Maroun Semaan Faculty of Engineering & Architecture
Department of Mechanical Engineering
Couse Number (MECH 230) - Dynamics
Fall - Academic Year 2024-2025

COURSE SYLLABUS

I. General Course Information

Course Number and Title	MECH 230 Dynamics – Section 2
Number of Credits	3
Course Level	Undergraduate
Course Format	Face-face lectures and recitation
Pre-requisite Courses	CIVE 210 and Math 201
Meeting Schedule	MW 2:00-3:15 pm
Meeting Location	Bechtel 211

II. Course Coordinator, Instructors and Teaching Assistants

Name	Role	Office Location	Office Hours	Extension	E-mail
Dr. Theresa Honein Assistant Professor	Coordinator & Section 1 Instructor	Bechtel 532	M 10:30-11:30am T 2:00-3:00pm Th 10:30-11:30am	3429	Theresa.honein at aub.edu.lb

Starting Monday September 2, discussion sections will be held on Mondays from 3:30-4:45pm in Bechtel 211.

III. Course Description

This is a basic course in engineering mechanics covering dynamics of particles and planar rigid bodies. This course introduces Newton's law of motion, the principle of work and energy, and the principle of impulse and momentum. Diagrammatic representations of the basic laws are applied on motion of particles, systems of particles, and rigid bodies.

IV. Course Learning Objectives/Outcomes

At the end of this course, the student is expected to:

1. Understand position, velocity, and acceleration of particles and rigid bodies in relation to space and time.
2. Understand Newton's second law of motion in dynamics.
3. Draw free body diagrams and perform kinetic analysis.
4. Solve problems by applying conservation of energy with an understanding of the concept of work and energy.
5. Solve problems by applying conservation of momentum with an understanding of the concept of impulse and momentum.

V. Course Outline/ Topics

Week	Date	Topic & Chapter in Primer	Course LOs	Learning Activities
1	Aug 26 & 28	A. Preliminary on Vectors and Calculus 1. Single Particle: Cartesian Coordinates	1, 2, 3	Lecture, Recommended problems, and HW as assigned.
2	Sep 2 & 4	2. Single Particle: Polar Coordinates	1, 2, 3	
3	Sep 9 & 11	4. Single Particle: Serret-Frenet Triads	1, 2, 3	
4	Sep 16* & 18	4. Single Particle: Further Kinetics	2, 3	
5	Sep 23 & 25	5. Single Particle: Work and Energy	4	
6	Sep 30 & Oct 2	6.1-6.2. Linear Momenta and Angular Momenta	5	
7	Oct 7 & 10	6.3-6.5. Collisions of Particles	2,3,5	
8	Oct 14 & 16	7. Systems of Particles	2,3	
9	Oct 21 & 23	8. Kinematics of Rigid Bodies	1	
10	Oct 28 & 30	8. Kinematics of Rigid Bodies	1	
11	Nov 4 & 6	9. Planar Dynamics of Rigid Bodies	2,3,4,5	
12	Nov 11 & 13	9. Planar Dynamics of Rigid Bodies	2,3,4,5	
13	Nov 18 & 20	9. Planar Dynamics of Rigid Bodies	2,3,4,5	
14	Nov 25 & 27	10. Systems of Rigid Bodies	2,3,4	

* Prophet's Birthday tentatively on Monday September 16.

VI. Course Evaluation/Grading Criteria

	Type of Evaluation	Course LOs	Percentage
A.	Attendance		6%
B.	Assignments	All	10%
C.	Midterm 1: Saturday, September 28 8-10am	1,2,3	24%
	Midterm 2: Saturday, November 2 8-10am	1,2,3,4,5	24%
D.	Final Exam	1,2,3,4,5	36%
	Total		**100%**

VII. Course Resources/References

- O. M. O'Reilly, Engineering Dynamics: A Primer, Third Edition. Springer-Verlag, New York, 2019.
- J. L. Meriam, L. G. Kraige, and J. N. Bolton (MKB), Engineering Mechanics: Dynamics, Ninth Edition, Wiley, New York, 2018.

VIII. Course Policies

- **Course Website**
  All homework, deadlines, recommended problems, and a selection of notes will be posted on the course website:
  https://thh00.github.io/08-2024-dynamics/homepage.html
- **Recommended Problems**
  - The course website will feature a list of recommended problems from MKB along with instructions to solve them.
  - These problems should not be submitted with the homework. However, it is highly recommended that you solve them. At least one of these problems will feature in a midterm or in the final exam.
- **Homework**
  - Homework will usually consist of a problem and a set of instructions to solve it. It might feature a derivation or a programming problem.
  - Instructions for simulations will be given for Matlab. You are free to use Matlab, Python, or any other programming language. However, only support for coding questions in Matlab is guaranteed to be provided.
  - Please hand in a hard copy of your homework at the beginning of the lecture on the day that it is due.
  - If you have an emergency or other extenuating circumstances and need to turn in an assignment later than its due date, you must contact the instructor before the assignment is due (by email).
  - **Notation and Method.** Your written homework solutions will be graded primarily on method and presentation. Homework which is deemed illegible will be returned ungraded and no credit will be given to the student. If it is deemed that you are copying a solution from an online resource or a solution manual, then that will be considered an AUB student code of conduct violation. This will be obvious to the grader as you would not be following the structure presented in class and deviating from the advice given in the homework assignment itself.
- **Study Groups**
  You are encouraged to form small study groups of 2-3 students. However, each student should write their homework on their own. Do not share homework solutions! If applicable, indicate the names of the people in your study group on your homework submission.
- **Make-up Exams**
  Make-up exams will only be provided in extenuating circumstances. Please contact the instruction by email as soon as you know you might miss an exam.
- **Final Examinations:**
  Please note that students are expected to be on-campus and available to take a final examination for any of their courses at any time during the final examination period. For the current term, the final examination period runs between Dec. 3 and Dec. 14, 2024. Students and professors will be notified of the final examination schedule being posted on the Office of the Registrar website as soon as feasible after the change of schedule period (drop and add).

