# FCMEH FA2024

Florida College B.S.M.E in Mechanical Engineering Handbook


Fall 2024

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# Contents

# A: Sources of Information

This Handbook (FCMEH) is intended to assist the Mechanical Engineering (ME) students at Florida College (FC) and is a supplement to the material contained in the Florida College Catalog (FCC) and Florida College Student Handbook (FCSH). All students declaring Mechanical Engineering must carefully read the FCSH and the FCMEH. The purpose of this Handbook is to outline the departmental requirements, policies and procedures applicable to all students in the Mechanical Engineering Program.

# B: Program Information

## B1 Program Mission Statement

The aim of this Mechanical Engineering program is to prepare students for careers and leadership in Mechanical Engineering and related disciplines as well as lives of service to their Creator and humanity by providing an educational experience which develops them spiritually, mentally, physically, and socially. This education integrates biblical concepts that encourage further study of the nature and will of God while providing another perspective on the natural world as Creation. Graduates of this program will be high quality; bright, interactive people capable of succeeding in any environment while preserving the ability to think creatively and with moral clarity. These people will understand deeply the gravity of their actions both as Christians and engineers.

## B2 Program Description

Engineering is aptly described as “solving problems using rules of thumb that cause the best change in a poorly understood situation using available resources”. More broadly speaking, engineering involves the knowledge of the mathematical and natural sciences (biological and physical) gained by study, experience, and practice that are applied with judgment and creativity to develop ways to utilize the materials and forces of nature for the benefit of mankind. The Mechanical Engineering program at Florida College is taught from a biblical perspective, offering a broad and versatile education of engineering principles, particularly the principles of design & analysis of mechanical systems including materials, mechanics of solids, thermodynamics, heat transfer, and fluid mechanics. Professional ethics is a centerpiece of this program, combining godly attitudes and behavior with professional wisdom to produce engineers of the highest moral caliber. The wide range of subject matter provided within this program prepares graduates for successful careers Mechanical Engineering as well as a wide range of engineering disciplines.

## B3 Program Educational Objectives

Within 3-7 years of graduation, Mechanical Engineering program alumni are expected to:

1. Attain positions of responsibility in which they:
    1. Apply the concepts of math, science, computation, engineering, experimentation and/or manufacturing.
    2. Participate and communicate effectively in a professional, multi-disciplinary team environment.
    3. Utilize critical thinking, innovation, and problem-solving skill.
    4. Act according to ethical codes of conduct
2. Obtain sustained employment or further academic education in engineering or a related technical or professional field.
3. Pursue self-development milestones such as learning opportunities, professional licensure, or volunteer work.
4. Engage meaningfully in the practice or education of engineering and/or related technical fields.

## B4 Learning Outcomes

Graduates must have demonstrated the following to earn the B.S.M.E. degree:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a broad range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

# C: Admissions and Graduation Requirements

## C1 Admission Requirements

Students must submit an application for admittance into the Mechanical Engineering program and provide transcripts with proof of cumulative GPA of 3.0 or higher on all college work and grades of "C" or higher for the following pre-requisite courses:

MAC 2311 Calculus I
MAC 2312 Calculus II
MAC 2313 Calculus III
PHY2048C General Physics I with Lab
PHY2049C General Physics II with Lab
CHM 1045C Chemistry I with Lab
EML 3011 Mechanics of Solids
SPC 1608 Public Speaking

Students may be admitted conditionally to the Mechanical Engineering program during the semester in which they are registered for EML 3011 but must meet all requirements listed above at the end of the semester for the admission to stand.

Special note: EGN 3311 Engineering Statics is a pre-requisite for EML 3011 Mechanics of Solids. While EGN 3311 does not appear on this list of courses, students may opt to take EGN 3311 as a co-requisite for EML 3011 using Policy A1. Under these circumstances, no student shall be admitted to the program without passing EGN 3311.

## C2 Transfer Credit for Mechanical Engineering

Transfer credits for any mechanical engineering credit from a previous program or institution must be approved by the Program Chair and must come from an ABET accredited academic program. The program must have been ABET accredited A) During the time period in which the student obtained credit or B) Up to one academic year prior to the program receiving its first ABET accreditation (and thus being retroactively accredited per ABET policy). Students seeking to transfer credit in this manner may request up to 15 credits with grades of C or better. For each course, the student must provide their academic transcript, the syllabus of the prior course, and proof of the transferring program's ABET accreditation status.

