, or SLU Math Placement with a minimum score of 2530)
* Concurrent enrollment allowed.

ESCI 2300 - Thermodynamics
Credit(s): 3 Credits
Properties, characteristics and fundamental equations of gases, application of first and second laws of thermodynamics in evaluation of engines, cycles and processes.
Prerequisite(s): MATH 2530
* Concurrent enrollment allowed.

ESCI 2930 - Special Topics
Credit(s): 3 Credits (Repeatable for credit)

ESCI 2980 - Independent Study
Credit(s): 1 or 3 Credits (Repeatable for credit)

ESCI 3100 - Mechanics of Solids
Credit(s): 3 Credits
Stress and deformation due to axial load, torsion, bending and shear; properties of materials; statically indeterminate problems, analysis of plane stress and strain; combined loading; pressure vessels, beam deflections.
Prerequisite(s): (ESCI 2100 and MATH 2530)
* Concurrent enrollment allowed.

ESCI 3101 - Mechanics of Solids Lab
Credit(s): 1 Credit
Laboratory experiments to emphasize material covered in lectures of ESCI 3100.
Prerequisite(s): ESCI 3101
* Concurrent enrollment allowed.

ESCI 3110 - Linear Vibrations
Credit(s): 3 Credits
Single and two degrees-of-freedom with and without damping, vibration dampers and absorbers; model properties of vibrating systems; vibration of lumped parameter and continuous systems; approximate numerical methods and digital computation. Review of test equipment and methods.
Prerequisite(s): (ESCI 2150 and MATH 3550)

ESCI 3111 - Mechanics Laboratory
Credit(s): 1 Credit
This course is the complementary laboratory course to lecture courses in Fluid Dynamics and Mechanics of Solids, providing the opportunity to directly engage and observe some of the concepts and phenomena described in the lectures. Other topics include laboratory procedures, statistical analysis of experimental data, and presentation of experimental results. (Offered in Fall and Spring)
Prerequisite(s): ESCI 3100; ESCI 3200
* Concurrent enrollment allowed.
ESCI 3200 - Fluid Dynamics
Credit(s): 3 Credits
Fluid mechanics, conservation of mass, momentum and energy, stream function; dimensional analysis and similitude; application to problems of inviscid and viscous flows, drag, flow measurements.
Prerequisite(s): MATH 2530

* Concurrent enrollment allowed.
Corequisite(s): ESCI 3201

ESCI 3201 - Fluid Dynamics Laboratory
Credit(s): 1 Credit
Prerequisite(s): ESCI 3200*

* Concurrent enrollment allowed.
Corequisite(s): ESCI 3200

ESCI 3410 - Analysis and Control of Linear Systems
Credit(s): 3 Credits
Linear vibration theory; control system block diagrams; analog and digital simulation; frequency and time domain analysis techniques; state space; and introduction to optimal control theory. Spring semester.
Prerequisite(s): ESCI 3110

ESCI 3930 - Special Topics
Credit(s): 3 Credits (Repeatable for credit)

ESCI 3980 - Independent Study
Credit(s): 1 or 3 Credits (Repeatable for credit)

ESCI 4930 - Special Topics
Credit(s): 1-3 Credits (Repeatable for credit)

ESCI 4980 - Independent Study
Credit(s): 1 or 3 Credits (Repeatable for credit)

ESCI 5000 - Engineering Graduate Seminar
Credit(s): 0 Credits (Repeatable for credit)
Engineering Graduate Seminar features talks from professionals in industry and academia. Topics are varied, and range from research, to instruction and the transition from school to career. Engineering MS students are required to pass 2 semesters, and Engineering PhD students are required to pass 4 semesters. PhD students with a previous master's are only required to take 2 semesters.
Restrictions:
Enrollment limited to students in the Parks College of Eng, Av Tch college.

ESCI 5930 - Special Topics
Credit(s): 1-3 Credits (Repeatable for credit)
A one-time course on a particular topic, or a trial course that is expected to become a standard course with its own unique course number.