

CIVE 261 DYNAMICS SYLLABUS – Fall 2017

COURSE DESCRIPTION

Course Title: CIVE 261 Engineering Mechanics: Dynamics

Credits: 3 (40 hours of instruction)

Section 001: MWF 2-2:50pm in Clark A104

Section 002: MWF 3-3:50pm in Clark A104

Section 008: Online (Online Students see Online Supplemental Syllabus too)

Welcome to Dynamics! This is a mid-level course in engineering mechanics which is concerned with the motion of bodies under the action of forces. The study of dynamics has numerous engineering applications; the mechanical design of an automobile or bicycle, the path of a projectile, or even the design of highways. It will also help you interpret the movement of all moving objects we encounter in our daily lives.

Dr. Baker's team will be expected to:

- Deliver engaging lectures which introduce, clarify, and integrate course materials
- Provide a wide-array of quality learning opportunities and materials
- Assign well-sculpted assignments and exams materials to enable you and I to know how well you are understanding course material

You will be expected to:

- Learn the material presented in this course
- Tap into your existing intuition, strengths, and passion
- Become an active participant in your Dynamics education, taking full advantage of lectures, texts, homework, office hours, your fellow students and everyday life

COURSE OBJECTIVES

By the end of this course, you will be able to:

1. Resolve the motion of single particles in multiple coordinate systems,
2. Demonstrate the motion of multiple particles in constrained motion,
3. Use the equations of motion to compute the position, velocity, and acceleration of multiple points on rigid bodies in constrained motion,
4. Apply the basic concepts of force, mass and acceleration; of work and energy; and of impulse and momentum for particles and rigid bodies.
5. Apply the knowledge and tools of dynamics to solve engineering problems, and
6. Explain your knowledge to peers through hand-written problem sets, verbalization, and writing.

As a participant in this course, I ask you for your attention, hard work, and most of all respect. In return, I will work hard to meet your academic needs, create an atmosphere of learning, and respect and appreciate you as individuals.

INSTRUCTOR INFORMATION



Dr. Dan Baker, PhD PE

Dan.Baker@colostate.edu

Office Hours

Tu Noon-1:30pm in ENGR B206

Th 3-4:30pm in ENGR B206

INSTRUCTIONAL ASSISTANTS

Mohammad Reza, Teaching Assistant, mrhg@rams.colostate.edu

Mikaela Hennes-Wilson, Grader and Office Hour Host, mikaela_ann@hotmail.com

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Quill Maurer, TILT Study Group Leader, kbradley11@msn.com

COURSE MATERIALS

WEBSITE

<https://colostate.instructure.com>

All course materials presented in class will also be posted on our Canvas website. The majority of the material will be organized by topic in the [Modules](#) and the links to lectures from a previous semester and the current semester (if available) are available on the [Home](#) page. Here's some useful Canvas guides:

- [What do icons and markings on the Grades Page represent?](#)
- [How do I view feedback from graded assignments?](#)
- [How do I view assignments posted as Quizzes?](#)

If you need technical assistance with the Canvas either (1) visit the [Canvas Student Guide](#) page to troubleshoot common issues, (2) email help@colostate.edu or (3) call 970-491-7276.

LECTURES

Lectures will be delivered Monday, Wednesday, and Friday in our assigned classroom. For on-campus students attending and being an active learner during lectures is likely the top way you can succeed in this course. You are welcome to attend either lecture as long as there are seats available.

During the Spring semester there is also an online section of this course, thus lectures are also recorded and posted to the Echo360 tool in the left menu bar. In the Fall semester course I will re-post the Spring lecture recordings. I encourage on-campus students to use the recorded lectures should you need to miss class or want to review a section of lecture.

TEXTBOOK

The official textbook for this course is: *Engineering Mechanics: Dynamics (13th Edition)* by R.C. Hibbeler. Reading assignments will complement material presented in lectures. You need a Dynamics textbook for the course, but you are also welcome to use the 10th, 11th, 12th, or 14th editions of the Hibbeler Dynamics text. I'll post PDF's of each HW assignment.

CALCULATORS

Calculators are a vital tool for engineers. As such, we allow you to use your calculator to the fullest of its ability. Additionally, cell phones, computational websites, and computational software may be used on course assignments, however these additional tools cannot be used on exams. Only non-graphing scientific calculators will be allowed for use on exams. We use the basic list of FE permitted calculators (for more information see <http://ncees.org/exams/calculator-policy/> ([Links to an external site.](#)), but also allow other comparable models.

