

ME 142
Kinematics and Dynamics of Machines
Prerequisites: ME 41, ES 12

Main Textbook:

Mechanisms and Dynamics of Machinery, Fourth Edition by Hamilton Mabie and Charles Reinholtz

References:

Theory of Machines and Mechanisms, Second Edition by Joseph E. Shigley and John Uicker Jr.

Design of Machinery, Third Edition by Robert L. Norton

Kinematics, Dynamics and Design of Machinery, Second Edition by Kenneth J. Waldron and Gary L. Kinzel

Teacher: Joseph Gerard T. Reyes, Ph.D. (jogereyes@gmail.com/09954532770)

Consultation Hours: Monday 0900 – 1200, 1300 – 1600H, UPDME

WF 0900 – 1200H, UPDME

Objectives of the Course: By the end of the semester, the student must be able to exhibit the following:

- Perform a complete kinematic analysis of a linkage
- Do a force analysis of machines under certain loads
- Do an analysis of balance of rotating machinery

Course schedules/topics

Date*	Topic*
January 17, 2017	Discussion of syllabus Orientation on class policies Assignment of project groups
January 19, 2017	Review of linkages Vector algebra fundamentals Equations of motion of particles
January 24, 2017	Velocity analysis using relative motion – particles on common links
January 26, 2017	Velocity analysis using relative motion – coincident particles on separate links
January 31, 2017	Velocity analysis using relative motion – rolling elements Instantaneous centers
February 7, 2017	Kennedy's theorem Velocity analysis using the method of instantaneous centers
February 9, 2017	Review of velocity analysis
February 14, 2017	FIRST EXAM
February 16, 2017	Acceleration analysis using relative motion – particles on common links
February 21, 2017	Acceleration analysis using relative motion – coincident particles on separate links; rolling elements

February 23, 2017	Kinematic analysis using complex algebra
February 28, 2017	Review of acceleration analysis
March 2, 2017	SECOND EXAM
March 7, 2017	Introduction to kinetics of mechanisms Forces on rotors
March 9, 2017	Force analysis using superposition
March 14, 2017	Force analysis using complex algebra
March 16, 2017	Review on force analysis
March 21, 2017	THIRD EXAM
March 23, 2017	Introduction to engine dynamics
March 28, 2017	Engine dynamics
March 30, 2017	Review on engine dynamics
April 4, 2017	FOURTH EXAM
April 6, 2017	Balance of rotors
April 11, 2017	Analytical determination of engine unbalance
April 18, 2017	Analytical determination of unbalance – Vee engines
April 20, 2017	Review on balance of machinery
April 25, 2017	FIFTH EXAM
April 27 – May 15, 2017	Class project
May 19, 2017	Submission of class project FINAL EXAMINATION

*note: Dates and topics may be changed by the instructor when deemed necessary

Computation of pre-final class standing:

60% average of five exams + 30% project grade + 10% assignments = 100% pre-final class standing

There will be no make-up exams for any student who misses any exam.

The project grade of a student will be based on the lowest peer rating by any of the co-group members divided by 100, then multiplied by the project grade. The project grade is 100 ONLY IF THE PROJECT IS ACCEPTED BY THE INSTRUCTOR. Projects are accepted by the instructor only upon proper presentation with all group members present.

Conditions for exemption from the final examinations:

- All scores of regular exams must be at least 60%.
- Project scores must be at least 60%.
- All assignments scores must be at least 60%.

Final standings and grades:

- For those who are exempted and opt to miss the final exams, their final grade will be based on their pre-final standings.
- For those who take the final examinations: Final class standing = 60% pre-finals score + 40% final exam scores

Grading scale:

92 and up	1.00	72 – below 76	2.25
88 – below 92	1.25	68 – below 72	2.50
84 – below 88	1.50	64 – below 68	2.75
80 – below 84	1.75	60 – below 64	3.00
76 – below 80	2.00	Below 60	5.00

A student may receive a grade of INC upon assessment by the teacher regarding said student's compliance with all requirements.

House rules:

1. Attendance will be checked before a class begins (as per University Policy). A student is marked as absent if he/she is not present during the checking of attendance. Tardy students will be marked as absent and will be barred from entering the classroom, to prevent disruption of ongoing sessions. Any student who is absent for more than six (6) meetings spread throughout the semester or for more than three (3) consecutive meetings will be unofficially dropped from the class list. If majority of these absences are unexcused, the student concerned will receive a grade of 5 for the course.
2. All mobile phones must be switched off or set to silent mode when inside the classroom. Any student whose phone emits a sound while class is in session will be told to leave the classroom and, consequently, will be marked as absent for that session.
3. Anyone who is caught sleeping during class will be told to leave the classroom and, consequently, will be marked as absent for that session.
4. Any student who is caught cheating in any exam will be automatically given a grade of 5 and would be subject to sanctions prescribed by the University Student Disciplinary Tribunal.
5. Any student who commits acts that could lead to physical or any other form of injury to anyone inside the classroom will face sanctions prescribed by the University Student Disciplinary Tribunal.
6. Only the teacher could cancel classes outside of official announcements.