Engineering Dynamics  
PHY/EGR 321.001 Syllabus – Spring 2019

GENERAL COURSE INFORMATION
Name and Department: Dr. Harry D. Downing, Professor of Physics, Department of Physics, Engineering and Astronomy  
Instructor Homepage: http://www.physics.sfasu.edu/downing/downing.htm  
Office: Room 207A Cole STEM Building  
Office Hours: 11:00-11:50 M-F; 2:30-3:30 T-R, or by appointment/207A Cole STEM Bldg.  
Phone, Fax, E-mail: 468-2290 or 468-3001, Fax: 468-4448, hdowning@sfasu.edu  
Class Meeting Times and Place: 10:00-10:50 MWF, 2:30-5:20 M, Room 103 Cole STEM Bldg.  
Physics Homepage: www.physics.sfasu.edu  
Course Homepage: http://www.physics.sfasu.edu/downing/321HomePage.htm  

Text: Vector Mechanics for Engineers: Statics and Dynamics (12th Ed.) by Beer, Johnston, Mazurek, Cornwell, Self  

COURSE DESCRIPTION  
Basic theory of engineering mechanics, using calculus, involving the motion of particles, rigid bodies, and systems of particles; Newton's Laws; work and energy relationships; principles of impulse and momentum; application of kinetics and kinematics to the solution of engineering problems. Hamiltonian and Lagrangian mechanics. Four semester hours, three hours lecture, three hours lab per week. Prerequisite: EGR 250. Lab fee required. PHY 321 and EGR 321 are cross-listed.  

This is the intermediate level course in dynamics that employs various problem solving methods and the laws of mechanics to analyze and obtain solutions to fundamental problems in engineering and physics.  

PROGRAM LEARNING OUTCOMES  
- Knowledge: The student will demonstrate knowledge and comprehension of the basic and applied fields of physics.  
- Problem Solving: The student will develop independent problem solving skills.  
- Written Communications: The student will develop effective written communication skills by clear and concise problem solving, well-structured laboratory reports, and accepted formatting of research papers.  
- Oral Communications: The student will develop effective oral communication skills in oral presentations of problem solution, seminars, and oral presentations at scientific meetings.  

GENERAL EDUCATION CORE CURRICULUM OBJECTIVES/OUTCOMES  
This course is not included in the general education core curriculum.  

STUDENT LEARNING OUTCOMES  
By the end of the course, successful students will be able to:  
- Demonstrate an advanced level knowledge and understanding of the laws of classical mechanics to include representing these laws in mathematical expressions with appropriate units for physical quantities.  
- Show quantitative and analytical skills necessary to solving physics/engineering problems.
Exhibit effective written communication skills in presentations of physics/engineering homework problems.

Exhibit effective oral communication skills in presentations of physics/engineering problems to one’s peers.

COURSE OBJECTIVES
The main objective of this course in mechanics is to develop in the engineering/physics student the ability to analyze any problem in a simple and logical manner and to apply to its solution a few, well-understood, basic principles. A cooperative problem solving approach is taken where students develop time management skills and teaming skills.

COURSE REQUIREMENTS/GRADING POLICY

- There will be seven to eight exams during the lab this semester. Each problem on an exam will be regarded as an individual test. For example if the exam has three problems, then there will be three test scores entered in the grade sheet. Your three worst test scores will be dropped. Test dates and what the tests will cover will be announced in class. These tests (individual problems) will comprise the bulk of your grade in this course. Poor performance on any test problem will result in a personal visit to the instructor’s office. The tests will be done in symbolic form, therefore, no calculators will be allowed. The final examination period will consist of three to four problems and it will not be comprehensive. It will cover Lagrangian and Hamiltonian formulations. The problems on the final cannot be one of the three that will be dropped.
- All students must do one conference with the course instructor during the semester regardless of what their test scores are. This conference will be part of your lab grade.
- Homework portfolio will be worth 1/16th of your overall grade.
- Oral presentations, attendance, and performance during the problem sessions (PHY/EGR lab) will be 1/8th of your overall grade.

