

Administrative Master Syllabus

Course Information

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| Course Title | Engineering Mechanics - Dynamics |
| Course Prefix, Num. and Title | ENGR 2302 |
| Division | Math & Physical Sciences |
| Department | Physics & Engineering |
| Course Type | Academic General Education Course (from ACGM, but not WCJC Core) |
| Course Catalog Description | Basic theory of engineering mechanics, using calculus, involving the motion of particles, rigid bodies, and systems of particles; Newton's Laws; work and energy relationships; principles of impulse and momentum; application of kinetics and kinematics to the solution of engineering problems. |
| Pre-Requisites | ENGR 2301 with a grade of "C" or better |
| Co-Requisites | None |

Semester Credit Hours

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|--|-------|
| Total Semester Credit Hours (SCH): Lecture Hours: | 3:3:0 |
| Lab/Other Hours | |
| Equated Pay Hours | 3 |
| Lab/Other Hours Breakdown: Lab Hours | 0 |
| Lab/Other Hours Breakdown: Clinical Hours | 0 |
| Lab/Other Hours Breakdown: Practicum Hours | 0 |
| Other Hours Breakdown | 0 |

Approval Signatures

| Title | Signature | Date |
|-------------------------|----------------------|-----------|
| Department Head: | <i>Rocio Doherty</i> | 11/29/23 |
| Division Chair: | | 12-5-2023 |
| VPI: | | |

Additional Course Information

Topical Outline: Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, and clinical or other non-lecture instruction).

1. Kinematics of Particles
2. Kinetics of Particles: Newton's Second Law
3. Kinetics of Particles: Energy and Momentum Methods
4. Systems of Particles
5. Kinematics of Rigid Bodies
6. Plane Motion of Rigid Bodies: Forces and Accelerations
7. Plane Motion of Rigid Bodies: Energy and Momentum Methods
8. Kinetics of Rigid Bodies in Three Dimensions
9. Mechanical Vibrations

Course Learning Outcomes:

Learning Outcomes – Upon successful completion of this course, students will:

1. Express dynamic quantities as vectors in terms of Cartesian components, polar coordinates, and normal-tangential coordinates.
2. Compute mass moments of inertia for systems of particles and rigid bodies.
3. Solve kinematic problems involving rectilinear and curvilinear motion of particles.
4. Solve kinetic problems involving a system of particles using Newton's Second Law.
5. Apply the principles of work and energy, conservation of energy, impulse and momentum, and conservation of momentum to the solution of engineering problems involving particles and systems of particles.
6. Solve kinematic problems involving the translation and rotation of a rigid body.
7. Solve kinetic problems involving planar translation and rotation of rigid bodies.
8. Apply the principles of work and energy, conservation of energy, impulse and momentum, and conservation of momentum to the solution of engineering problems involving rigid bodies in planar motion.

Methods of Assessment:

Class work, homework assignments, quizzes, and/or exams, posters/graphs/charts, oral

Required text(s), optional text(s) and/or materials to be supplied by the student:

Russell C. Hibbeler. *Modified Mastering Engineering Revision with Pearson eText* -- Standalone Access Card -- for Engineering Mechanics: Statics & Dynamics; 14th edition, Pearson.

Students must have computer access to the WCJC website, their WCJC student email and online accounts. WCJC has open computer labs, with internet access, on all campuses for students to use.

Suggested Course Maximum:

36

List any specific or physical requirements beyond a typical classroom required to teach the course.

None

Course Requirements/Grading System: Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course.

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| Coursework (homework, quizzes, etc.) | 0-35% |
| Exam average | 30-70% |
| Final Exam (at least 50% comprehensive) | 20-30% |
| | 100% course total |

The overall course grade is assigned as specified by the college:

A = 90–100

B = 80–89

C = 70–79

D = 60–69

F = below 60

Curriculum Checklist:

- Administrative General Education Course** (from ACGM, but not in WCJC Core) – No additional documents needed.
- Administrative WCJC Core Course** – Attach the Core Curriculum Review Forms
 - Critical Thinking
 - Communication
 - Empirical & Quantitative Skills
 - Teamwork
 - Social Responsibility
 - Personal Responsibility
- WECM Course** – If needed, revise the Program SCANS Matrix and Competencies Checklist