



# Department of Engineering

## Faculty

### Full-time Faculty

Fred A. Wentorf, Ph.D. Department Chair

David B. Ray, MS

### Half-time faculty

David C. Winyard, Sr., Ph.D.

### Part-time Instructors

Mearlin Bixler

Nolan Jones BA

Matthew Reimink MS

Grace College offers the Bachelor of Science in Mechanical Engineering (BSME) degree. The BSME program prepares graduates for entry into the workforce with the engineering skills to

## MECHANICAL ENGINEERING

Of all fields of engineering, mechanical engineering is the most diverse and global. Mechanical engineers can be found working in almost every industry: Manufacturing, transportation, health care, and insurance are just a few of the types of firms that employ mechanical engineers. No other field of engineering provides a better professional base for interdisciplinary activities.

Mechanical engineers design machines of all types, from bicycles to spacecraft. They plan, design, and direct the manufacture, distribution, and operation of these machines. Mechanical engineers also design the power sources needed to operate the machines and provide for the environment in which they function. In fact, mechanical engineering involves all phases of energy production and utilization: engines, power plants, electrical generation, heating, ventilating, and air conditioning.

### Mechanical Engineering Student Learning Outcomes

The Department of Engineering supports character education by sharpening competence, and preparing for service.

ABET, the leading accreditation organization for engineering, mandates student outcomes 1 following in its accreditation Criterion 3. The department has added outcomes to meet the needs of its constituencies. Together, the nine outcomes of engineering competence:

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 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

**Major Requirements (90 hours):**

**Math and Science Requirements (24 hours):**

MAT 1230/1240 Calculus I and Lab

MAT 1250 Calculus II

MAT 2250 Calculus III

MAT 2280 Differential Equations

PHY 2240/2250 University Physics I and Lab

PHY 2260/2

Alternatively, the Department of Engineering Chair can admit individual students based on a transcript review and personal interview. The requirement for standardized tests may be waived under the admission alternative transcript review and interview admission process.

## ACCREDITATION

Grace College is accredited by the Higher Learning Commission and the BSME degree is accredited by ABET

**MEG 2000 Engineering Internship**

## ENGINEERING SCIENCE

### MEG 2110 Engineering Statics

This course covers static mechanical behavior. The topics covered include; force and moment vectors, equivalent systems,

### MEG 2700 Fluid Mechanics

Introduction to Newtonian fluids; statics, continuity, momentum, and energy principles; dimensional analysis and similarity; laminar and turbulent, incompressible, internal and external, viscous flow; boundary layers; and the basics of pumps and fluid systems. Prerequisites: MAT 2250 and MEG 2200. Three hours.

## TECHNICAL ELECTIVES

### MEG 3010, 3020, 3030 Special Topics in Engineering

Study of advanced subjects in engineering science and practice. May involve intermediate or advanced study of prerequisite introductory courses. Topics may vary from one semester to the next based on student interests and the availability of qualified faculty. Prerequisite: junior or senior standing in engineering or instructor permission. One to three hours, repeatable.

### MEG 3500 Orthopedic Biomechanics

The human musculoskeletal system will be investigated and then evaluated as a mechanical system. Experimental data and research documents will be used to solve different biomechanical problems. An introduction to orthopedic implant science will also be included. Prerequisite: MEG 2900. Three hours.

### MEG 3600 Robotics

This course provides an overview of robot mechanisms, dynamics, and intelligent control systems. Topics include planar and spatial kinematics, and motion planning; mechanism design for manipulators and mobile robots, rigid-body dynamics, 3D graphic simulation; control design, actuators, and sensors. Training and certification on a KUKA Axis educational robot.