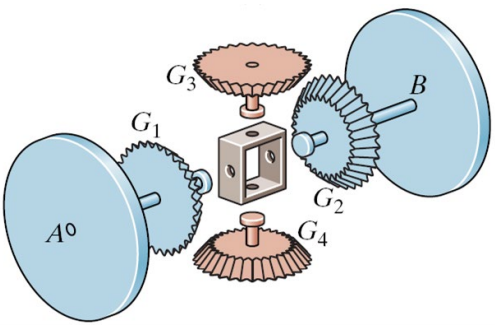


Engineering 360
Dynamics
Syllabus

Fall 2018

Instructor: Kurt DeGoede, Professor of Engineering and Physics
- 161 B Esbenshade Hall
- (717) 361-1380, anytime
- degoedek@etown.edu, anytime
- Cell: (717) 419-9568 (text)
  8:00 AM – 10:00 PM (no calls between 1:00 PM Saturday and 4:00 PM on Sunday please).

Office Hours: M Tu W Th 2:00-3:20
Or by appointment. Please feel free to stop by my office anytime, if I am not available when you stop by please leave a note on the whiteboard.

Class Hours: **Tu Th** 8:00 – 9:20 in Nicary 127

Prerequisites: PHY200, MA222 – you should have a foundational understanding of the Newtonian Dynamics of a particle, constructing Free Body Diagrams, vector calculus and introductory differential equations.

Textbook: ISBN Number: 0-471-40198-6
Author: Tongue
Title: Dynamics
Edition and Copyright: 2nd 2011
Publisher: Wiley

Supplemental Material: There are numerous Dynamics texts available in E161, or as "on reserve" from my office.

Course Objectives:

1 - Students will be able to explain the fundamental principles of engineering dynamics. (1)
2 - They will apply these principles to solve complex-realistic-engineering problems. (1)
3 - Many problems will require the students to make appropriate estimations and justify all assumptions to define a specific problem statement or design a structure. (1)
4 - Students will present engineering solutions clearly in both written and oral settings. (3)
5 - Utilize Numerical Tools and Modeling (MATLAB and System Modeler) to analyze complex systems and test alternate designs. (1)

Specific Skills:

Foundational

F1 – Rotate vector quantities between various coordinate systems and take derivatives in a moving CS.

Primary Skills:

P1 – Kinematics of 2 interconnected bodies: determine the acceleration of the CM of any one or two interconnected bodies in the plane. Find a_G of any system in 7.3. Particle dynamics in polar coordinates.{EXAM1}

P2 – Construct FBDs and Of any system in 7.1,2,3

P3 Apply Newton's laws of motion to set up equations of motion for a system of 1 or 2 rigid bodies moving in the plane (7.1, 2 and 3). {EXAM 2}

Required Skills (Must master P skills before moving on to R skills.)**:**

R1 – Apply ode45 to solve equations of motion of a rigid body in the plane(App A). {Must submit brief technical report on individually assigned problem and demonstrate competency on a written quiz, must submit report within 6 class sessions of completing P3}.

R2 – Utilize principles of energy and momentum to solve for the motion of a system of 1 or 2 bodies (7.4 and 7.5).

R3 – Kinematics: calculate the velocities and accelerations (linear and rotational) of 2 or 3 or more interconnected rigid bodies (6.3 and 6.4).

Supplemental Skills (Must pass all R skills before sitting for an exam/quiz on S skills):

S1 – Analyze oblique impact between two rigid bodies (3.8).

S2 – Solve for the kinetics of mass flow systems (5.4 and 5.5).

S3 – Determine the equation of motion of a rigid body moving in 3D (8.8).

Take-Home Mini Projects (Online tutorials available in Canvas; must submit a brief technical report on individual assigned problem by 5:00 PM on 7 Dec):

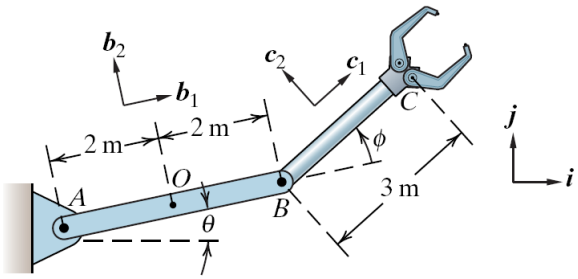
S4 – Construct a model and perform analysis of an assigned 2D 4-bar system with SimMechanics {**must be completed within 6 class sessions of completing R1**}. {Must demonstrate competency with SimMechanics – 15 minute practicum}

S5 – Complete an experimental vibrational analysis of multi-degree of freedom structure {Must submit brief technical report} (9).