## C3 Direct Admit

Students who are transferring credit from another institution may elect for direct admit to the program with approval from the Program Chair and if they meet all criterion to be admitted to the program and have a cumulative 3.0 GPA on a 4.0 scale.

## C4 Graduation Requirements

To graduate, candidates must complete a minimum of 128 semester hours of accredited academic college work. Candidates must complete a minimum of 40 hours of their upper-level Mechanical Engineering Core hours at Florida College to receive their B.S.M.E. from Florida College. Students must pass all required engineering program courses with a grade of "D" or better, and a minimum cumulative GPA of 2.50 is required for graduation.

Graduation Requirements Summary

| Minimum Total Hours | Minimum Mechanical Engineering Core Hours | Minimum General Education Hours | Minimum Bible Hours | Minimum Physical Education Hours | Minimum Institutional GPA |
|---|---|---|---|---|---|
| 128 | 55 | 55 | 16 | 2 | 2.50 |

## C5 Advising

Upon admission to the Mechanical Engineering program, the Chair of Mechanical Engineering shall choose a permanent Major Advisor (the Academic Advisor) for the student from among the Florida College Mechanical Engineering faculty. This Major Advisor will work in tandem with Advising to provide the student with full advising services. As part of this obligation, the Major Advisor will schedule an advising appointment with all the students to which they have been assigned at least once per semester. All students have the right to request an advising appointment with Program Chair.

# D: Curriculum

## D1 Curriculum Breakdown

**General Education Requirements (54 hours)**

Written Communication Skills (6 hours):
- ENC 1101 Freshman Composition I (3)
- ENC 1102 Freshman Composition II (3)

Computation/Mathematics (18 hours):
- MAC 2311 Calculus I (4)
- MAC 2312 Calculus II (4)
- MAC 2313 Calculus III (4)
- MAP 2302 Differential Equations (3)
- STA 2023 – Introductory Statistics (3)

Behavioral and Social Sciences (9 hours)

Oral Communication Skills (3 hours):
- SPC 1608 Public Speaking (3)

Humanities (6 hours also counts as Bible)
*LIT 2371 OT Poetry & Wisdom (3)
*REL 3308 World Religions (3)
Natural Sciences(12 hours):
PHY 2048C General Physics I with Calculus/Lab (4)
PHY 2049C General Physics II with Calculus/Lab (4)
CHM 1045C Chemistry I with Lab (4)

**Physical Education (2 hours)**

Physical Education Electives (2 hours)

**Bible Coursework (16 hours)**

Bible Electives (16 hours distributed to allow for daily bible class)

**Mechanical Engineering Core Course Requirements (46 hours):**

EGN 1001C Introduction to the Engineering Profession with Lab (1)
EGN 3311 Statics (3)
EGN 3343 Thermodynamics (3)
EGN 3321 Dynamics (3)
EML 3011 Mechanics of Solids (3)
EGN 3365 Materials (3)
EML 3022 Computer-Aided Design (3)
EML 3041 Computational Methods (3)
EML 3701 Fluid Mechanics (3)
EML 4325 Manufacturing (3)
EML 3262 Kinematics & Dynamics of Machinery (3)
EGN 3373 Introduction to Electronics and Programming (3)
EML 4906L Mechanical Laboratory (3)
EML 4500 Machine Design (3)
EML 4140 Heat Transfer (3)
EML To Be Announced (3)

