

ME215 - VECTOR DYNAMICS**SYLLABUS**

Todd D. Coburn, (909) 869-2235, tdcoburn@csupomona.edu, Office: 17-2111, Office Hours: 1-3 PM MW, 1-2 PM F, or by appointment

Instructor: Dr. Todd D. Coburn

E-mail: tdcoburn@csupomona.edu

Office Hours: 1-3 PM MW & 1-2 PM F, or by appointment

Phone: (909) 869-2235

Office: Bldg 17, Office 2111

Required Text & Tools:

- Miriam & Kraige, Engineering Mechanics - Dynamics, 7th Edition (preferred).
 - All Homework is assigned from the 7th edition of the text. Use of other editions will require additional effort from the student to copy assigned problems from the current edition.
- Pencil, Paper (Quad or Quint Pad Recommended), Engineering or Scientific Calculator

Prerequisites:

- Major in ARO, CE, ME, or MFE.
- MAT 116 w/ C or better (Analytic Geometry and Calculus III)
- ME214 w/ C- or better (Vector Statics)

Course Description: This course builds upon concepts covered in Statics (ME214) and expands focus to include systems of particles and rigid bodies in motion. This study includes the vector mathematics of absolute and relative motion of particles and the planar motion of rigid bodies in an inertial reference frame. Newton's laws of motion, work-energy, impulse-momentum, and mass moments of inertia are also studied and applied to practical problems in engineering.

Course Comments:

- This class is one of the most difficult in engineering, and will require a lot of work to master the principles covered.
- Mastering the material is not possible without working a wide variety of problems.
- The lecture is intended to prepare the student for this problem-solving phase by helping them to grasp the concepts applicable, but these concepts cannot be fully grasped without each student personally struggling through a wide variety of problems.
- For this reason, lots of homework will be given in this course.
- Homework will be given each class and will be due the following class.
- Lots of time will be needed for each homework & frequent review of the text will be required in order to decipher the engineering principles needed & the proper application of these.
- Students who fall behind will find it very difficult or impossible to catch up.
- Homework is worth points in this class. Homework credit is intended to reward the student who works hard at mastering the material.
- Each homework must be graded by the student using the grading policy (page 3) in order to obtain maximum credit.
- Completing the homework on time & understanding the basic principles covered will be the largest factor influencing quiz scores, and will also directly influence test scores.
- Quizzes will tend to be simple problems easily solved by those who did their homework. Not much time will be given so the best preparation is having worked and understood the homework.

Course Grading	-----	-----	Grading Scale	-----	
Homework	5%		A	100 % - 93 %	
Quizzes	20%	B+	89 % - 87%	A-	92 % - 90 %
Test #1	15%	C+	79 % - 77%	B	86 % - 83%
Test #2	15%	D+	69 % - 66%	C	76 % - 73%
Test #3	15%			D	65 % - 61%
Test #4	15%			F	55 % - 0%
Final	15% (optional for those with a cumulative grade of 93% or higher after Test #4)				

Work Standards:

Engineering is a precise discipline. One aspect of this class, in addition to the engineering principles studied, is to teach each student solid engineering problem-solving skills. This starts with clearly defining the problem and the information sought, identifying the engineering principles and equations applicable, and applying them properly in an orderly fashion. Analytical work should be neat, clear, concise, and easy to follow. Avoiding, identifying and eliminating errors are highly dependent on being able to clearly review the analysis presented, both in the classroom and in the workplace. Credit on homework, quizzes and tests will be highly dependant on how easy it is to follow the thoughts and judgments of the student. Work that is cluttered, overly sloppy, jumbled, or simply hard to follow will lose points, even if the final answer is correct. The following standards are expected and will result in maximum credit:

- Homework should be worked on Quad (4 squares/inch) or Quint (5 squares/inch) paper. Ampad's Engineering paper (22-141, 22-142, or equivalent) is one of the best for this.
- Homework, quiz & test problems should be worked on only one side of the paper.
- Each homework, quiz, or test should clearly identify the students name (first & last), preferably on every separate sheet.
- Each separate sheet of homework, quiz, or test should also clearly identify the problem number, the assignment number (HW #1, HW #2, Quiz #1, Test, etc.), and the page number of the assignment (1 of 5, etc).
- Each homework problem should be clearly identified with three primary sections, GIVEN, FIND, & SOLUTION, with each section title identified & underlined. This is required on homework, but may be skipped on quizzes and tests to maximize application of time to problem solving.
- GIVEN: List the data given in the problem statement. Usually this should be preceded or accompanied by a sketch with appropriate dimensioning and/or labeling that contains most, if not all of the given information. Absence of a piece of given information or key word often makes a problem difficult or impossible to solve.
- FIND: State what you are trying to find in this problem.
- SOLUTION: Solve the problem in a neat and logical manner. This should usually be preceded by one or more free-body-diagrams, when applicable. Each equation used should be first identified prior to substituting the appropriate values. Each step in solving the equation should be clearly shown in a linear fashion as you proceed down the page. All solutions to the problems identified in the "FIND" section should be shown to the appropriate number of significant figures and enclosed in a box, including the appropriate units and direction (as appropriate).

