ENGR 101  Grand Challenges in Engineering  Credits: 3 (3-0-0)
Course Description: National Academy of Engineering’s Grand Challenges in Engineering: overview, roles of engineering disciplines, engineering and societal challenges.
Prerequisite: None.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 102  Problem Solving for Engineers  Credits: 3 (3-0-0)
Course Description: Engineering problem solving: dimensional analysis; precision, accuracy, repeatability; problems from all major engineering disciplines.
Prerequisite: MATH 160, may be taken concurrently.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 298  Undergraduate Research  Credits: Var[1-3] (0-0-0)
Course Description: Directed undergraduate research with a faculty mentor.
Prerequisite: None.
Registration Information: Written consent of research mentor; written consent of department chair.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 300  3D Printing Lab for Engineers  Credit: 1 (0-3-0)
Course Description: Basics of 3D printing, technology, workflows, techniques and related software, focused on practical usage and project development in engineering. Topics include technology of devices, usage, calibration and tuning, repair and maintenance, and techniques for maximizing part quality with minimal waste.
Prerequisite: BIOM 101 or CBE 101 or CIVE 102 or ECE 102 or ENGR 101 or MECH 103.
Registration Information: Credit not allowed for both ENGR 300 and ENGR 381A1.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

ENGR 370  Study Abroad: Grand Challenges in Engineering--China  Credits: 3 (0-0-3)
Course Description: Faculty-led study abroad program that includes cultural, language, and engineering instruction. Course will be held at a host institution in China with instruction at CSU before the travel portion of the course.
Prerequisite: None.
Registration Information: Credit not allowed for both ENGR 370 and ENGR 382A.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 382A  Study Abroad: Grand Challenges in Engineering--China  Credits: 3 (0-0-3)
Course Description: Faculty-led study abroad program that includes cultural, language, and engineering instruction. Course will be held at a host institution in China.
Prerequisite: None.
Registration Information: Credit not allowed for both ENGR 382 and ENGR 382A.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 389  Engineering Cooperative Experience  Credit: 1 (0-0-40)
Course Description: Semester-long full-time industry engineering experience in a position relevant to the student's major field.
Prerequisite: None.
Registration Information: Written consent of instructor. May be taken up to 9 times.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

ENGR 422  Technology Entrepreneurship  Credits: 3 (3-0-0)
Course Description: Principles of technology-based entrepreneurship, including recognizing, analyzing, and acting on technology-based business opportunities; and development of an opportunity analysis.
Prerequisite: MGT 340.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 486  Practicum  Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ENGR 496  Group Study  Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring.
Grade Modes: Instructor Option, Traditional.
Special Course Fee: No.

