Strategies, methods, and means of the design process will be discussed, participation, discussion of solved problems, hands-on design projects. Opportunities for students to demonstrate their learning through in-class will be facilitated in an "apply what you have learned" fashion with ample in the context of a collaborative design project. Learning in this course decision-making; and, demonstrate the application of this knowledge will internalize the importance of information and decision-making in systems engineering in analysis, design, development, integration, verification and validation of complex systems. The course is intended for engineering students who aspire to careers in systems design and those who wish to broaden their knowledge so as to address systems problems. The principal objectives of this course are: (1) to bring systems theory, systems thinking, systems engineering, and systems management together into a single framework and to integrate them such that successful system design is possible; and (2) to immerse the student in the principles, practices, and application of systems engineering through selected readings, textbook study, lectures, and homework assignments and as members of a multidisciplinary systems development team on a systems design project. The course is designed to immerse students in the principles, practices and application of systems engineering within the design, development, integration and deployment of complex systems. Students will learn the special functions and responsibilities of systems engineers in comparison to analysts, design specialists, test engineers, project managers and other members of the systems development teams. They will acquire the knowledge, skills and mindset necessary to be successful as part of a major system development project and will acquire the leadership, problem-solving and innovation skills necessary for success. The objective of this course is to immerse traditional engineering students in the principles, practices, and application of systems engineering and design through selected readings, textbook studies, lectures, homework assignments, and a team design project. This course begins with an overview of systems engineering as a discipline, which prepares the student for the course topics/modules that follow. The course addresses the "hows" and "whys" of systems analysis, design, and development. Students will: 1) learn how to bridge the gap between capturing user needs and the development of systems by honing skills in the technical activities of systems analysis, systems design, and systems development; 2) learn how to translate abstract visions of the stakeholders and users into a language of specifications, architectures, and designs to direct the system hardware and software development activities resulting in a system that satisfies user needs without latent defects, delivered on schedule, within budget, and profitable for the developing entity; 3) acquire an understanding of systems engineering as a problem-solving solution development discipline that requires a comprehensive understanding of how to analyze systems and how systems are organized, structured, defined, and employed by the user; and, 4) apply the knowledge gained from these lessons toward the analysis, design, and development of a system as members of a multi-disciplinary team.

**EDSGN 558: Systems Design**

3 Credits

Systems engineering, principles, practices, and applications of systems engineering in analysis, design, development, integration, verification and validation of complex systems. The course is intended for engineering students who aspire to careers in systems design and those who wish to broaden their knowledge so as to address systems problems. The principal objectives of this course are: (1) to bring systems theory, systems thinking, systems engineering, and systems management together into a single framework and to integrate them such that successful system design is possible; and (2) to immerse the student in the principles, practices, and application of systems engineering through selected readings, textbook study, lectures, and homework assignments and as members of a multidisciplinary systems development team on a systems design project. The course is designed to immerse students in the principles, practices and application of systems engineering within the design, development, integration and deployment of complex systems. Students will learn the special functions and responsibilities of systems engineers in comparison to analysts, design specialists, test engineers, project managers and other members of the systems development teams. They will acquire the knowledge, skills and mindset necessary to be successful as part of a major system development project and will acquire the leadership, problem-solving and innovation skills necessary for success. The objective of this course is to immerse traditional engineering students in the principles, practices, and application of systems engineering and design through selected readings, textbook studies, lectures, homework assignments, and a team design project. This course begins with an overview of systems engineering as a discipline, which prepares the student for the course topics/modules that follow. The course addresses the "hows" and "whys" of systems analysis, design, and development. Students will: 1) learn how to bridge the gap between capturing user needs and the development of systems by honing skills in the technical activities of systems analysis, systems design, and systems development; 2) learn how to translate abstract visions of the stakeholders and users into a language of specifications, architectures, and designs to direct the system hardware and software development activities resulting in a system that satisfies user needs without latent defects, delivered on schedule, within budget, and profitable for the developing entity; 3) acquire an understanding of systems engineering as a problem-solving solution development discipline that requires a comprehensive understanding of how to analyze systems and how systems are organized, structured, defined, and employed by the user; and, 4) apply the knowledge gained from these lessons toward the analysis, design, and development of a system as members of a multi-disciplinary team.

**EDSGN 558: Systems Design**

Cross-listed with: IE 549

3 Credits

The study and application of data mining/machine learning (DM/ML) techniques in multidisciplinary design. CSE 561 / EDSGN 561 / IE 561 / IST 561 Data Mining Driven Design (3) This course examines how theoretical data mining/machine learning (DM/ML) algorithms can be employed to solve large-scale, complex design problems. Knowledge Discovery in Databases (KDD) is the umbrella term used to describe the sequential steps involved in capturing and discovering hidden,
EDSGN 581: Engineering Design Studio I

3 Credits

Cross-disciplinary teams learn in a studio environment to consider broad aspects and context of engineering design activities. EDSGN 581 Engineering Design Studio I (3) Students examine engineering design from a broad perspective, including design thinking, systems design, and societal contexts. Students bring together many disparate aspects of their previous engineering and non-engineering experiences and investigate new aspects. The material will be presented through a variety of hands-on activities including design projects. Current and best industry practices will also be examined. This course provides a unique opportunity to explore material from many engineering fields and other disciplines within the context of design. This course is a precursor to Engineering Design Studio II (i.e., EDSGN 582). The course will be taught using a studio model.

EDSGN 582: Engineering Design Studio II

3 Credits

Cross-disciplinary teams in an engineering design studio environment with project emphasis on technical and analytical depth. EDSGN 582 Engineering Design Studio II (3) The course is a continuation of Engineering Design Studio I (i.e., EDSGN 581) and will be conducted using a studio model. The course requires students to bring together the many disparate aspects of their previous engineering and non-engineering experiences. The course material will be presented through a variety of hands-on activities including design projects. Current and best industry practices will also be studied. Students will integrate the depth and breadth of their engineering and personal experiences and focus on analysis and performance prediction throughout the life cycle of the design.

Prerequisite: EDSGN581

EDSGN 585: Engineering Design Portfolio

1 Credits

Preparation of a portfolio summarizing the student’s experience with engineering design research and practice. EDSGN 585 Engineering Design Portfolio (1) Industries seeking to fill positions in engineering design frequently ask for a portfolio representing the applicant’s work. In this course, students will work with a faculty mentor (i.e., course instructor) to create a design portfolio that reflects the depth of their research and design experience. The portfolio consists of two parts: a detailed white paper or report and a short graphical summary. The graphical summary represents the breadth of the student’s experience. Students will reflect on their experiences, identify critical milestones, opportunities for growth, and successes and present these experiences as vignettes in their portfolio. Those examining this element of the portfolio will gain insight into the growth and talent of the engineering designer it represents. The portfolio is mutually beneficial - for the students and the prospective employer.

Prerequisite: EDSGN582

EDSGN 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

EDSGN 594: Research Topics

1-12 Credits/Maximum of 12

Supervised student activities on research projects identified on an individual or small-group basis.
EDSGN 595: Internship
1-9 Credits/Maximum of 9
Supervised off-campus, nongroup instruction, including field experiences, practicums, or internships. Written and oral critique of activity required.

EDSGN 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

EDSGN 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

EDSGN 599: Foreign Studies
1-2 Credits/Maximum of 4
Courses offered in foreign countries by individual or group instruction.

EDSGN 600: Thesis Research
1-15 Credits/Maximum of 999
No description

EDSGN 610: Thesis Research Off Campus
1-15 Credits/Maximum of 999
No description.

EDSGN 890: Colloquium
1-3 Credits/Maximum of 3
Continuing, professionally oriented seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

EDSGN 896: Individual Studies
1-9 Credits/Maximum of 9
Creative projects with a professional orientation, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

EDSGN 897: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject with a professional orientation that may be offered infrequently.