**Engineering Internship (3 hours)**

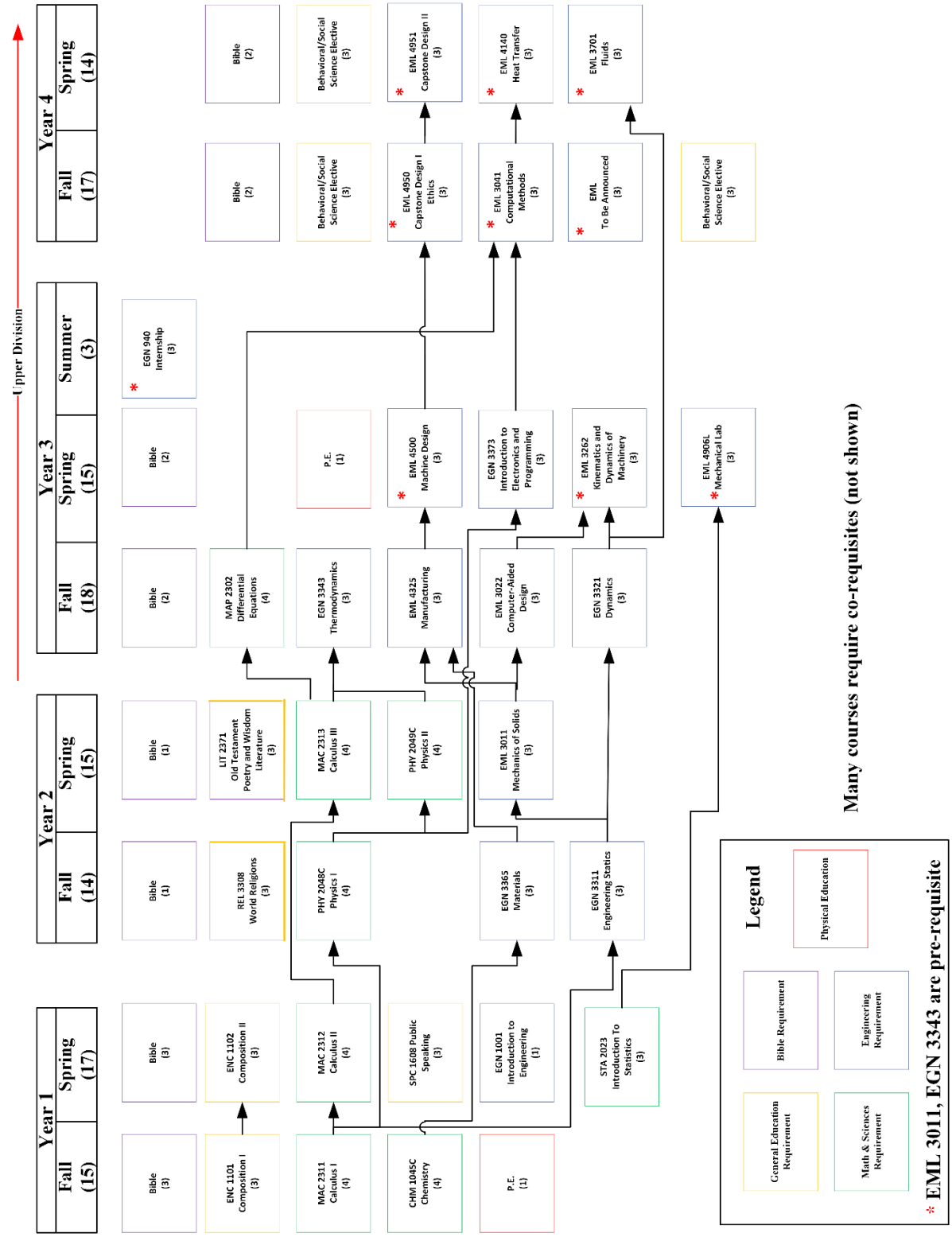
EGN 3940 Internship (3) equivalent to 200 clock hours

**Engineering Design Capstone (6 hours):**

EML 4950 Capstone Design I(3)
EML 4951C Capstone Design II (3)

*Course is not a requirement but is suggested to streamline general education requirements.