IX. University Rules and Regulations (Add Updated Policies and Links)

- **General Academic Information**
  - Undergraduate: https://www.aub.edu.lb/Registrar/catalogue/Pages/undergraduate-general-university-academic-information.aspx
  - Graduate: https://www.aub.edu.lb/Registrar/catalogue/Pages/graduate-general-university-academic-information.aspx

- **University - Course Withdrawal Policy**

A student can withdraw from only one required course per semester. Students who wish to withdraw from more than one required course in any given semester must petition the appropriate faculty committee for permission to do so. Full time undergraduate students can withdraw from courses to a minimum of 12 credits per regular semester (6 credits for summer) by the withdrawal deadline specified on the University calendar. Students receive a grade of 'W' for the course and will not get a refund. Students who withdraw from a course will not be reinstated in that course and are not allowed to take the final exam.

- **Academic Integrity (cheating and plagiarism):**

Please refer to AUB Student Code of Conduct, in particular section 1.1, which concerns academic misconduct including cheating, plagiarism, in-class disruption, and dishonesty. Please be aware that misconduct is vigorously prosecuted and that AUB has a zero tolerance policy. Course policy is that credible evidence of cheating will result in course failure.

- **Accessibility Statement to Acknowledge the Unique Learning Needs of Students with Disabilities:**

AUB strives to make learning experiences as accessible as possible. If you anticipate or experience academic barriers due to a disability (including mental health, chronic or temporary medical conditions), please inform me immediately so that we can privately discuss options. In order to help establish reasonable accommodations and facilitate a smooth accommodations process, you are encouraged to contact the Accessible Education Office: accessibility@aub.edu.lb; +961-1-350000, x3246; West Hall, 314.

- **Non-Discrimination and Title IX Statement**

In line with its commitment to the principle of equal opportunity in education and employment, AUB policies protect you from discrimination on the basis of protected characteristics, including discriminatory harassment and sexual harassment. Protected characteristics include: race, color, religion, age, national or ethnic identity, sex, gender or gender identity, sexual orientation, pregnancy, marital status, disability, genetic predisposition or carrier status, alienage or citizenship status, and political affiliation.

The policies are applicable to all the AUB Community including: officers, faculty, staff, academic appointees, students (including medical interns and residents), visiting students, alumni, trainees, visitors, contractors, subcontractors, suppliers, located on campus and at AUB Medical Center, Advancing Research Enabling Communities Center (AREC), or any other facility or program affiliated with the University. The "AUB community" also includes the dependents and domestic employees of faculty and staff dwelling on campus and at AREC.

If you think you have experienced discrimination, discriminatory harassment, or sexual harassment, we encourage you to inform the Equity/Title IX Coordinator, Mitra Tauk at 01-350000 ext. 2514, titleix@aub.edu.lb , report to a Title IX deputy at your faculty or at any other faculty (www.aub.edu.lb/titleix), or report online (www.aub.ethicspoint.com). Reports may be submitted anonymously or not. Please know that the University will maintain the confidentiality of the complaint and privacy of the persons involved to the greatest extent possible, consistent with its goal of conducting a thorough and complete investigation and to the extent permitted by law.

You need to also know that the University has designated academic and administrative department/unit heads, managerial level staff, academic advisors, protection officers, and residence hall staff/monitors, as responsible employees or "mandatory reporters", and may designate others at its discretion. These individuals are obligated to report actual or suspected discrimination or discriminatory harassing conduct to the Equity/Title IX Coordinator, unless they are a "confidential" resource. The following have been designated as confidential

resources: on campus counselors in the Counseling Center of the Office of Student Affairs and AUB Medical Center counselors, and healthcare providers at the University Health Services (UHS) and at the AUB Medical Center. Confidential resources are not required to report actual or suspected discrimination or harassment to appropriate university officials, except in cases of suspected abuse of a minor, in the event of an external investigation or prosecution, or in the event of imminent danger to the reporting party or others.

X. Grading System

https://www.aub.edu.lb/Registrar/Pages/academic-information.aspx

Numeric Course Grade to Letter Course Grade

Starting with Numeric Course Grade /100	Corresponding Course Letter Grade
< 60	F
60	D
61–62	D+
63–65	C–
66–68	C
69–71	C+
72–74	B–
75–78	B
79–82	B+
83–86	A–
87–92	A
93–100	A+

Grade Conversion Chart

Course Letter Grade	Quality Points
A+	4.3
A	4.0
A–	3.7
B+	3.3
B	3.0
B–	2.7
C+	2.3
C	2.0
C–	1.7
D+	1.3
D	1.0
F	0.0

Note: The GPA at AUB is capped at 4.0

I	P	PR	W	NP
Incomplete	Pass	In Progress	Withdraw	No Pass