ENGR 498  Undergraduate Research  Credits: Var[1-3] (0-0-0)
Course Description: Directed undergraduate research with a faculty mentor.
Prerequisite: None.
Registration Information: 30 credits in engineering and/or science; written consent of instructor.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.
ENGR 502 Engineering Project and Program Management Credits: 3 (3-0-0)
Course Description: Engineering program management fundamentals, program planning and control strategies, risk assessment, work breakdown structures and costing options.
Prerequisite: None.
Registration Information: Credit not allowed for both ENGR 502 and MECH 501. Sections may be offered: Online.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 510 Engineering Optimization: Method/Application Credits: 3 (3-0-0)
Course Description: Optimization methods; linear programming, network flows, integer programming, interior point methods, quadratic programming, engineering applications.
Prerequisite: MATH 261 and MATH 229.
Registration Information: Credit not allowed for both ENGR 510 and MATH 510. Sections may be offered: Online.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 520 Engineering Decision Support/Expert Systems Credits: 3 (3-0-0)
Course Description: Decision support systems for complex engineering problems; multicriteria decision making and optimization; hybrid knowledge-based/algorithmic methods.
Prerequisite: ENGR 510 or MATH 510.
Registration Information: Sections may be offered: Online.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 522 Object-Oriented GIS Programming for Engineers Credits: 3 (3-0-0)
Course Description: Object-oriented GIS programming with C# & .NET framework; integration of GIS libraries; development of custom desktop GIS applications in engineering.
Prerequisite: CIVE 577.
Restriction: Must be a: Graduate, Professional.
Registration Information: Sections may be offered: Online.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 525 Intellectual Property and Invention Systems Credits: 3 (3-0-0)
Course Description: Focused on the appropriate application of "patterns for patenting" together with intuition, inspiration, and cross-disciplinary connecting. De-mystify "inventing" as applied to science, engineering, and technology.
Prerequisite: None.
Restriction: Must not be a: Freshman, Sophomore.
Registration Information: Junior standing. Sections may be offered: Online. Credit not allowed for both ENGR 423 and ENGR 525.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 531 Engineering Risk Analysis Credits: 3 (3-0-0)
Course Description: Estimation and risk identification, development of mitigation techniques.
Prerequisite: ECE 303 or STAT 303 or STAT 315.
Registration Information: Credit not allowed for both ECE 531 and ENGR 531. Sections may be offered: Online.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 550 Numerical Methods in Science and Engineering Credits: 3 (3-0-0)
Also Offered As: MATH 550.
Course Description: Numerical methods, including finite elements, finite differences, spectral methods, method of lines, and conservation laws; stability and convergence analysis for PDEs; and applications in science and engineering.
Prerequisite: MATH 340 or MATH 345 or MATH 530.
Registration Information: Sections may be offered: Online. Credit not allowed for both ENGR 550 and MATH 550.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 555 Life Cycle Assessment for Sustainability Credits: 3 (3-0-0)
Also Offered As: ESS 555.
Course Description: The quantitative and qualitative measure of cradle-to-grave impacts of products and services on the environment, the economy, and society.
Prerequisite: BIOM 300 to 479 or BZ 300 to 479 or CHEM 300 to 479 or CHEM 300 to 479 or CIVE 300 to 479 or ECOL 300 to 479 or ENGR 300 to 479. Sections may be offered: Online.
Registration Information: Sections may be offered: Online. Credit allowed for only one of the following: ENGR 555, ESS 555, ENGR 581A1, or ESS 581A1.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 565 Electrical Power Engineering Credits: 3 (3-0-0)
Also Offered As: ECE 565.
Course Description: Analysis of power systems in terms of current, voltage, and active/reactive power; introduction of computer-aided tools for power systems.
Prerequisite: ECE 332 with a minimum grade of C and ECE 342 with a minimum grade of C.
Restriction: Must not be a: Freshman, Sophomore.
Registration Information: Sections may be offered: Online. Credit not allowed for both ECE 565 and ENGR 565.
Term Offered: Fall (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 570 Coupled Electromechanical Systems Credits: 3 (3-0-0)
Course Description: Coupled electrical and mechanical systems and the analysis of energy transfer between these systems. Analysis of field energy and the relationship between electrical, mechanical and electromagnetic forces.
Prerequisite: ECE 202 or ECE 204.
Registration Information: Sections may be offered: Online. Credit not allowed for both ENGR 570 and ENGR 581A2.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.
ENGR 596 Group Study - Systems Engineering Skills Credits: Var[1-2] (0-0-0)
Course Description: Topics related to building specialized skills relevant for the systems engineering field.
Prerequisite: None.
Registration Information: Bachelor’s degree required. Sections may be offered: Online.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 597 Group Study in Systems Engineering Credits: 3 (0-0-3)
Course Description: Special and contemporary topics in the field of systems engineering.
Prerequisite: None.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. Sections may be offered: Online.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 665 Stochastic Simulation in Engr Applications Credits: 3 (3-0-0)
Course Description: Probabilistic treatment of uncertainties in modeling behavior of engineering systems; basic and advanced stochastic simulation techniques for evaluating stochastic system performances; Bayesian model updating and model selection; applications in reliability and risk assessment of infrastructure systems under random loading, and calibration of engineering models using measurement data.
Prerequisite: CIVE 203 or STAT 301 or STAT 315.
Restriction: Must be a: Graduate, Professional.
Registration Information: Credit not allowed for both CIVE 680B1 and ENGR 665.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 667 Advanced Model-Based Systems Engineering Credits: 3 (3-0-0)
Course Description: Theory and application of formal systems architecture modeling.
Prerequisite: ENGR 567.
Restriction: Must be a: Graduate, Professional.
Registration Information: Sections may be offered: Online.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 697 Group Study Credits: Var[1-6] (0-0-0)
Also Offered As: ECE 697.
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Credit not allowed for both ENGR 697 and ECE 697.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

ENGR 699 Thesis Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

ENGR 786 Applied Systems Engineering Practicum Credits: Var[1-9] (0-0-0)
Course Description: Research techniques, critical thinking, evaluation criteria, and methods of technical writing.
Prerequisite: (ENGR 502) and (ENGR 531 or CIS 600 or CIS 670).
Restriction: Must be a: Graduate, Professional.
Registration Information: Written consent of advisor.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

ENGR 795 Independent Study Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

ENGR 799A Dissertation: PhD Credits: Var[1-18] (0-0-0)
Course Description: Dissertation for PhD in System Engineering Program.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Written consent of advisor. Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

ENGR 799B Dissertation: Professional Doctorate Credits: Var[1-9] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Written consent of advisor. Admission to Professional Doctorate of Engineering, Systems Engineering.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.