Spring 2020

MECH 236-002: Engineering Mechanics: Dynamics

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CIVIL AND ENVIRONMENTAL ENGINEERING

NJIT New Jersey Institute of Technology

MECH 236 - Engineering Mechanics: Dynamics
Section: 001 & 003

Spring 2020

Text:
1. Hibbeler, R.C., Engineering Mechanics-Dynamics, 14th Edition, Prentice Hall, 2010, ISBN 978-0-13-291127-6 or 0-13-291127-2
2. NCEES, Fundamentals of Engineering Supplied-Reference Handbook, 8th Edition, (optional, free from: https://ncees.org/engineering/fe/)

Instructor: Prof. Rajib Moral, 973-596-2447, rsmoral@njit.edu

Prerequisites: MECH 234 or MECH 235 with a grade of C or better or MECH 320 and MATH 112, PHYS 111/111A. Provides an understanding of the mathematics of the motion of particles and rigid bodies, and of the relation of forces and motion of particles.

"Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:
http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

WEEK	TOPIC	ARTICLES
1	Kinematics of Particles	12.1 - 12.6
2	Kinematics of Particles	12.7 - 12.10
3	Force & Acceleration	13.1 - 13.3
4	Force & Acceleration	13.4 - 13.5
5	Energy & Work	14.1 - 14.6
6	Exam-1 (tentative)	Confirmation on moodle

7	Momentum, Impact	15.1 - 15.4
8	Kinematics of Rigid Bodies	16.1 - 16.4
9	Rigid body: Relative Velocity	16.5
10	Exam-2 (tentative)	Confirmation on moodle
11	Rigid body: Instant Center	16.6
12	Rigid Bodies Acceleration	16.7
13	Kinetics of a Rigid Body	17.1 - 17.5
14	Rigid body Energy, Vibrations	18.1 - 18.5, 22.1 - 22.2
15	Final Exam	

TUTORIAL HELP:
Tutorial hours will be announced in class. Students with difficulties are encouraged to come during the tutorial hours.

GRADING:
The grade will be decided based on the following:

Homework	10 % (Attendance will be taken during each class.)
2 Exams	60 % (30% each)
Final Exam	30%
Total	100%

The grade scheduling:

A	=	90 to 100	C	=	70 to 74
B+	=	85 to 89	D	=	60 to 69
B	=	80 to 84	F	=	59 or less
C+	=	75 to 79	W	=	Voluntary before deadline (school schedule)

Incomplete = given in rare instances where the student is unable to attend or otherwise do the work of the course due to illness, etc. The grade must be made up in the next semester by completing all of the missed work.

EXAMs:
Generally, calculator is need for all exams. No other electronic device, storage medium, or accessory of any kind, is allowed during any exam.

HOMEWORK:
Homework will be checked and returned the following week. To obtain full credit, you must submit the work on time and in the proper form. A minimum of 70% of the homework must be submitted to receive a passing grade in the course. Late homework will get reduced points (20% off for each collection cycle). The followings are required for homework:

1. On the very top of each page (along top edge), PRINT your name, class day and time (e.g. Wednesday 9:15 am), HW set number (e.g., HW-1), problem number (e.g. 12-3), date, and page number (1 of 7, 2 of 7, etc.).

2. The problems must be presented in numerical order as assigned. If more than one problem on the same page**, a clear dividing line is required between problems.** (Do not write one problem on two pages). Writings are to be neat, clear and legible.
3. Draw neat, clear free body diagrams as required. Use a straight edge if needed.
4. Box the final answer(s) with unit(s) (and direction if needed).
5. **Staple** the pages in proper numerical order with a single staple at the upper left corner. Loose pages will **NOT** be accepted.

SPECIAL NOTES:

*The University Code on Academic Integrity (NJIT Honor Code) will be upheld in this course. Any violations will be brought to the immediate attention of the Dean of Students

Outcomes Course Matrix – MECH 236 Engineering Mechanics: Dynamics

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1: Identify transition concepts from Physics (science) to Dynamics (engineering).			
Present engineering approach and problem solving techniques.	1	1	Homework, tests and success in future courses.
Student Learning Outcome 2: Analyze and solve kinematics, kineties of particles and rigid bodies in engineering dyna problems.			
Discuss the underlying concepts, principals and procedures of dynamics of particles and rigid bodies.	1	1	Homework, tests and success in future courses.
Student Learning Outcome 3: Formulate, diagram and solve FBD problems.			
Require FBD's for all problems .	1, 2	1	Homework, tests and success in future courses.
Illustrate the problem solving process including FBD, equation formulation and mathematical solution.	1	1	Homework, tests and success in future courses.

CEE Mission, Program Educational Objectives and Student Outcomes

The mission of the Department of Civil and Environmental Engineering is:

- to educate a diverse student body to be employed in the engineering profession
- to encourage research and scholarship among our faculty and students
- to promote service to the engineering profession and society

Our program educational objectives are reflected in the achievements of our recent alumni:

1 – Engineering Practice: Alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working toward sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.

2 – Professional Growth: Alumni will advance their skills through professional growth and development activities such as graduate study in engineering, research and development, professional registration and continuing education; some graduates will transition into other professional fields such as business and law through further education.

3 – Service: Alumni will perform service to society and the engineering profession through membership and

participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

Our Student Outcomes are what students are expected to know and be able to do by the time of their graduation:

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

Revised: 2/13/18