	Tue	Thu
August	**28** Intro/ P1 Instruction	**30** P2 Instruction
September	**4** P1/P2 Coaching	**6** P3 Instruction
	11 P3 Coaching	**13** P3 Coaching
	18 P1/P2 Coaching P3 Coaching	**20** **Exam P**
	25 **R1 Instruction**	**27** P Coaching or **P Quiz (ROOM TBD)** R1 Coaching
October	**2** **R2 Instruction**	**4** **Fall Break**
	9 P Coaching R2 Coaching	**11** P Coaching or **P Quiz (ROOM TBD)** R Coaching
	16 **R3 Instruction**	**18** P Coaching or **P Quiz (ROOM TBD)** R3 Coaching
	23 R Coaching P Coaching	**25** P Coaching or **P Quiz (ROOM TBD)** R Coaching
	30 **R Exam** **P Quiz**	**1** **S1 Instruction**
November	**6** P/R Coaching S1 Coaching	**8** **S2 Instruction**
	13 P/R Coaching S2 Coaching	**15** **S1 S2 Exam** **P/R Quiz**
	20 **S3 Instruction**	**22** **Thanksgiving Break**
	27 P/R Coaching S3 Coaching	**29** Coaching or **P/R Quiz (ROOM TBD)** S3 Coaching
December	**4** Coaching (All Skills)	**6** **Exams** (Last Chance: FE slot - 13th 8:00AM)

Exams: To pass an objective you must score an average of 4.5/5 on the assigned analyses/problems in a test environment. **5 point grading scale** used for evaluating exam problems: 5/4.5: correct or trivial errors (A), 4: minor conceptual error (B/C), 3: major or multiple conceptual errors (D), 2: something was correct (F+), 1: problem was attempted (F).

Final Exam: You may take up to 4 skill exams.



All exams will be taken using only the "Bottom Line" packet and a calculator approved for use on the FE/PE exams (http://ncees.org/exams/calculator/). Students will not be able to leave the room during exams.It will be the students' responsibility to ensure that any devices with the ability to connect to the internet are not within reach during exams (cell phones, apple watches, etc).

Grading:

Pass one P skill	D-
Pass two P skills	D
Pass all three P skills	D+
Pass one R skill	C-
Pass two R skills	C
Pass all three R skills	C+
Pass one S skills	B-
Pass two S skills	B
Pass three S skills	B+
Pass four S skills	A-
Pass all five S skills	A

Adjustment: Participating in daily out of class work is essential to your success in this course. If you do not satisfactorily complete 80% of daily discussion assignments, your grade will be reduced by 1/3 of a letter grade.

Ethics: Students are to act in accordance with the Pledge of Integrity:

> I pledge to respect all members of the Elizabethtown College community, and to act as a responsible member of the College community. I pledge to respect the free exchange of ideas both inside and outside the classroom. I pledge to represent as my work only that which is indeed my own, refraining from all forms of lying, plagiarizing, cheating, and academic dishonesty.
>
> As members of the Elizabethtown College community, we hold each other responsible in the maintaining of these values.

and the NSPE code of ethics (Cannons attached, with 2018 Etown Rules of Practice)

Students will be asked to reaffirm their commitment to the pledge and the code with their signature on each exam. Dishonest practice can result in failure of the course and possibly expulsion from the college.

All work should represent each student's individual efforts. **Students are encouraged to discuss assignments with other students and/or the instructor, however submitted assignments should reflect the student's own work and understanding.**

Any solution obtained from any source should be properly referenced.

Re-Grading: Written requests, with full rationale, for re-grading of all course-work will be accepted the next class period after original materials are returned to the students.

Elizabethtown College welcomes otherwise qualified students with disabilities to participate in all of its courses, programs, services, and activities. If you have a documented disability and would like to request accommodations in order to access course material, activities, or requirements, please contact the Director of Disability Services, Lynne Davies, by phone (361-1227) or e-mail daviesl@etown.edu. If your documentation meets the college's documentation guidelines, you will be given a letter from Disability Services for each of your professors. Students experiencing certain documented temporary conditions, such as post-concussive symptoms, may also qualify for temporary academic accommodations and adjustments. As early as possible in the semester, set up an appointment to meet with me, the instructor, to discuss the academic adjustments specified in your accommodations letter as they pertain to my class.

