

ENSC 101 Introduction to Engineering

Introduction

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Course: ENSC 101 Introduction to Engineering (3 Credits)
Term: Fall 2019
Prerequisites: None

Class Hours: Tuesdays and Thursdays 7:00 PM – 8:30 PM
Classroom: Meyer Hall 130
Website: my.blc.edu (MyBLC)

Textbook: *Engineering Fundamentals: An Introduction to Engineering, 5th Edition*
By Saeed Moaveni
ISBN-13: 978-1-305-08476-6
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Calculator: Scientific Calculator (TI-83 or higher recommended)

At its heart, engineering is about using science to find creative, practical solutions. It is a noble profession.
– Queen Elizabeth II

Course Overview

Welcome to Engineering! The intent of this course is to give prospective engineering students an early exposure to the field of engineering to aid them in making an informed professional decision. This course will provide insights into what it means to be an engineer including: introduction to careers in engineering, emphasizes on professional communication skills and engineering fundamentals, and hands-on projects that highlight design methodology and teamwork.

The course will emphasize understanding rather than pure memorization of mathematical formulae. The word science comes from the Latin, scientia, meaning “knowledge.” Keep this in mind throughout the semester, as your goal is to truly understand the concepts and extend that knowledge to new situations. After all, this is precisely what engineers do.

Examine the everyday with an eye for improving it. – Unknown

Topics

The topics of study will generally include: the engineering profession, preparing for a career in engineering, the engineering design process, engineering communication, engineering ethics, professionalism, engineering fundamentals, computational tools, engineering economics, and case studies. This course will include applications in mechanical and biomedical engineering, aerodynamics, chemical and environmental engineering, civil engineering, and physics.

We are what we repeatedly do. Excellence, therefore, is not an act, but a habit. – Aristotle

Grading

Grading System:

		A	93-100%	A-	90-93%
B+	87-90%	B	83-87%	B-	80-83%
C+	77-80%	C	73-77%	C-	70-73%
D+	67-70%	D	63-67%	D-	60-63%
		F	0-60%		

Coursework Weighting:

Assignments	10%
Projects	20%
Chapter Exams	30%
Midterm Exam	20%
Final Exam	20%
Extra Credit	Up to +3%

Class Participation and Attendance: Attendance and participation is vital to understanding the subject matter and demonstrating knowledge of the course topics. Therefore, attendance and class participation is mandatory. If a class period is to be missed, a valid excuse must be

communicated prior to the absence. After the second unexcused absence, a one percent reduction in the student's final grade will be taken with each additional absence.

Assignments: An assignment will be provided for each chapter and published on MyBLC. Each assignment will include assigned reading, practice problems, and a problem set. The reading and practice problems are encouraged to be completed collaboratively and will not be submitted for grading. The problem sets will be completed independently, unless otherwise stated in the individual problem statement, and will be submitted for grading. Instructions, including requirements, due dates, and submission procedures, will be detailed in the assignment documents.

Projects: This course includes projects that will be completed either independently or in small groups, depending on each project assignment. Instructions, requirements, due dates, and submission procedures will be detailed in project assignment documents.

Exams: Exam dates and times will be communicated in advance. It is the responsibility of the student to prepare and be present for the exam at the time it is administered. Once an exam has been administered, no make-up opportunities will be allowed. If a student is unable to be present for an exam, it is his/her responsibility to make arrangements to take the exam in advance. In the event of a medical, family, or other emergency, this policy may be adjusted.

Extra Credit: Each student can earn extra credit by completing extra credit assignments. This involves either writing a one-page, single-spaced summary essay or giving a five minute presentation (typically held at the beginning of class) on a pre-approved seminar/presentation/event/tour or article/journal/paper. For each extra credit assignment, the student can earn a 1% increase in his/her final grade. Each student can submit up to three extra credit assignments, but may only submit one per week.

I can do all things through Christ who strengthens me. – Philippians 4:13

Policies

Disclaimer: The instructor reserves the right to modify, amend, and/or change the syllabus and policies as needed or desired.

Safety: This course includes a project component, which may require independent work in Bethany's labs. Prior to working in the labs unsupervised, all students must complete safety training with the instructor. Lab time must be scheduled in advance with the instructor so that accommodations can be made.

Communication: Typically, due dates will be announced during class and in coursework documents. However, MyBLC will be used as the official communication tool for coursework. If a student would like to schedule a meeting, communicate an absence, etc., the preferred means of communication is email.

Late Work: With the exception of exams, late assignments will be penalized by 33% per day late. In the event of a medical, family, or other emergency, this policy may be adjusted.

Disabilities/Accommodations: Any student with a disability that might interfere with the demonstration of his or her abilities should contact the instructor as soon as possible so that accommodations can be made to ensure full participation in the class and its learning opportunities.

Citations: Citation of sources in papers, reports, etc. will follow either the American Institute of Physics (AIP) Referencing Style or the Harvard Referencing Style. Students may use automatic citation formatting programs (e.g., Microsoft Word, Citation Machine, etc.).

Mathematical Assistance: Students are expected to have a certain level of mathematical knowledge before starting the course. That includes, but is not limited to, algebra and trigonometry. If any student needs additional study material to bolster his or her mathematical skills, he or she should meet with the instructor as soon as possible. The mathematics academic support center on campus is also a good resource.