# D2 Program Flow Chart



## D3 Advising Map

| Fall Year One | Hours | Spring Year One | Hours |
|---|---|---|---|
| Bible | 3 | Bible | 3 |
| MAC 2311 Calculus I | 4 | SPC 1608 Public Speaking | 3 |
| CHM 1045C Chemistry | 4 | MAC 2312 Calculus II | 4 |
| Physical Education | 1 | ENC 1102 Composition II | 3 |
| ENC 1101 Composition I | 3 | EGN 1001 Introduction to Engineering | 1 |
| | | STA 2023 Introduction to Statistics | 3 |
| **Total** | **15** | **Total** | **17** |
| **Fall Year Two** | | **Spring Year Two** | |
| Bible | 1 | Bible | 1 |
| REL 3308 World Religions | 3 | LIT 2371 Old Testament Poetry and Wisdom Literature | 3 |
| PHY 2048C Physics I | 4 | MAC 2313 Calculus III | 4 |
| EGN 3365 Materials | 3 | EML 3011 Mechanics of Solids | 3 |
| EGN 3311 Engineering Statics | 3 | PHY 2049C Physics II | 4 |
| **Total** | **14** | **Total** | **15** |
| **Fall Year 3** | | **Spring Year 3** | |
| Bible | 2 | Bible | 2 |
| MAP 2302 Differential Equations | 4 | Physical Education | 1 |
| EGN 3343 Thermodynamics | 3 | EML 4500 Machine Design | 3 |
| EML 4325 Manufacturing | 3 | EGN 3373 Introduction to Electronics and Programming | 3 |
| EML 3022 Computer-Aided Design | 3 | EGN 3262 Kinematics and Dynamics of Machinery | 3 |
| EGN 3321 Dynamics | 3 | EML 4906L Mechanical Lab | 3 |
| **Total** | **18** | **Total** | **15** |
| **Fall Year 4** | | **Spring Year 4** | |
| Bible | 2 | Bible | 2 |
| Behavioral/Social Science Elective | 3 | Behavioral/Social Science Elective | 3 |
| EML 4950 Capstone Design I | 3 | EML 4951C Capstone Design II | 3 |
| EML 3041 Computational Methods | 3 | EML 4140 Heat Transfer | 3 |
| Behavioral/Social Science Elective | 3 | EML 3701 Fluid Mechanics | 3 |
| EML (To Be Announced) | 3 | | |
| **Total** | **17** | **Total** | **14** |

*Does not include EGN 940 Internship (3) recommended Summer Year 3

## D4 Course Descriptions, Prerequisites, Corequisites

**EGN 1001 Introduction to Engineering (1)**
Introduction to Engineering provides students with an overview of the engineering profession. It introduces the fundamental principles and practices of engineering, helping students explore various engineering disciplines. Topics include problem-solving, engineering design, and an understanding of the ethical and professional responsibilities of engineers.
**EGN 3311 Engineering Statics (3) [**Pre-requisite MAC 2311; Co-requisite: PHY 2048C]
Statics is a fundamental engineering course that focuses on the study of objects at rest or in equilibrium. It delves into the principles of forces, moments, and their effects on rigid bodies. This class equips students with the essential skills to analyze and solve problems related to the equilibrium of structures and systems.
**EGN 3321 Dynamics (3) [**Pre-requisite EGN 3311]
Dynamics is a branch of engineering that deals with the study of objects in motion. This class examines the behavior of particles and rigid bodies as they move and interact with forces. It provides students with the tools to analyze and predict the dynamic behavior of mechanical systems.
**EGN 3343 Thermodynamics (3) [**Pre-requisite PHY 2049C, MAC 2313]
Thermodynamics is the study of energy and heat transfer in engineering systems. This course explores the fundamental laws and principles governing energy conversion, emphasizing the analysis of heat engines, refrigeration systems, and their applications in various industries.
**EGN 3365 Materials (3) [**Pre-requisite CHM 1045C; Co-requisite EGN 3311]
The Materials class explores the properties, selection, and behavior of materials used in engineering applications. Students gain insights into the characteristics of metals, polymers, ceramics, and composites, enabling them to make informed choices in material selection for specific engineering projects.
**EGN 3373 Introduction to Electronics and Programming (3)** [Pre-requisite PHY 2048C]
This class introduces students to the fundamentals of electronics and programming. It provides a foundational understanding of electronic components, circuits, and programming languages, equipping students with the knowledge to integrate electronics into engineering projects.
**EGN 3940 Internship (3) [**Pre-requisites EML 3011, EGN 3343]
The Internship class provides students with valuable real-world experience in an engineering-related industry. It offers an opportunity to apply classroom knowledge in a professional setting, fostering practical skills and industry connections.
**EML 3022 Computer-Aided Design (3) [**Pre-requisites EML 3011]
Computer-Aided Design (CAD) introduces students to the use of computer software to create, modify, and analyze 2D and 3D models. This class equips students with the skills necessary to design and simulate complex engineering systems and components, improving efficiency and accuracy in the product development process.
**EML 3041 Computational Methods (3) [**Pre-requisites MAP 2302; EGN 3373; EGN 3343; and EML 3011] Computational Methods focuses on the application of numerical techniques and algorithms to solve engineering problems. Students learn how to use computer programs to model, simulate, and analyze real-world engineering challenges, making it an essential tool for problem-solving and decision-making.
**EML 3262 Kinematics & Dynamics of Machinery (3) [**Pre-requisites EGN 3321, EML 3022, EGN 3343, and EML 3011] This course delves into the design, analysis, and operation of

machinery and mechanical systems. Students learn about the motion, kinematics, and dynamic behavior of machines, gaining the skills to optimize their performance and efficiency.

