6. COLLEGE OF ENGINEERING

The College of Engineering offers six Bachelor of Science (B.S.) degree programs in: Biomedical Engineering (BME); Chemical Engineering (CME); Civil Engineering (CE); Computer Engineering (CPE); Electrical Engineering (EE); and Mechanical Engineering (ME). The College of Engineering programs in Biomedical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, and Mechanical Engineering are accredited by the Engineering Accreditation Commission of ABET. Chemical Engineering is a newly established program and will seek accreditation following graduation of their first class per ABET policy.

The College has excellent laboratory facilities where students receive hands-on instruction by faculty. Computer-aided design (CAD) facilities, including state-of-the-art workstations, are routinely used in all programs. Some classes are taught by adjunct faculty from local industries, giving students the opportunity to interact with engineering professionals engaged in relevant engineering practice.

Admission to the College of Engineering

Direct Admission Criteria

Applicants entering UTSA as Freshmen or Freshmen Transfers (fewer than 12 transferable semester credit hours) will be directly admitted to the College of Engineering if they:

- meet all UTSA undergraduate admission requirements,
- qualify for enrollment in MAT 1214 Calculus I, or a higher level mathematics course, and
- are ranked in the top 10 percent of their high school class (no minimum SAT or ACT scores required), or
- are ranked below the top 10 percent of their high school class and have a minimum 1200 SAT* or 25 ACT score.

Applicants with SAT scores below 1200 or ACT scores below 25 may undergo admission by committee review.

Transfer requirements for direct admission to the College of Engineering for students who have earned 12 or more transferable semester credit hours:

- meet all UTSA undergraduate transfer admission requirements, and
- have completed MAT 1214 Calculus I and WRC 1013 Freshman Composition I, or the equivalents, with grades of "C-" or better, and
- meet grade point average requirements:
  1. applicants with a transfer grade point average of 3.00 or higher may be granted direct admission to the College, or
  2. applicants with a transfer grade point average below 3.00 may be granted admission to the College by committee review.

Applicants who do not meet College of Engineering admission requirements will be admitted to the Engineering, Math, and Sciences Studies in the University College. Students have three semesters to complete Calculus I with a grade of "C-" or better and meet the COE Transfer Requirements.

"C-" Grade Rule

A grade of "C-" or better in any science, engineering, or mathematics course required for an engineering degree or any other course that is

a prerequisite to a required Biomedical Engineering (BME), Chemical Engineering (CME), Civil Engineering (CE), Computer Engineering (CPE), Electrical Engineering (EE), Mechanical Engineering (ME), or Engineering (EGR) course indicates satisfactory preparation for further engineering education. Any course assigned a grade below a "C-" must be repeated before enrolling in any course for which it is a prerequisite. This requirement is subject to both the Gateway Course and Three-Attempt Limit rules.

Gateway Courses

Students pursuing a degree in the College of Engineering must successfully complete Gateway Courses with a grade of "C-" or better in no more than two attempts. If the student does not successfully complete a Gateway Course in two attempts, then the student is required to change their major.

For the purpose of this policy, dropping a course with a grade of "W" or taking an equivalent course at another institution of higher education counts as an attempt at taking the course.

Three-Attempt Limit for the College of Engineering

Students pursuing a degree in the College of Engineering must successfully complete all science, engineering, and math courses for their program with a grade of "C-" or better in no more than three attempts. A student unable to achieve the "C-“ Grade Rule within three enrollments (attempts) shall be required to change their major.

For the purpose of this policy, dropping a course with a grade of "W" or taking an equivalent course at another institution of higher education counts as an attempt at taking the course.

Engineering Honors

The College of Engineering (COE) Honors distinction provides the opportunity for experiential and advanced study under close faculty supervision to those admitted into the Engineering Honors Program (EHP). Selection for the honors designation is based on the student’s academic performance and recommendation by a faculty member in the student’s major discipline.

Program Admission

To be eligible for the program, students must have a minimum UTSA grade point average of 3.25 and a minimum grade point average of 3.25 in their major at UTSA. These minimum averages must be maintained by the student to receive approval of the College Honors Committee. Admission to the Engineering Honors Program is competitive.

Engineering Honors Program Admission Criteria for Freshman

Applicants entering UTSA from high school may be directly admitted to the Engineering Honors Program if they meet the following requirements:

- meet all UTSA and COE admission requirements,
- rank in the top 25 percent of their high school class, and
- earn an SAT score of 1280 or higher or an ACT composite score of 27 or higher.
Engineering Honors Program Admission Criteria for Transfer and Current UTSA Engineering Students

Transfer applicants and applicants who are current UTSA engineering students may be admitted to the Engineering Honors Program if they meet the following requirements:

- have completed 12 UTSA semester credit hours,
- have a cumulative UTSA GPA of 3.0, and
- have documented involvement in extracurricular activities and student societies.

Students who are admitted to the Honors College Program have direct admission to the Engineering Honors Program but must complete the Engineering Honors Program acknowledgement form in order to participate in the program. The application forms and deadlines will be available on the College of Engineering website.

Program Requirements

The Engineering Honors Program requires its member to meet academic and experiential learning requirements in order to graduate with the Engineering Honors designation. Students must meet a minimum of 15 hours through any combination of:

- Any Engineering Practice in Community Service (EPICS) courses
- Honors designated engineering courses which will be listed on the engineering website and typically offered once per semester

and must complete:

- EGR 4993 Honors Research for 3 semester credit hours in their last year of study which may be repeated once for credit and may be approved as a technical elective with department agreement.

Cooperative Education in Engineering Program

The Cooperative Education in Engineering Program formally integrates University studies with institutionally supervised work experiences at cooperating organizations. Students participating in this program alternate periods of study at the University with periods of employment in industry. This combination of experiences enhances the student’s knowledge, personal development, and preparation for a professional career. Participants register at the University each semester. During the work periods, students register for the 3-semester-credit-hour EGR 3303 Engineering Co-op course. At the end of each work period, students submit reports covering the period. These reports are the basis of the student’s grades in the course. The cooperative education work periods also provide students with a source of income to help pay for their college expenses.

To qualify for the Cooperative Education in Engineering Program, a student must have declared a major in the College of Engineering and have a minimum cumulative grade point average of 2.50 and a minimum grade point average of 2.50 in their College of Engineering courses. Students are advised that many co-op employers require cumulative grade point averages higher than 2.50, and some require a minimum cumulative grade point average of 3.0. Transfer students may participate in the program after completing at least one semester at UTSA.

For more information and to apply to the Cooperative Education in Engineering Program, students should contact their Undergraduate Advisor of Record (UGAR).

Degree Requirements Common to All Engineering Programs

During their first semester, students should specify their interest in a specific engineering program by selecting biomedical, chemical, civil, computer, electrical, or mechanical engineering as a major. Undecided engineering students should select a major closest to their area of interest (refer to the following program descriptions). Students may obtain additional information about each program from their academic advisor or a faculty advisor in the appropriate department.

Students must satisfy the University’s Core Curriculum and ABET accreditation requirements. Recommended degree plans and current ABET requirements may be obtained from the College of Engineering. All students admitted to the College of Engineering must complete at least 42 semester credit hours from their required major courses at UTSA before graduation.

Course requirements common to all engineering degree programs follow.

I. Core Curriculum requirements

Students seeking the Bachelor of Science degree in any engineering field must fulfill University Core Curriculum requirements in the same manner as other students at UTSA.

MAT 1214 Calculus I, PHY 1943 Physics for Scientists and Engineers I, and PHY 1963 Physics for Scientists and Engineers II (also listed under section II, General Engineering requirements) may be used to satisfy the Core Curriculum requirements for Mathematics and Life and Physical Sciences.

II. General Engineering requirements

All degree-seeking candidates in engineering must complete the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 1103</td>
<td>General Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>EGR 2323</td>
<td>Applied Engineering Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>MAT 1214</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MAT 1224 or</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>EGR 1324</td>
<td>Calculus II for Engineers</td>
<td></td>
</tr>
<tr>
<td>PHY 1943 &amp;</td>
<td>Physics for Scientists and</td>
<td>4</td>
</tr>
<tr>
<td>PHY 1951</td>
<td>Engineers I and Physics for</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engineers I Laboratory</td>
<td></td>
</tr>
<tr>
<td>PHY 1963 &amp;</td>
<td>Physics for Scientists and</td>
<td>4</td>
</tr>
<tr>
<td>PHY 1971</td>
<td>Engineers II and Physics for</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scientists and Engineers II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

Total Credit Hours 22

- Certificate in Engineering Projects in Community Service (EPICS)
- Certificate in Data Center Design

Certificate in Engineering Projects in Community Service (EPICS)

The Certificate in Engineering Projects in Community Service (EPICS) will prepare degree seeking students at UTSA with a national award winning social, civic, entrepreneurship program. In the 15 hour certificate, teams design, build, and maintain systems to solve engineering-based problems for the community, non-profits, schools, and other service organizations. This program certifies to employers that participants aren’t waiting to graduate to solve social problems; they have already engaged them while
in college. The EPICS program at UTSA will be housed in the College of Engineering but EPICS and honors section courses will be open to all undergraduates.

Students will engage in the design process from start to finish with an emphasis on sustainability as they deliver products to clients. EPICS are multi-year, and often decade long ventures, with students encouraged to work on a project for at least one year. The course structure proposed has a 1 credit hour introduction and a 2 credit continuation each year tied to the service based project and offered at freshman, sophomore, junior and senior levels.

Certificate Requirements

Students will be required to complete a minimum of 15 semester credit hours for the certificate, credits may be repeated if engaged in different course sections tied to each project. Students may register for either 1 or 2 hours of credit but will be required to take on a higher-level role if registering for 2 hours of credit in a semester. The EPICS program will also encourage the use of a co-op internship at the host partner business if available. The EPICS co-op may be substituted for technical elective credit with permission of the department. Courses must be taken at their level of current status; freshman may take EPICS courses if between 0-29 hours, sophomores at 30-59, juniors at 60-89, and seniors at or above 90 hours. Certificates will be awarded upon completion of the 15 approved hours, and with a GPA of 2.0 or above.

Freshman Students

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR 1351</td>
<td>First Year Participation in Engineering Projects in Community Service (EPICS)</td>
<td>1</td>
</tr>
<tr>
<td>EGR 1352</td>
<td>First Year Participation in Engineering Projects in Community Service (EPICS)</td>
<td>2</td>
</tr>
</tbody>
</table>

Sophomore Students

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR 2351</td>
<td>Sophomore Participation in Engineering Projects in Community Service (EPICS)</td>
<td>1</td>
</tr>
<tr>
<td>EGR 2352</td>
<td>Sophomore Participation in Engineering Projects in Community Service (EPICS)</td>
<td>2</td>
</tr>
</tbody>
</table>

Junior Students

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR 3351</td>
<td>Junior Participation in Engineering Projects in Community Service (EPICS)</td>
<td>1</td>
</tr>
<tr>
<td>EGR 3352</td>
<td>Junior Participation in Engineering Projects in Community Service (EPICS)</td>
<td>2</td>
</tr>
<tr>
<td>EGR 3353</td>
<td>EPICS Engineering Co-op</td>
<td>3</td>
</tr>
</tbody>
</table>

Senior Students

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR 4351</td>
<td>Senior Participation in Engineering Projects in Community Service (EPICS)</td>
<td>1</td>
</tr>
<tr>
<td>EGR 4352</td>
<td>Senior Participation in Engineering Projects in Community Service (EPICS)</td>
<td>2</td>
</tr>
</tbody>
</table>

Senior engineering students may be allowed to register for interdisciplinary senior design proportional to the hours in their home program of: Biomedical, Chemical, Civil, Computer, Electrical or Mechanical Engineering provided they meet the prerequisites of their respective senior design class, with permission of the department and with prior engagement with EPICS projects. Students enrolled in EPICS senior design will be tasked with a significant leadership role of juniors, sophomores and freshmen.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR 4362</td>
<td>Senior EPICS Design I</td>
<td>2</td>
</tr>
<tr>
<td>EGR 4363</td>
<td>Senior EPICS Design I</td>
<td>3</td>
</tr>
<tr>
<td>EGR 4373</td>
<td>Senior EPICS Design II</td>
<td>3</td>
</tr>
</tbody>
</table>

Certificate in Data Center Design

The certificate program in Data Center Design is designed so that students in mechanical, civil, and electrical engineering disciplines will take all the required courses in their disciplines, then, take additional courses from other majors (options A, B and C shown below). For instance, in order to be certified, a mechanical engineering student not only has to satisfy the mechanical engineering degree requirements, but also needs to complete courses in option A, shown below. All students must satisfy the prerequisites for courses in the option before registering for courses. Regardless of the option, all participating students must complete a 3 semester credit hour data center design project. The following exhibits the description of the project:

EGR 4953 Special Studies in Engineering: Overview of Data Center Design and Operation

The goal of this course is to provide the student with a broad overview of the application of technical course material and to utilize that knowledge in completion of an approved data center project. The scope of the project encompasses all of the requisite phases in planning for a system deployment into a data center. The phases are: planning, requirement analysis, facility design and installation, system deployment, check out and transitioning to operations. Students should propose the projects, an advisor will be assigned (either from UTSA or industry), and the project will be evaluated as the principal element of the student’s grade. Additionally, the course will include field trips to data centers, and guest lecturers to be provided. Some examples of the lecture topics include: Information Technology set up considerations, PSC management and systems monitoring, fire protection/detection at room and cabinet level, future power projections for servers and high performance computers, future cooling applications, physical security measures, etc. Successful course completion includes completing a class project and project presentation.

Option A. Mechanical Engineering Students

Requires 15 semester credit hours in addition to the B.S. in Mechanical Engineering degree requirements. Mechanical Engineering students pursuing a certificate in Data Center Design must complete the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 3113</td>
<td>Structural Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CE 3213</td>
<td>Reinforced Concrete Design</td>
<td>3</td>
</tr>
<tr>
<td>EE 3413</td>
<td>Analysis and Design of Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>EE 4953</td>
<td>Special Studies in Electrical and Computer Engineering (Power Electronics)</td>
<td>3</td>
</tr>
<tr>
<td>EGR 4953</td>
<td>Special Studies in Engineering (Overview of Data Center Design and Operation)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credit Hours 15

Option B. Civil Engineering Students

Requires 21 semester credit hours in addition to the B.S. in Civil Engineering degree requirements. Civil Engineering students pursuing a certificate in Data Center Design must complete the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 2213</td>
<td>Electric Circuits and Electronics</td>
<td>3</td>
</tr>
<tr>
<td>EE 3413</td>
<td>Analysis and Design of Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>EE 4953</td>
<td>Special Studies in Electrical and Computer Engineering (Power Electronics)</td>
<td>3</td>
</tr>
<tr>
<td>EGR 4953</td>
<td>Special Studies in Engineering (Overview of Data Center Design and Operation)</td>
<td>3</td>
</tr>
</tbody>
</table>
Option C. Electrical Engineering Students
Requires 18 semester credit hours in addition to the B.S. in Electrical Engineering degree requirements. Electrical Engineering students pursuing a certificate in Data Center Design must complete the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 4953</td>
<td>Special Studies in Electrical and Computer Engineering (Power Electronics)</td>
<td>3</td>
</tr>
<tr>
<td>EGR 4953</td>
<td>Special Studies in Engineering (Overview of Data Center Design and Operation)</td>
<td>3</td>
</tr>
<tr>
<td>ME 3293</td>
<td>Thermodynamics I</td>
<td>3</td>
</tr>
<tr>
<td>ME 3663</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>ME 4293</td>
<td>Thermodynamics II</td>
<td>3</td>
</tr>
<tr>
<td>ME 4313</td>
<td>Heat Transfer</td>
<td>3</td>
</tr>
<tr>
<td>Total Credit Hours</td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

**Engineering (EGR) Courses**

**EGR 1003. Engineering Design and Problem Solving. (3-0) 3 Credit Hours.**
This course will introduce students to the scope of engineering, foundations of engineering science, and engineering design. Engineering fundamentals and design methods are addressed through rigorous design challenges and reverse engineering and redesign modules. The modules are designed so that students learn specific engineering content as they solve engineering problems in multiple contexts. This course is restricted to students in the Engineer Your World program. Course Fees: LRE1 $20; STSE $30.

**EGR 1313. Calculus with Engineering Applications. (3-2) 3 Credit Hours.**
Prerequisite: Completion of precalculus or satisfactory performance on a placement examination. The first of a two-part integrated physics and calculus course. Calculus topics include an introduction to the concepts of limit, continuity, and derivative, mean value theorem, and applications of derivatives such as velocity and acceleration; introduction to the Riemann integral and the fundamental theorem of calculus. Physics topics include an introduction to vectors, force and Newton’s Laws of Physics. Classes meet weekly for three hours of lecture and two hours of problem solving tutorials. Course Fees: LRE1 $20; STSE $30.

**EGR 1324. Calculus II for Engineers. (4-0) 4 Credit Hours. (TCCN = MATH 2414)**
Prerequisite: MAT 1214. Methods of integration, applications of the integral, sequences, series, and Taylor expansions. Calculus topics are combined with physics applications including an introduction to vectors, parametric equations, gradients, and Newton’s Laws of Physics. (Credit cannot be earned for both EGR 1324 and MAT 1224.) Course Fees: LRE1 $20; STSE $40.

**EGR 1343. The Impact of Modern Technologies on Society. (3-0) 3 Credit Hours.**
Prerequisites: Basic background in high school mathematics and physical sciences. This course is designed to inform students of the social impact of modern technologies. The course explores the issues faced by society as technology becomes an integral part of human life. The course prepares students to think critically, practically, creatively and responsibly about technological and sociological challenges, and encourages them to examine solutions of their own. The course also explores and discusses the socio-technological interplay. May be applied toward the core curriculum requirement in Social and Behavioral Sciences. Course Fees: LRC1 $12; LRE1 $20; STSE $30.

**EGR 1351. First Year Participation in Engineering Projects in Community Service (EPICS). (1-2) 1 Credit Hour.**
Engineering Projects in Community Service (EPICS) courses create a vertical project track under which students work in multidisciplinary teams on long-term engineering-based design projects. Projects of at least one-year in duration are intended to solve real problems that are defined in consultation with “customers” from not-for-profit community and education organizations. EPICS courses are open to students from all disciplines; each student contributes expertise in his/her academic discipline. Each team consists of a mix of first year, sophomores, juniors, and seniors. Students are encouraged to participate in an EPICS project team for two or more semesters. First year students gain insight into the specific project, and more generally, into the design and development process. They attend planning and reporting meetings with the customer and are expected attend all team meetings. Under the mentorship of the team’s sophomores, juniors, and seniors they perform and report upon tasks consistent with their level of discipline expertise. May be repeated for credit. Course Fees: LRE1 $20; STSE $10.

**EGR 1352. First Year Participation in Engineering Projects in Community Service (EPICS). (2-2) 2 Credit Hours.**
Prerequisite: Permission of instructor required. Continuation of Engineering Projects in Community Service (EPICS). Participants gain insight into the specific project, and more generally, into the design and development process. They attend planning and reporting meetings with the customer and are expected to attend all team meetings. Working with the team’s sophomores, juniors, and seniors, they perform and report upon tasks consistent with their level of discipline expertise. EPICS 1352 is offered for two credits and is intended for students who have exhibited significant achievement in EGR 1351 and desire the level of responsibility that is appropriate for two credits. May be repeated for credit. Course Fees: LRE1 $20; STSE $20.

**EGR 1403. Technical Communication. (3-0) 3 Credit Hours.**
Prerequisite: WRC 1013. Oral, written, graphical and visual communication; technical instructions; design project with presentation; teamwork; and personal responsibility. May be applied toward the Core Curriculum requirement in the Component Area Option. Course Fees: LRC1 $12; LRE1 $20; STSE $30.

**EGR 2103. Statics. (3-0) 3 Credit Hours. (TCCN = ENGR 2301)**
Prerequisites: PHY 1943, and completion of or concurrent enrollment in MAT 1224. Vector analysis of force systems applied to particles and rigid bodies and free body diagrams. Engineering applications of equilibrium; of moments, internal forces, and friction; and of centroids, centers of gravity, and moments of inertia. Generally offered: Fall, Spring, Summer. Course Fees: LRE1 $20; STSE $30.
EGR 2213. Statics and Dynamics. (3-0) 3 Credit Hours. (TCCN = ENGR 2303)
Prerequisites: MAT 1224 and PHY 1943. Force, moment, equilibrium, centroids and moments of inertia, kinematics, and kinetics of particles. Not open to students in Civil or Mechanical Engineering. May not be substituted for EGR 2103. Generally offered: Fall, Spring, Summer. Course Fees: LRE1 $20; STSE $30.

EGR 2323. Applied Engineering Analysis I. (3-1) 3 Credit Hours. (TCCN = MATH 2321)
Prerequisite: MAT 1224 or EGR 1324. Application of mathematical principles to the analysis of engineering problems using linear algebra and ordinary differential equations (ODE's). Topics include: mathematical modeling of engineering problems; separable ODE's; first-, second-, and higher-order linear constant coefficient ODE's; characteristic equation of an ODE; non-homogeneous equations; Laplace transforms; shifting theorems; convolution; solution of an ODE via Laplace transform; matrix addition and multiplication; solution of a linear system of equations via Gauss elimination and Cramer's rule; rank, determinant, and inverse of a matrix; eigenvalues and eigenvectors; existence and uniqueness of solutions; solution to system of ODE's by diagonalization. One hour of problem solving recitation. Generally offered: Fall, Spring, Summer. Course Fees: LRE1 $20; STSE $30.

EGR 2351. Sophomore Participation in Engineering Projects in Community Service (EPICS). (1-2) 1 Credit Hour.
Continuation of Engineering Projects in Community Service (EPICS). Sophomores gain insight into the specific project, and, more generally, into the design and development process. They attend planning and reporting meetings with the customer and are expected attend all team meetings. Under the mentorship of the team's juniors and seniors, they perform and report upon tasks consistent with their level of discipline expertise. May be repeated for credit. Course Fees: LRE1 $20; STSE $10.

EGR 2352. Sophomore Participation in Engineering Projects in Community Service (EPICS). (2-2) 2 Credit Hours.
Continuation of Engineering Projects in Community Service (EPICS). Sophomores gain insight into the specific project, and, more generally, into the design and development process. They attend planning and reporting meetings with the customer and are expected attend all team meetings. Under the mentorship of the team's juniors and seniors they perform and report upon tasks consistent with their level of discipline expertise. May be repeated for credit. Course Fees: LRE1 $20; STSE $20.

EGR 2513. Dynamics. (3-0) 3 Credit Hours. (TCCN = ENGR 2302)
Prerequisites: MAT 1224 and EGR 2103. Kinetics of particles and plane rigid bodies, work and energy, impulse and momentum, equations of motion and engineering applications. Generally offered: Fall, Spring, Summer. Course Fees: LRE1 $20; STSE $30.

EGR 3303. Engineering Co-op. (0-0) 3 Credit Hours.
Prerequisite: Acceptance into the Cooperative Education in Engineering Program. Designed for students participating in Cooperative Education in Engineering Program. Problems related to students' work assignments during their work for co-op employers. No more than 3 semester credit hours of Engineering Co-op may apply to a bachelor's degree. To apply 3 semester credit hours of Engineering Co-op as a technical elective toward a degree in engineering, a student must petition and get approval of a faculty supervisor prior to co-op activities. (Formerly EGR 3301.) Differential Tuition: $165.

EGR 3323. Applied Engineering Analysis II. (3-1) 3 Credit Hours.

EGR 3351. Junior Participation in Engineering Projects in Community Service (EPICS). (1-2) 1 Credit Hour.
Prerequisite: Upper-division standing. Continuation of Engineering Projects in Community Service (EPICS). The responsibilities of juniors include working with the seniors in the planning and organization of the project, contributing to the design process, problem solving by contributing expertise from their discipline, meeting with the customer, and the mentorship of sophomores and freshmen. The EPICS procedures manual provides information on expected relative workload for students. May be repeated for credit. Differential Tuition: $55.

EGR 3352. Junior Participation in Engineering Projects in Community Service (EPICS). (2-2) 2 Credit Hours.
Prerequisites: Upper-division standing and permission of instructor required. Continuation of Engineering Projects in Community Service (EPICS). The responsibilities of juniors include working with the seniors in the planning and organization of the project, contributing to the design process, problem solving by contributing expertise from their discipline, meeting with the customer, and the mentorship of sophomores and freshmen. The EPICS procedures manual provides information on expected relative workload for students. May be repeated for credit. Differential Tuition: $110.

EGR 3353. EPICS Engineering Co-op. (0-0) 3 Credit Hours.
Prerequisite: Acceptance into the Cooperative Education in Engineering Program and permission of instructor required. Designed for students participating in EPICS Cooperative Education in Engineering Program. Problems related to students' work assignments during their work for co-op employers. No more than 3 semester credit hours of Engineering Co-op may apply to a bachelor's degree. To apply 3 semester credit hours of Engineering Co-op as a technical elective toward a degree in engineering, a student must petition and get approval of a faculty supervisor prior to co-op activities. Differential Tuition: $165.

EGR 3713. Engineering Economic Analysis. (3-0) 3 Credit Hours.
Prerequisites: ECO 2013 or ECO 2023, and MAT 1224. Time-value of money concepts; techniques for economic evaluation of engineering alternatives; depreciation and taxes; inflation and market rates; contracting practices; funding public projects and related public policy issues. Generally offered: Fall, Spring. Differential Tuition: $165.

EGR 4351. Senior Participation in Engineering Projects in Community Service (EPICS). (1-2) 1 Credit Hour.
Prerequisite: Upper-division standing. Continuation of Engineering Projects in Community Service (EPICS). Seniors are responsible for the management tasks of planning and organizing their team project activity. They are expected to contribute expertise from their discipline to the design of the team's projects throughout most of the design process phases of problem identification, specification development, design, production, and deployment. Seniors will also meet with the customer and mentor the freshman, sophomores, and juniors. The EPICS procedures manual provides information on expected relative workload for students. May be repeated for credit. Differential Tuition: $55.
EGR 4352. Senior Participation in Engineering Projects in Community Service (EPICS). (2-2) 2 Credit Hours.
Prerequisites: Upper-division standing and permission of instructor required. Continuation of Engineering Projects in Community Service (EPICS). Seniors are responsible for the management tasks of planning and organizing their team project activity. They are expected to contribute expertise from their discipline to the design of the team's projects throughout most of the design process phases of problem identification, specification development, design, production, and deployment. Seniors will also meet with the customer and mentor the freshman, sophomores and juniors. The EPICS procedures manual provides information on expected relative workload for students. May be repeated for credit. Differential Tuition: $110.

EGR 4362. Senior EPICS Design I. (1-4) 2 Credit Hours.
Prerequisite: Permission of instructor required. Continuation of Engineering Projects in Community Service (EPICS). Seniors using EGR 4363 to fulfill capstone or design requirements where approved for their major may be required to satisfy additional course requirements specified by their degree program. The EPICS procedures manual provides information on expected relative workload for students. Seniors are responsible for the management tasks of planning and organizing their team project activity. They are expected to contribute expertise from their discipline to the design of the team's projects throughout most of the design process phases of problem identification, specification development, design, production, and deployment. Seniors will also meet with the customer and mentor the first year, sophomores and juniors. May be repeated for credit. Differential Tuition: $110.

EGR 4363. Senior EPICS Design I. (1-6) 3 Credit Hours.
Prerequisite: Permission of instructor required. Continuation of Engineering Projects in Community Service (EPICS). Seniors using EGR 4363 to fulfill capstone or design requirements where approved for their major may be required to satisfy additional course requirements specified by their degree program. The EPICS procedures manual provides information on expected relative workload for students. Seniors are responsible for the management tasks of planning and organizing their team project activity. They are expected to contribute expertise from their discipline to the design of the team's projects throughout most of the design process phases of problem identification, specification development, design, production, and deployment. Seniors will also meet with the customer and mentor the first year, sophomores and juniors. May be repeated for credit. Differential Tuition: $110.

EGR 4373. Senior EPICS Design II. (1-6) 3 Credit Hours.
Prerequisite: EGR 4362 or EGR 4363, and permission of instructor. Continuation of EPICS courses. Seniors using EGR 4363 to fulfill capstone or design requirements where approved for their major may be required to satisfy additional course requirements specified by their degree program. The EPICS procedures manual provides information on expected relative workload for students. Seniors are responsible for the management tasks of planning and organizing their team project activity. They are expected to contribute expertise from their discipline to the design of the team's projects throughout most of the design process phases of problem identification, specification development, design, production, and deployment. Seniors will also meet with the customer and mentor the first year, sophomores and juniors. May be repeated for credit. Differential Tuition: $110.

EGR 4953. Special Studies in Engineering. (3-0) 3 Credit Hours.
Prerequisite: Consent of instructor. An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Studies may be repeated for credit when topics vary, but not more than 6 semester credit hours, regardless of discipline, will apply to a bachelor's degree. Differential Tuition: $165.

EGR 4993. Honors Research. (0-0) 3 Credit Hours.
Prerequisite: Enrollment limited to candidates for college honors during their last two semesters; approval by the College Honors Committee. Supervised research and preparation of an honors thesis. May be repeated once with approval. Differential Tuition: $165.