An introductory communications course in the tools and techniques utilized to produce various types of working drawings. Principles of multiview projections, geometric relationships, shape and size description, and pictorial methods are included with emphasis on technical applications and design problem solving.

3 Credit Hours. 2 Lecture Contact Hours. 2 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

ENGR 2300. Materials Engineering.
Structure, properties and behavior of engineering materials including metals, polymers, composites and ceramics. Mechanical, electrical, magnetic, thermal, and optical properties are covered. Prerequisites: CHEM 1341 or CHEM 1335 and CHEM 1141, all with a grade of "D" or better.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

ENGR 3190. Cooperative Education.
This course provides special problems in engineering for cooperative education students. Problems are related to the student's work assignment and culminate in a technical report. Three hours may be used as technical elective, and one additional hour may be used as free elective; 4 hours may be used toward graduation. Prerequisite: Overall GPA 2.5 or above and approval of department head.

1 Credit Hour. 0 Lecture Contact Hours. 40 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

This course covers the principles of mechanic materials and includes the following topics: stress and strain; elastic modulus and Poisson's ratio; constitutive equations; torsion; bending; axial, shear and bending moment diagrams; deflection of beams; and stability of columns. Prerequisite: ENGR 3375 with a grade of "D" or better.

3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

ENGR 3315. Engineering Economic Analysis.
Interest formulas, economic equivalence, rate of return analysis, techniques of economic analysis for engineering decisions and an introduction to cost estimation. Prerequisite: MATH 1315.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 3360. Structural Analysis.
Structural engineering fundamentals to include design loads, reactions, force systems, functions of a structure, and the analysis of statically determinate and indeterminate structures by classical and modern techniques. Prerequisite: ENGR 3311 with a grade of "D" or better.

3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

ENGR 3373. Circuits and Devices.
DC and AC circuit analysis, network theorems, electromechanical devices, electronic devices and an introduction to amplifiers, oscillators and operational amplifiers. Prerequisite: PHYS 2425 with a grade of "D" or better.

3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

ENGR 3375. Mechanics for Engineers.
This course covers statics, using a vector approach to mechanics. Prerequisite: PHYS 1430 with a grade of "D" or better. Co-requisite: MATH 2472 with a grade of "D" or better.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 4390. Internship.
Supervised on-the-job professional learning experience in engineering and other technical areas. This course provides practical work experience in their particular field of interest.

3 Credit Hours. 0 Lecture Contact Hours. 20 Lab Contact Hours.
Grade Mode: Standard Letter

Open to undergraduate students on an independent basis by arrangement with the faculty member concerned. Requires school director's approval. Repeatable for credit with different emphasis. Prerequisite: junior or senior standing.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

ENGR 5100. Seminar in Engineering.
Graduate students attend seminars by invited speakers presenting relevant topics in academia and industry. The schedule of speakers will be developed each semester with strict faculty supervision. This course may only be taken for credit one time. Restricted to students enrolled in the MS Engineering program.

1 Credit Hour. 1 Lecture Contact Hour. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit

ENGR 5101. Academic Instruction for Engineering Graduate Assistants.
This course is seminar based and covers topics related to teaching and employment responsibilities. Completion of this course is required as a condition of employment for graduate assistants. This course does not earn graduate degree credit. Restricted to students enrolled in the MS Engineering program.

1 Credit Hour. 1 Lecture Contact Hour. 0 Lab Contact Hours.
Course Attribute(s): Graduate Assistantship|Exclude from Graduate GPA
Grade Mode: Leveling/Assistantships
ENGR 5105. Engineering Internship.
This course is a faculty-supervised, experiential, work-integrated learning course intended to help the student acquire engineering curriculum-related industrial experience and hence successfully make the transition into the workforce. Course cannot be counted toward graduation. Course may be repeated once. Enrollment requires Ingram School Director's approval. Prerequisite: At least one academic year (or two long semesters) of enrollment in MS Engineering, a valid offer of engineering-related internship from industry, and a written internship plan approved by the Director of Ingram School of Engineering.
1 Credit Hour. 0 Lecture Contact Hours. 1 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Credit/No Credit

ENGR 5199B. Thesis.
This course represents a student's continuing thesis enrollments. The student continues to enroll in this course until the thesis is submitted for binding. Registration requires Approval of Committee. Restricted to students enrolled in the MS Engineering program.
1 Credit Hour. 1 Lecture Contact Hour. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit

ENGR 5298B. Project.
This course represents a student's continuing project enrollments. The student continues to enroll in this course until the project is completed. Registration requires Approval of Committee. Restricted to students enrolled in the MS Engineering program.
2 Credit Hours. 2 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit

ENGR 5299B. Thesis.
This course represents a student's continuing thesis enrollments. The student continues to enroll in this course until the thesis is submitted for binding. Registration requires Approval of Committee. Restricted to students enrolled in the MS Engineering program.
2 Credit Hours. 2 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit

ENGR 5301. Academic Instruction for Engineering Graduate Assistants.
This course is seminar based and covers topics related to teaching and employment responsibilities. Completion of this course is required as a condition of employment for graduate assistants. This course does not earn graduate degree credit. Restricted to students enrolled in the MS Engineering program.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Graduate Assistantship/Exclude from Graduate GPA
Grade Mode: Leveling/Assistantships

ENGR 5310. Probability, Random Variables, & Stochastic Processes for Engineers.
This course develops theory underlying analysis and design of systems. Fundamental distributional concepts, applications of statistical methods, and theory of stochastic processes are introduced to create a foundation for mathematical analysis of physical systems involving randomness. Applications to engineering topics are taught, including estimation, control, and systems theory. Prerequisite: IE 3320 with a grade of "C" or better, or equivalent, or approval of instructor. Restricted to students enrolled in the MS Engineering program.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5384. Problems in Engineering.
Graduate students investigate a special topic by developing a technical problem, researching the topic, and presenting the findings. Plans will be developed on an individual basis with strict faculty supervision. This course may be repeated once for additional credit with permission of the School Director. Restricted to students enrolled in the MS Engineering program and with approval of instructor.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5398B. Project.
This course represents a student's continuing project enrollments. The student continues to enroll in this course until the project is completed. Registration requires Approval of Committee. Restricted to students enrolled in the MS Engineering program.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit

ENGR 5399B. Thesis.
This course represents a student's continuing thesis enrollments. The student continues to enroll in this course until the thesis is submitted for binding. Registration requires Approval of Committee. Restricted to students enrolled in the MS Engineering program.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit
ENGR 5598B. Project.
This course represents a student's continuing project enrollments. The student continues to enroll in this course until the project is completed. Registration requires Approval of Committee. Restricted to students enrolled in the MS Engineering program.
5 Credit Hours. 5 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit

ENGR 5599B. Thesis.
This course represents a student's continuing thesis enrollments. The student continues to enroll in this course until the thesis is submitted for binding. Registration requires Approval of Committee. Restricted to students enrolled in the MS Engineering program.
5 Credit Hours. 5 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit

ENGR 5998B. Project.
This course represents a student's continuing project enrollments. The student continues to enroll in this course until the project is completed. Registration requires Approval of Committee. Restricted to students enrolled in the MS Engineering program.
9 Credit Hours. 9 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit

ENGR 5999B. Thesis.
This course represents a student's continuing thesis enrollments. The student continues to enroll in this course until the thesis is submitted for binding. Registration requires Approval of Committee. Restricted to students enrolled in the MS Engineering program.
9 Credit Hours. 9 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit