MENG 233 – Dynamics

Eastern Mediterranean University
Faculty of Engineering

Department: Mechanical Engineering

Program Code: 23	**Program:** Mechanical Engineering	**Year/Semester:** 2025-26 FALL

Course Code:	**Course Title:**	**Credit hours**		
MENG233	Dynamics	**Lec.**	**Tut/Lab**	**Total**
		4	**1**	**4**

Categorization of Course:
- ☒ Engineering or Area Core
- ☐ Engineering Course offered by other programs
- ☐ Engineering Area Elective
- ☐ Mathematics and Basic Sciences
- ☐ General Education

Categorization of Credits:
Mathematics & Basic Science: -
Engineering Topics: **4**
General Education: -
Major Engineering Design: -

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Course Web Page: https://staff.emu.edu.tr/qasimzeeshan/en/teaching/meng-233

Textbook(s):
- Hibbeler, Hibbeler, Yap & Yap, Mechanics for Engineers: Dynamics, SI Edition, 13th Edition, Edition. 2013, Pearson.
- Ferdinand P. Beer E. Russel Johnston, Jr. and Phillip J. Cornwell, Vector Mechanics for Engineers - Dynamics, 10th. Edition in SI units, 2013, McGraw Hill.

Catalog Description: Kinematics and kinetics of particles and system of particles. Planar kinematics of rigid bodies. Planar kinetics of rigid bodies. Newton`s second law of motion. Principle of work and energy. Principle of impulse and momentum. Angular Momentum. Introduction to Mechanisms. Relative Motion Analysis. Introduction to Vibration.

Prerequisite(s)	MENG231 or CIVL211
Type of Course	☒ Required ☐ Selected Elective ☐ Elective

Student Outcomes		
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 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.	☒

Course Learning Outcomes		Student Outcomes							Assessment Percentages
		1	2	3	4	5	6	7	
1	Analyze the kinematics of particles	X							Midterm Exam: 20% Final Exam: 40% Project: 20% Lab Work: 20% * Labs Report and Project are group submissions, however, viva voce/ oral examination will be conducted (for each group member indivually)
2	Analyze the kinetics of particles using: (force and acceleration, principle of work and energy, or principle of impulse and momentum)	X				X	X		
3	Analyze the planar kinematics of rigid bodies (Relative motion analysis: velocity and acceleration)	X				X	X		
4	Analyze the planar kinetics of rigid bodies using: (force and acceleration, principle of work and energy, or principle of impulse and momentum)	X							
5	Use the techniques learned to model and analyze a dynamic system.	X				X	X	X	
	Weight of Student Outcomes	H				H	M	M	

Topics Covered and Class Schedule:	
Week 1	Introduction to Dynamics and Coordinate Systems
Week 2	Kinematics of Particles: Rectilinear Kinematics, Curvilinear Motion
Week 3	Kinematics of Particles: Projectile Motion, Dependent Motion
Week 4	Kinematics of Particles: Relative Motion
Week 5	Kinetics of Particles: Force and Acceleration
Week 6	Kinetics of Particles: Work and Energy
Week 7	Kinetics of Particles: Impulse and Momentum
Week 8	**Midterm Examination**
Week 9	**Midterm Examination**
Week 10	Kinematics of Rigid Bodies: Relative motion analysis
Week 11	Kinematics of Rigid Bodies: Relative motion analysis, Instantaneous Center of Zero Vel.
Week 12	Kinetics of Rigid Bodies: Force and Acceleration
Week 13	Kinetics of Rigid Bodies: Work and Energy
Week 14	Kinetics of Rigid Bodies: Impulse and Momentum
Week 15	Introduction to Vibration
Week 16	**Final Examination**

Laboratory Work				
No.	**Experiment Title and Equipment Used**	**CLO**	**SO**	**Percentage**
1	**Title**: Measurement of Static and Kinetic Coefficients of Friction **Eqpt:** Data collector PS2002, force sensor PS2104, block, weights	2	1, 5, **6**	5 %
2	**Title:** Conservation of Momentum; **Eqpt:** Data collector PS2002, motion sensors PS2103A, horizontal track, carts ME6950, weights	2	1, 5, **6**	5 %
3	**Title**: Modelling, Simulation and Analysis of Mechanisms; **Equipment:** MATLAB Software	3, 5	1, 5, **6**	5 %
4	**Title**: Coefficient of Restitution **Equipment:** Sports balls, Measuring tape, Surfaces floor of interest, MATLAB	2	1, 5, **6**	5 %

Important Notes Regarding the Course: University rules and regulations are applied to this course. For details, please see http://mevzuat.emu.edu.tr

Exam and Quiz Policy:

The midterm and final exams are CLOSE BOOK. Formula sheet is provided.

Makeups:

1. There is no make-up or resit for the Quiz and Labs.
2. A student who fails to sit for an examination for a valid reason is given a make-up exam. Within three working days after the examination, students who wish to take a make-up must submit a **written statement** to the course instructor explaining the reason(s) for his/her request.
3. Eligibility to take a **Make-Up Exam**:
   a. Student must contact the Instructor immediately within "**three working days**" after the examination when (s)he has missed the mid-term exam or final exam and to discuss with the faculty about the date and time to take the make-up exam.
   b. Student must secure a "**Make-Up Exam Form**" from the department Office or from instructor website & fill-out the Form. For each Make-Up Exam, please use separate Form.
   c. Student must secure the approval from the instructor for taking the Make-Up Exam.
   d. Failure to take the Make-Up Exam at the agreed date and time will lead to a "NG" Grade for the Make-Up Exam, midterm or final.

NG Policy:

1. **"NG" Nil Grade/ Failing from Absenteeism:** Students who do not comply with the required level attendance and/or not fulfilling the requirements for the evaluation of the course are given the "NG" grade by the Instructor of the Course based on the criteria determined by the Faculty/School Academic Council. Students are informed about the criteria for receiving the "NG" grade by the related course instructor at the beginning of the semester. "NG" grade is included in the computation of GPA and CGPA.
2. Student attendance is monitored and assessed by the course instructor. A student who fails to meet the requirements of a course or who is absent more than the limit specified by the Faculty is considered to be unsuccessful in that course.
3. Students who do not attend any of the above assessment activities (such as mid-term exam, final exam, lab exam, design project report etc.) will be given NG (Nil Grade).
4. Late Submissions of the Assignments, Lab Reports and Project will be graded as zero.

Appeals:

Any appeal against the marks of any assessment component must be made to the course instructor within one week following the announcement of the marks. Any appeal concerning a semester grade must be made to the course instructor no later than the end of the registration period of the following semester.