



**COURSE: MEC 270 MACHINE DESIGN**

**HOURS:** Lecture: 3 Lab/Shop: 3 Work Exp/Clinical: 0 Credits: 4

### COURSE DESCRIPTION:

This course covers the basic principles underlying design and selection of machine elements. Topics include stress analysis, selection of components, power transmission, and other design considerations. Upon completion, students should be able to identify and solve mechanical design problems by applying basic engineering principles.

**PREREQUISITE(S):** DFT 151, EGR 250, and MEC 180

**COREQUISITE(S):** NONE

### TEXTBOOK(S) & OTHER SPECIAL REQUIREMENTS:

Mott, Robert L. Machine Elements in Mechanical Design. 5<sup>th</sup> ed. Upper Saddle River, NJ: Pearson–Prentice Hall, 2013.  
ISBN #: 9780135077931

### STUDENT LEARNING OUTCOMES:

Upon successful completion of this course, the student will be able to:

1. Identify and calculate the different types of normal and shear stresses of loaded members of mechanical structures and machine elements.
2. Apply the above skills to execute original safe and economical designs of machine elements for different types of loading.
3. Recognize the basic principles of power transmissions designs and performance.
4. Use the Mohr Circle approach to design safe machine elements subject to combined stresses.
5. Apply the engineering principles to estimate the actual endurance strength, predictions of failure, and design factors of machine elements for different types of loading.
6. Analyze and design long and short loaded columns to avoid buckling.
7. Design safe loaded helical and compressions springs.
8. Design safe shafts and spur gears.
9. Apply the required standards and safety procedures required to design mechanical systems subject to forces.
10. Apply the global safe and economical materials selection and dimensions of loaded members.
11. Recognize the Environmental Protection Agency (EPA) standard rules, related to avoiding the use of hazardous materials in engineering applications, to protect the environment, and the living species.
12. Apply the US Occupational Safety and Health Administration (OSHA), and the International American Society of Mechanical Engineers (ASME) standards safety rules of engineering applications.

13. Discuss the global use of the engineering machine designs and their impact on products designs, manufacturing, employment, safety, and the economy.

### **EXPLANATION OF SYLLABUS:**

The Student Learning Outcomes listed in this syllabus are those required actions that a student who successfully completes the course must be able to perform or exhibit. The educational experience, however, is a two-way, interactive process involving both the student and his/her instructor. The student must play an active role in the learning process in order to be successful. Each Instructor will provide an Instructor's Course Requirements document at the first class meeting explaining how he/she measures each of the Student Learning Outcomes listed in the syllabus. A student who is unable to accomplish the outcomes will not receive a passing grade in the course.

The information in this RCC Syllabus may not be accurate beyond the current semester. Textbooks and other course materials are subject to change. Students should verify the textbooks at the first class meeting with their instructor prior to purchasing.

### **RCC ATTENDANCE POLICY:**

Regular attendance is considered essential to realize course outcomes. Rules on attendance, tardiness, and leaving class early are addressed in each Instructor's Course Requirements document.

No matter the basis for absence, students are held accountable for academic activities, and faculty may require special work or tests to make up for missed classes.

When courses are delivered through online instruction (DL or Distance Learning) or through a combination of traditional classroom and online instruction (hybrid), class participation is no less important, though its measurement may be somewhat different.

The Nursing Department's requirement related to attendance exceeds the college policy. Nursing students are required to attend 90% of classes, labs, and clinicals. At the discretion of the instructor, a written assignment or makeup clinical may be given for hours missed determined to be unavoidable.

### **RCC GRADING SYSTEM:**

Richmond Community College employs a system of letter grades and corresponding quality points per grade to evaluate a student's performance in meeting the stated goals and objectives for each course.\*\*

### **SECURITY AND SAFETY PROCEDURES:**

RCC's upgraded security procedures require all doors to be locked at class start-time.

All students, faculty, staff, and visitors must wear visible identification (ID) badges. Identification badges should be worn on the front of clothing. RCC employees can stop, restrict, and remove from any school-related activity or function anyone who does not display an ID badge.

## **STUDENTS WITH DISABILITIES:**

Richmond Community College complies with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act, which require that no qualified student with a disability be excluded from participation in or be denied the benefits of any services, programs or activities on the basis of his or her disability. If accommodations in the classroom and/or in extracurricular activities are required, the student is encouraged to contact the Disability Services Counselor in Student Services prior to the start of the semester; however, a student may request accommodations at any time. Reasonable accommodations may take up to three (3) weeks to implement. Richmond Community College is committed to providing support and services to students with disabilities to help them obtain a quality education and to reach their goals. Assistance is provided, as necessary, and is intended to help students participate in and benefit from the programs and activities enjoyed by all students.

## **WITHDRAWAL:\*\***

Students may withdraw from Richmond Community College courses at any time. However, depending upon what point in the semester the student withdraws from a course may have consequences for the student if they are receiving any form of financial aid, scholarships, and/or veterans benefits.

In order to formally withdraw from a course, the student must complete a Student Withdrawal Form. The student is encouraged to read through the refund policies, and discuss the impact of withdrawing with their instructor, advisor, financial aid staff, and/or Veterans' Coordinator.

Individual instructors may have attendance requirements in individual classes. The instructor will notify the student if they are at risk of being withdrawn from an individual course due to the attendance requirements outlined on the Instructor's Course Requirements for an individual course. The instructor will notify the student's advisor, financial aid staff, and/or the Veterans' Coordinator if an instructor initiated student withdrawal is imminent.

A withdrawal occurring before the 10% census reporting period ends for that course will not be included on the student's transcript.

A withdrawal occurring after the 75% point of the course time-frame will receive either a "WP" or a "WF". A "WP" grade is given to a student who is passing the course at the time of withdrawal. A course for which a "WP" grade is given will be counted as an attempted course. A "WF" grade is given to a student who is not passing the course at the time of withdrawal. A course for which a "WF" grade is given will count as an attempted course and will be counted as an "F" in computing grade point averages.

**\*\*Please refer to the online version of RCC's Catalog & Student Handbook for current academic and general policies.**