COMMUNICATION

Delivery of Course Information: You are responsible for keeping track of information related to this course. The three primary ways I'll convey course logistical information in this course will be:

- This Canvas Website (including the Calendar, [Modules](#), and [Assignments](#))
- Messages sent via the Canvas
 - You need to check your [Notification Preferences](#) and can even get Notifications [sent via text message](#).
- In-class announcements, notes, and verbal discussion.

Communicating with Dr. Baker & his team: Please use the following guidelines insure streamlined and documented communication with Dr. Baker & his team:

- Make emails concise and complete. In every email include your course, section and full name. For problem based questions include the problem number as listed on the assignment.
- Please contact your grader *first* for all Homework and Learning Exercise grading questions.
- Please submit all exam grading inquiries to Dr. Baker via email - within one week of the return of the exam. Include a photo or scan of the entire problem in question.
- Note that comments submitted with Canvas assignments are only viewed by the grader of that individual assignment and should NOT be used as a means of communicating with Dr. Baker.

UNIVERSITY CALENDAR

You are expected to keep track of important course dates related to enrollment. Dates for adding, dropping, and withdrawing from this course can be found on the [CSU Academic Calendar](#).

ACADEMIC INTEGRITY

This course will adhere to the [Academic Integrity Policy \(Links to an external site.\)](#)[Links to an external site.](#) of the Colorado State University General Catalog and the [Student Conduct Code \(Links to an external site.\)](#)[Links to an external site.](#). A good summary can be found in this [list of Student Responsibilities \(Links to an external site.\)](#)[Links to an external site.](#).

I know that solutions to textbook problems are available on the internet. Copying all or part of an assignment from the solutions or a fellow student's assignment is considered cheating and will earn you a zero on the assignment(s), prevent you from learning anything from the assignment, and lose the trust of Dr. Baker. All cases of cheating are seriously evaluated and could result in you failing the class or removed from the university.

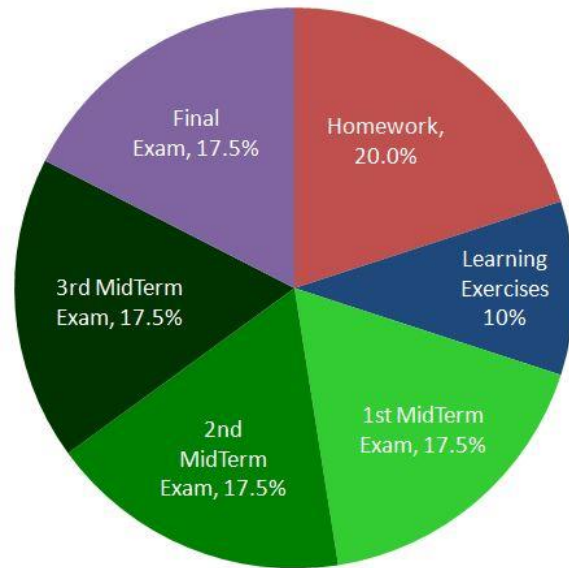
WORKING TOGETHER

You are encouraged to work alongside your peers on homework assignments, **but each student is responsible for completing in their own assignments**. The interaction of teaching and learning among a group is a powerful way to learn. However if you ever find yourself copying work that is not yours - STOP and reevaluate.

COURSE GRADING

Your current weighted grade will always be available on [Canvas Grades](#). Assignments and exams will be weighted as follows:

- Homework 20%
- Learning Exercises 10%
- Exams (4 x 17.5%) 70%



Individual exams/assignments may be curved, but the class will not be curved overall. In general for hand and online grading, '✓' (a check mark) indicates correct work and an 'x' indicates an error. Letter grades will be assigned on the scale below.

Grade	Range
A+	100 % to 96.5%
A	< 96.5 % to 92.5%
A-	< 92.5 % to 89.5%
B+	< 89.5 % to 86.5%
B	< 86.5 % to 82.5%
B-	< 82.5 % to 79.5%
C+	< 79.5 % to 76.5%
C	< 76.5 % to 69.5%
D	< 69.5 % to 59.5%
F	< 59.5 % to 0.0%

LATE AND RESUBMITTED ASSIGNMENTS

There is only one (1) *unexcused* late or resubmitted assignment (Homework or Learning Exercise) allowed per student each semester. Excused extensions will be granted for university or medical excused absences - if you contact Dr. Baker 24 hours in advance of the due date. A couple of additional notes:

- Due dates and times listed in Canvas are all for the Mountain Time zone and are absolute - a deadline is a deadline

- No assignments will be accepted after the final exam
- We keep track of any exceptions (late, resubmitted, or extensions) on our side of the grade book.