Important Notes, Expectations & Comments:

- Exams and Quizzes will be closed book and closed notes.
- One 3"x5" or 5"x8" card of student-prepared equations will be permitted on exams. Card MUST be yellow, and may be written front and back with formulas, conversion factors, etc.
- Quizzes will be given frequently (nearly every class) & will be unannounced.
- No make-up exams or quizzes will be administered.
- Homework is due at the beginning of the class following when it is assigned.
- Late homework will not be accepted or scored.
- Collaboration on homework is recommended. Copying homework is considered cheating.
- Cheating is unacceptable at any time, and will result in immediate failure of the class.
- Attendance is required. Students who do not attend class may be dropped from the class.
- Cell Phones, pagers & laptops may not be used in class. Use will result in loss of class credit.
- Eating or drinking is not allowed in the classroom.
- April 22nd is the last day to drop without a petition.
- Participation in class is desired, recommended, and rewarded.

Homework Grading Procedure:

Each student must grade their own Homework prior to submitting to instructor, as follows:

- Using a colored pen or marker that stands out from your homework, score each problem next to its identification, and circle the score of each.
- Score each problem as follows:
 - SETUP: If the problem is identified (1, 2, 3, etc) & the ID circled, with Given, Find, and Solution clearly marked and appropriate pertinent data recorded, score 1 point.
 - FIGURES/FBDs: If you've provided a legible sketch of the problem, or of the FBD and/or KD, score 1 point.
 - WORK: If you worked the problem to completion, and boxed your answers, score 2 points.
 - NEATNESS: If your work is neat and legible, and if you show each step of computation, and note when steps are not shown due to calculator algorithms or programs, score 1 point.
 - ACCURACY: If the answers to each part of the problem are provided, and if your solution matches the answer(s) for each part provided, and you have shown the appropriate number of significant figures in your solution, then score 1 point. If no solution is provided then score yourself the point as if you'd matched the answer(s).
- This means each problem score will range from 1 to 6 based on the above items being in the solution.
- Sum your scores to the top of the first page with the total points earned over the total possible (6 times the number of problems), and circle the total score conspicuously.
- If you failed to write your name at the top of the paper, or to staple your work together, score -3 next to the collective score.
- If you did something beyond the homework that you want me to see or score, write "See XYZ" or some such and I will take a look and evaluate.
- I will make any modifications to the grades as needed, and may score punitive point reductions if I feel the scoring is intentionally misleading.

Any ungraded Homework will lose 1 point per problem not scored.

If there are questions, see me.

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Class	Section	Number	Lecture	Location
ME215	6	31309	10:30 am – 11:35 am MWF	Bldg 9, Room 303
ME215	7	31310	11:45 am – 12:50 pm MWF	Bldg 9, Room 303

CLASS SCHEDULE

Week	Date	Mtg	Day	Chapters	Topics	Homework
1	04/03	1	W	1/1-1/8, Apx. C7	Introduction	HW #1
1	04/05	2	F	2/1-2	Particle Rectilinear Motion	HW #2
2	04/08	3	M	2/3-4	Particle Curvilinear Motion	HW #3
2	04/10	4	W	2/5	Particle Normal & Tang. Comp.	HW #4
2	04/12	5	F	2/8, 2/9	Relative & Constrained Motion	HW #5
3	04/15	6	M	-	Review of Chp. 1-2	---
3	04/17	7	W	-	TEST #1 (Chp. 1-2)	---
3	04/19	8	F	3/1-3/4	Newton's Rectilinear Motion	HW #6
4	04/22	9	M	3/5	Newton's Curvilinear Motion	HW #7
4	04/24	10	W	3/6, 3/7	Work & Kinetic & Potential Energy	HW #8
4	04/26	11	F	3/8-9	Linear Impulse & Momentum	HW #9
5	04/29	12	M	3/10	Angular Impulse & Momentum	HW #10
5	05/01	13	W	3/11-12	Impact	HW #11
5	05/03	14	F	-	Review of Chp. 3	---
6	05/06	15	M	-	TEST #2 (Chp. 3)	---
6	05/08	16	W	5/1-2	Rigid Body Rotation	HW #12
6	05/10	17	F	5/3, 5/4	Absolute & Relative Motion	HW #13
7	05/13	18	M	5/5	Instantaneous Center	HW #14
7	05/15	19	W	5/6	Relative Acceleration	HW #15
7	05/17	20	F	-	Review of Chp. 5	---
8	05/20	21	M	-	TEST #3 (Chp. 5)	---
8	05/22	22	W	App. B1	Mass Moments of Inertia	HW #16
8	05/24	23	F	6/1-3	Kinetics of Rigid Bodies	HW #17
3	05/27	-	M	HOLIDAY	---	---
9	05/29	24	W	6/4-5	Fixed-Axis Rotation & GPM	HW #18
9	05/31	25	F	6/6	Work-Energy Relations	HW #19
9	06/03	26	M	-	Review of Chp. 6	HW #20
10	06/05	27	W	-	TEST #4 (Chp. 6)	---
10	06/07	28	F	-	Review of Everything	---
11	06/10	30	M	-	NO CLASS	---
11	06/12	31	W	Section 6	FINAL EXAM	9:10 AM – 11:10 AM
11	06/14	32	F	Section 7	FINAL EXAM	7:00 AM – 9:00 AM