Housekeeping: Food and beverages will be allowed as long as they are not a distraction and cleanup is handled by the student.

Electronics: Laptops and tablets may be used during lectures, discussions, and labs as needed. Cell phone use will not be allowed in class. The use of any electronic devices beyond approved calculators will not be allowed during exams.

To give anything less than your best is to sacrifice the gift. – Steve Prefontaine

Academic Honor Code

The following is the Academic Honor Code from the Bethany Lutheran College Academic Catalog (Effective August 1, 2019, pg. 11):

Based upon truths that human beings are gifted with reason and other intellectual abilities above all creatures, and that the moral law of God applies equally to all people, Bethany Lutheran College encourages personal academic integrity and respect for the intellectual work and influence of others.

Therefore, members of the Bethany Lutheran College community are committed to academic honesty. They will not intentionally violate the requirements of an assignment nor intentionally fail to credit sources. They will complete all assignments and examinations according to the requirements set forth by the professors and submit work that is theirs alone.

Following the Academic Honor Code and promoting the virtues of integrity and honor, plagiarism, cheating, and academic dishonesty will not be tolerated in this course. In the event that plagiarism, cheating, or academic dishonesty are discovered, the first offense will result in a zero on the assignment and the second offense will result in failure of the course.

The integrity of the upright guides them, but the unfaithful are destroyed by their duplicity. – Proverbs 11:3

Program Evaluation

This course is a Core Requirement of the Mechanical Engineering and Biomedical Engineering tracks of the Engineering Sciences Baccalaureate Program at Bethany Lutheran College. Below are the Bethany Lutheran College Institutional Objectives, Program Mission Statement, Program Objectives, Program Learning Outcomes, and Program Learning Outcomes Assessment, the last of which is specific to this course.

Bethany Lutheran College Institutional Objectives

By graduation, a Bethany Lutheran College student will:

1. Recognize that the historic Christian faith professes that God the Holy Trinity is the source of all knowledge and truth, and that His wisdom is most clearly revealed in the life, death, and resurrection of Jesus Christ.

2. Demonstrate intellectual, creative, and problem-solving skills.
3. Demonstrate an understanding of personal and public responsibility.
4. Develop habits of thinking that apply to a fulfilling life of learning

Program Mission Statement

Circumscribed on the rotunda of Chicago's Museum of Science and Industry is the phrase, "Science discerns the laws of nature; industry applies them to the needs of man." Engineering does both.

Engineering is more than designing and building things. Engineers rely on a solid foundation of science and mathematics to understand and solve problems. In today's technology-driven society, innovative thinkers will always be in high demand. In addition, the very nature of technology requires a constantly changing and broadly diverse set of critical thinking skills. Because of its solid grounding in the liberal arts, Bethany Lutheran College is ideally suited for the teaching of these skills.

We see in Hebrews 11:10, "For he was looking forward to the city with foundations, whose architect and builder is God." Bethany is equipped to provide our students a path on which to pursue the engineering profession under the embrace of the One Thing Needful. The program described herein includes two concentrations or tracks: biomedical engineering and mechanical engineering.

Program Objectives

The objectives of the Engineering Sciences Baccalaureate Program are to produce graduates who:

1. Apply their education to address a full range of technical and societal issues, utilizing intellectual creativity and responsibility.
2. Participate successfully in post-baccalaureate professional activities such as graduate studies, engineering practice or other fields such as science, law, medicine, politics, business, or clergy.
3. Actively seek positions of leadership within their profession and community.
4. Retain the intellectual curiosity that motivates lifelong learning and allows for a flexible response to the rapidly evolving challenges of the 21st century.

5. Serve as ambassadors for Christ and Bethany in their chosen vocation by demonstrating the highest ethical and professional standards.

Program Learning Outcomes (PLO)

In alignment with ABET Student Outcomes, graduates of the Engineering Sciences Baccalaureate Program will have:

1. An ability to apply knowledge of mathematics, science, and engineering.
2. An ability to design and conduct experiments, as well as to analyze and interpret data.
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. An ability to function on multidisciplinary teams.
5. An ability to identify, formulate, and solve engineering problems.
6. An understanding of professional and ethical responsibility.
7. An ability to communicate effectively.
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. A recognition of the need for, and an ability to engage in life-long learning.
10. A knowledge of contemporary issues.
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Program Learning Outcomes Assessment

Following the Engineering Sciences Baccalaureate Program Schedule of Assessment Activity, this course will be used to assess PLO-6, PLO-9, and PLO-10. Assessing Program Learning Outcomes is conducted through one or more processes that identify, collect, and prepare data to evaluate the attainment of each PLO. The assessment will use relevant direct, indirect, quantitative and qualitative measures as appropriate to the PLO being measured. For the years in which PLO-6, PLO-9, and PLO-10 are being assessed, this course will use projects and exam questions to assess these PLOs. The data will be aggregated, summarized, and evaluated to identify actions to improve the Engineering Sciences Baccalaureate Program.

The heart of the discerning acquires knowledge; the ears of the wise seek it out. – Proverbs 18:15