HOLISTIC GRADING

The grading approach used in this course is called Holistic Grading. You'll be graded on how close you came to (1) using the correct method, (2) showing all required work, (3) keeping work legible and organized, and finally (4) getting the correct answer. The rubric for this scoring is as follows (relative to an 8 point scale):

8/8 Everything is correct – Including answers, units, steps, and sketches.

7/8 Everything essentially correct –The right idea on all parts of the problem. Only small missteps resulting in small errors (even wrong final answers).

6/8 The student had generally the right idea, but made a notable misstep at one point. Show general knowledge, but had a small conceptual error or a minor computational error.

5/8 The student had some sense of what they were up to, but missed a key piece. - Much of the work is good, but there's a big piece wrong or missing.

4/8 There is some evidence of understanding, but the work, overall, isn't correct. An idea of where to start, or how to handle such a problem, but not followed through very well.

3/8 Most of the work is wrong, but there is something that is correct or insightful - Some work that correct, but the problem, overall, isn't correct.

2/8 The student may have started the problem, but either went way off base or only finished $\frac{1}{4}$ of the problem – Needs to be at least a section of correct work.

1/8 Something of value – Something correct—a formula, a vector... something!

0/8 Blank or completely off-base – A solution and process which is completely wrong.

GRADED CONTENT

EXAMS

Midterm Exam 1	Tuesday, February 13, 5:00-6:30pm	Johnson 222
Midterm Exam 2	Tuesday, March 20 5:00-6:30pm	Johnson 222
Midterm Exam 3	Tuesday, April 17, 5:00-6:30pm	Johnson 222
Final ExamA (002)**	Monday, May 7, 4:10-5:40pm	TBD
Final ExamB (001)**	Tuesday, May 8, 8:00-9:30am	

** As long as we are able to arrange large enough rooms, students from any section have the option of taking either final exam time. We will poll you near the end of the semester. No additional exam times will be offered.

There will be three 90 minute midterm exams and a 90 minute final exam. Exam material will be drawn from lectures and course materials.

For students who cannot attend regular exams due to university related activities, serious illness, or family emergency (all with written validation); a makeup exam may be arranged. The instructor must be notified prior to the exam and no exceptions will be made without a legitimate reason and a timely arrangement.

An equation sheet (also posted to the [Exam Materials](#) Module) will be provided as part of the exam, but no additional materials are allowed.

Please submit all exam grading inquiries to Dr. Baker via email - within one week of the return of the exam. Include a photo or scan of the entire problem in question and the first page of the exam.

HOMEWORK

Each homework problem should be a self-contained representation of the entire problem and solution. You should be able to hand a student from another class your assignment and they would have enough information to understand what was asked, what you did to solve the problem, and what you found for an answer. As engineers we need to make sure our documentation is sufficient for others to follow our work. For the problem statement, simply listing the unknowns is not enough. You are welcome to paraphrase (restate in your own words) the problem statement.

All homework assignments are to reflect your original work and will be written by hand on paper or a tablet. While you are to complete your assignment by hand, the use of a calculator or computational websites/software are permitted for complex single calculations. When using a solver (calculator or computational websites/software) for complex calculations (e.g. the determinant of a matrix or the use of a polynomial or system solver) make sure to note which computations were done in the solver and

include (1) what was input into the solver, (2) which function you performed with the solver, and (3) the output.

Additional Homework Details

1. All homework is to be hand written. If using pencil use either plain white copy paper or engineering paper. Alternatively you can use a computer tablet and stylus to hand-write your assignment.
2. Your homework is required to follow a specific format (as shown below). Homework not following this format will receive up to a 20% reduced score.
3. You are responsible for submitting a gradable file. Hence, illegible (i.e. upside down, unreadable scan, or super-sloppy) submissions will receive a zero.
4. ALL homework will be submitted digitally to Canvas as a *single* PDF file by 5pm on the Friday due date. There are multiple sheet feed PDF scanners in the [Engineering computer labs \(Links to an external site.\)](#) and also in the library. You are also welcome to use scanning apps on your smartphone.
5. Only 2 of your homework problems each week will be thoroughly graded (8 points each). The others will be checked off for being complete (2 points each). The graded problems are randomly selected and are not an indication of importance and/or exam content. *Your lowest homework grade will be dropped.*