The College is willing to accommodate individual religious beliefs and practices. It is your responsibility to meet with the class instructor in advance to request accommodation related to your religious observances that may conflict with this class, and to make appropriate plans to make up any missed work.

Fine Print: The preceding information represents the *intent* of the course and is subject to change at the discretion of the instructor.

Elizabethtown Engineering Program Code of Ethics

I. **Hold paramount the safety, health, and welfare of fellow students.**
II. **Perform project tasks and assignments only in the areas of their competence.**
III. **Submit assignments only in an objective and truthful manner.**
IV. **Act for team members, instructors, or employers as faithful agents or trustees.**
V. **Avoid deceptive acts.**
VI. **Conduct themselves responsibly, ethically, lawfully, and in line with the integrity policy so as to enhance the honor, reputation, and usefulness of the profession and college's engineering department.**

Professional Obligations (Etown Engineering Students)

1. **Engineering students shall be guided in all their relations by the highest standards of honesty and integrity.**
   A. Be honest about your mistakes.
   B. Do not cheat on exams or assignments.
   C. Do not plagiarize or falsify data.
   D. Do not aid or abet another student in unethical behavior.
2. **Engineers shall at all times strive to gain the knowledge to serve the public's interest.**
   A. Your goal in class should be to gain knowledge to justify your intended degree, not just to obtain a high grade.
   B. Work for the advancement of society and the profession by engaging in the community, and recruiting youth to the engineering profession.
   C. Inform professors of unethical requests from other students.
3. **Engineers shall avoid all conduct or practice that deceives other students, instructors, or the public.**
   A. In lab work, be truthful with ALL data, even if it is not favorable.
   B. All assignments should be your own original work unless otherwise noted.
   C. Do not finish and submit team projects without the approval of ALL your other team members.
4. **Engineers shall not disclose confidential information concerning their own group work to any person outside of their group except for the professor.**
   A. Do not put individual assignments in your public folder.
   B. Do not spread the word of quiz questions or unannounced assignments to later sections of a course.
   C. Engineering students who are or have been a TA shall not disclose information about tests and grades of other students.
   D. Do not disclose or use information learned from the internships that have to do with processes, or techniques of production.
5. **Engineering students shall not be influenced in their scholastic duties by conflicting interests.**
   A. Do not attempt to receive a favorable grade or recommendation by establishing an unprofessional relationship with a professor.
   B. In peer assessments or as a TA, do not allow friendships or grades to sway judgment
   C. Do not attempt to gain favor in class or for assignments through flattery of professors.

6. **Students should not attempt to gain advancement by downgrading other students' work or by other questionable methods.**
   A. Credit should be awarded where it is deserved when submitting group work.
   B. If another student does exceptional work, do not take credit for it if it is not your work.
   C. If another student is performing inadequate work, calmly confront them about it before addressing it to the professor.
   D. Students shall not sabotage the projects or advancements done by other students.
   E. Do not blame group members for their own behavior.
   F. Do not blame professors or staff for their grades.
7. **Engineering students should not attempt to injure the reputation of the engineering department or the reputation of professors and engineers in the department.**
   A. If other engineering students are injuring the reputation of the department, you should inform the head of the department or the professor of their actions.
   B. Every student in the department's actions should coincide with the integrity policy of the college to avoid degrading the department.
   C. Students shall report malicious activities to the Head of the Engineering Department, or appropriate instructor. Yet, the student shall not tell others of the issue.
8. **Engineering students should accept personal responsibility for all of the work they do for the department and for their group.**
   A. Students shall act truthfully when accused of misconduct.
   B. Blame for violations of the integrity policy should not be placed on the department or professors, but rather on the individual who committed them.
   C. Students should also accept the blame if their group submits unethical work because it is their responsibility to ensure any submission with their name on it is held to high ethical standards.
9. **Engineering students shall give credit for engineering work to those to whom credit is due, and will recognize the proprietary interests of others.**
   A. Students shall not steal programs or work from other engineers or students from the internet through illegal networks.
   B. Students shall properly cite information in all manners of presentation such as research papers, essays, PowerPoints, etc.

Obligations written by Etown Engineering students Class of 2021
Cannons adapted from: https://www.nspe.org/resources/ethics/code-ethics