**EML 3011 Mechanics of Solids (3) [**Pre-requisite EGN 3311]

This course delves into the mechanics of materials and the behavior of solids under different loading conditions. Students learn how to analyze stress, strain, deformation, and failure in various materials, making it a crucial foundation for structural engineering and material science.

**EML 3701 Fluid Mechanics (3) [**Pre-requisites EGN 3321 and EML 3011 and EGN 3343]

Fluids is a class that explores the behavior and principles governing the flow of liquids and gases. Students study topics such as fluid properties, fluid dynamics, and fluid machinery, enabling them to understand and analyze various fluid systems, from pipelines to aerodynamics.

**EML 4140 Heat Transfer (3) [**Pre-requisites EML 3041, EML 3011; and EGN 3343]

Heat Transfer explores the mechanisms and principles of heat exchange in engineering systems. Students study conduction, convection, and radiation, gaining expertise in designing and optimizing heat transfer equipment and processes.

**EML 4325 Manufacturing (3) [**Pre-requisites EML 3011; EGN 3365; Co-requisite EGN 3343]

The Manufacturing class covers the processes and techniques used to transform raw materials into finished products. It introduces students to manufacturing methods, quality control, and automation, preparing them for careers in production and manufacturing industries.

**EML 4500 Machine Design (3) [**Pre-requisites EML 4325, EML 3011, EGN 3343; Co-req EML 3262]

Machine Design is a class that focuses on the design and analysis of mechanical systems and components. Students learn how to create efficient, reliable, and safe machines, considering factors like stress, materials, and manufacturing processes.

**EML 4906L Mechanical Laboratory (3) [**Pre-requisites STA 2023, EML 3011, and EGN 3343]

The Mechanical Laboratory offers hands-on experience in conducting experiments and testing mechanical principles. Students gain practical skills in data collection, analysis, and validation of theoretical concepts learned in other engineering courses.

**EML 4950 Capstone Design I (3) [**Pre-requisites EML 3011, EGN 3343, EML 4500]

This capstone course emphasizes the ethical considerations and social responsibilities of engineers in their design and decision-making processes. Students explore ethical dilemmas, legal regulations, and the broader impact of engineering on society. The engineering design process is discussed at length. Students will work with industry, school, and private partners to develop a design that solves real-world problems.

**EML 4951C Capstone Design II (3) [**Pre-requisite EML 4950]

This course is a continuation of EML 4950, in which students implement the design generated in that course and iterate until a final product is achieved. The course ends with an engineering expo in which the students will present their work to instructors, industry partners, and peers on campus.

**TO BE ANNOUNCED SPR 2025 (3)**

# E: Additional Program Policies

## E1 Entry Examination for Superseding EML 3011 Prerequisite Of EGN 3311

Any students wishing to take EML 3011 and EGN 3311 together (thereby treating EGN 3311 as a co-requisite as opposed to a pre-requisite) may opt to take an entrance examination under the following conditions:

A) All pre-requisites for EGN 3311 are otherwise satisfied or will be satisfied by the end of the semester in which the student has made the request.
B) All pre-requisites for EML 3011 are otherwise satisfied or will be satisfied by the end of the semester in which the student has made the request.
C) The student requesting the examination has a GPA of at least 3.0 in the semester in which the student has made the request.

To request the entrance examination, the student must notify the program chair of this request and conditions A,B, and C will be confirmed by a representative from Advising. After making the request, the student may be allowed to register for EML 3011

Entrance examination: A list of course topics from Statics which are deemed as necessary prerequisites for EML 3011 and a textbook recommendation will be provided to the student prior to the end of the semester in which the student has made the request. The exam will be administered prior to the start of classes in the following semester. The exam will be pass/fail, as determined by a minimum grade of 70.0%. If the student fails the exam, they will be dropped from the course prior to the start of classes.