FIRST AND LAST NAME	COURSE # AND SECTION	ASSIGNMENT #
PROBLEM NUMBER		
		Page # / Total Pages
<p>Use the FRONT SIDE of engineering paper. =Back side of Engineering Paper has grid lines =Front side has margin lines</p>		
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Box ANSWERS + units </div>		
Put a line between problems (2 max per page)		
NEXT PROBLEM NUMBER		
If you feel the next problem won't completely fit, start a new page		
Remember the 7 Fingers of Homework		
Paper	Engineering paper (any color) or plain copy paper, maximum of 2 problems on the front side only, pencil only (no pens unless used for highlight)	
Name	Name, course/section #, and assignment written on every page.	
Problem	Define the problem, including a list of known / unknown parameters.	
Sketch	Sketch the original system and a free body diagram (as required by problems summing forces or moments. Perfection is not required, instead focus on the appropriate dimensions, forces, and layout.	
Work	Show each step explicitly so that the grader can easily understand your work.	
Answer	Put a box around your answer and include the correct units.	
Scan	Legible and correct orientation scan of all pages in the order problems were assigned.	

Example

Name (as it appears in Canvas)	CIVE261-002	Homework No 5	Y6
<p>Problem Sketch: Doesn't need to be perfect, just readable. Include axis!</p>	<p>Problem Statement: You need a full problem statement, just listing the unknowns is not enough. You can paraphrase (restate in your own words).</p>	<p>FBD(s): Anytime you are summing forces or moments you need a FBD for <u>each</u> body</p>	<p>Computations: Write out the full starting equations and show step by step your computations. Match equations to FBD's. Units in equations are not required but a good idea.</p>
<p>Final Answer(s): Box final answer and include units</p> <p>$v_0 = 0.6573 \text{ m/s}$</p>			

LEARNING EXERCISES

Learning Exercises will bring additional active learning into this course. They will be given either in class or as a take-home assignment on an approximately weekly basis. All will be completed in Canvas. Examples of learning exercise activities could include:

- Pre and Post Concepts Inventories
- Multiple Choice Quizzes
- Write to learn (e.g. fuzziest point, define the process, short summaries)
- Responses to real world problems

Learning exercises will be *typically* be posted on Wednesday and are due by the following Monday at 11:59 pm MT.

Your lowest learning exercise grade will be dropped.

ESTIMATED SCHEDULE

Topic and Textbook Section Number

WEEK 1

Introduction to Dynamics 12.1

Rectilinear Particle Motion 12.2-12.3

WEEK 2

Curvilinear Particle Motion Rectangular Coordinates 12.4-12.5

Curvilinear Particle Projectile Motion 12.6

Curvilinear Motion: Tangent Normal (t,n) Coordinates 12.7

WEEK 3

Curvilinear Motion: Cylindrical (r,θ) Coordinates 12.8

Constrained (Dependent) Motion 12.9

Particle Relative Motion 12.10

WEEK 4

Particle Kinetics: Force, Mass and Acceleration, Newton's Second Law 13.1-13.3

Particle Kinetics: Rectangular Motion 13.4

WEEK 5

Review and Take Exam 1

Particle Kinetics: Tangent Normal (t,n) 13.5

Particle Kinetics: Cylindrical (r,θ) 13.6

WEEK 6

Go Over Exam 1

Particle Kinetics: Work and Energy for a System of Particles 14.1-14.3

Particle Kinetics: Power and Efficiency 14.4

WEEK 7

Particle Kinetics: Conservation of Energy 14.5-14.6

Particle Kinetics: Linear Impulse and Momentum 15.1-15.3

WEEK 8

Particle Kinetics: Impact 15.4

Particle Kinetics: Angular Impulse and Momentum 15.5-15.7

WEEK 9

Review and take Exam 2

Rigid Body Motion: Overview and Translation 16.1-16.2

WEEK 10

Go Over Exam 2

Rigid Body Motion: Fixed Axis Rotation 16.3

Rigid Body Motion: Relative Velocity 16.5

WEEK 11

Rigid Body Motion: ICZV's 16.6

Rigid Body Motion: Relative Acceleration 16.7

WEEK 12

Rigid Body Motion: Relative Motion with Rotating Axes 16.8

Moment of Inertia 17.1

Rigid Body Newtonian Kinetics: Overview and Translation 17.2-17.3

WEEK 13

Review and take Exam 3

Rigid Body Newtonian Kinetics: Fixed-Axis Rotation 17.4

Rigid Body Newtonian Kinetics: General Plane Motion 17.5

WEEK 14

Rigid Body Kinetics: Work and Energy 18.1-18.4

Rigid Body Kinetics – Conservation of Energy 18.5

WEEK 15

Rigid Body Kinetics – Impulse and Momentum 19.1-19.3

Final Exam Review

WEEK 16

Take Final Exam