Format for PHY/EGR 321 Homework Portfolio
Your homework problem portfolio will be of professional quality and professionally presented. The problems will be complete in themselves to the extent that any competent person, without reference to any material other than what you present, can determine the following: (a) the problem you are solving, (b) your method of solution, and (c) your answer. To assure these things you must adhere to the following rules:

1. Use engineering pad paper for your portfolio.
2. Before submitting the portfolio problems for review, check for the following:
   - Problem number and word for word statement of the problem
   - Problems neat and in correct order
   - Organized steps in the solution
   - Identification of the answers with boxes
   - Sufficient space for grader comments
   - No more than one problem per page
   - No pages with work on the back side
   - Homework left flat (not folded)
   - Pencil used instead of ink
3. Include the following when appropriate while working a problem:
   - Sketch
   - Definition of variables used
   - Units and vector arrows
   - Numbering of equations for clarity
   - Needed graphs at the back of the problem

Homework Portfolio Rules
The homework portfolio will be reviewed twice during the semester, once at midterm and once at the end of the semester during the last week of classes.
During the semester you may have one homework problem will be required to have a formal submission. Advance notice will be given. The submission must be a Word document using some form of a math editor and must have the look of a paper being submitted for publication. It will be graded and returned for corrections. It will be resubmitted for a second grading. The two grades will be averaged together and will count as 30% of your portfolio grade. This will not be done this semester and thus not count as 30% of your portfolio grade.

Grading Scale
Grades will be assigned according to the following percentages:
- 90 - 100% A
- 80 - 89% B
- 70 - 79% C
- 60 - 69% D
- 0 - 59% F

Miscellaneous Information
Students will have one week after the return of their graded exams/quizzes to discuss any possible errors made in the grading. Thereafter, no changes will be made concerning the grades for that exam. Keys to each exam will be posted online.

This syllabus is just a guide. If you miss an exam with a reasonable excuse, you will be allowed to take a make-up exam part of which will be oral. Reasonable excuses must be written and from the proper authority. Each problem given in an exam period will be considered to be a separate exam. For example if the first exam period has three problems, they will be considered to be exams 1, 2, and 3 and so on. Of the x number of exams, your (x-3) best exams will be counted toward your final grade. Test dates and what the tests will cover will be announced in class.

HINTS FOR SUCCESS IN PHY/EGR 321
You will benefit much more from lecture if you read the text material before coming to class. Attend class and take notes. Don’t try to copy everything I say, write on the board, or show in slides or video. Leave enough space in your notes to complement them through a thorough reading of the text material. I generally present material in class in the same order as the text. This makes it easier for you to augment your notes. Read the “Solving Problems on Your Own” sections preceding the problems and the “Review and Summary” section at the end of each chapter. If you have problems trying to comprehend this material, please do not hesitate to come and visit with me. I have truly enjoyed working with students, and often I have found that I am most effective with them when they have brought their questions and problems to me in my office.
The most important things you can do are read the book, attend class and be attentive, and do the homework!!!
ATTENDANCE
Absences from lab must be made up through extra homework. The first absence incurs one extra homework problem. Any further absences will incur three extra homework problems for each absence occurrence. Each of these extra homework problems must be submitted until each is completely correct. A deadline will be set for the completion of each extra problem. Failure to meet this deadline will increase the number of problems required. Failure to complete all extra homework by the end of the semester will result in a one letter grade reduction in your final grade in this course. Every four absences from lecture will count as if it were one lab absence, and lab absence rules will apply. Every four tardies (five minutes or more late) to lecture or lab will count as one lecture absence. Five unexcused absences from lecture and/or lab will result in a grade reduction of one letter grade. Seven will result in an F for the course. Absences from classes before and after breaks will count as double absences. (They will count as single absences toward letter grade reductions.) Failing to confirm the watching of a video lecture will count as a lecture absence. To get presentation points you must be present in class when the problem is presented to the rest of the class. Students should become familiar with the policies on cheating and plagiarism.

CLASSROOM POLICIES
For the benefit of your fellow students and your instructor, you are expected to practice common courtesy with regard to all course interactions. For example:
- Be considerate toward your classmates and instructor and **arrive to class on time**.
- Do not leave class early and do not create distractions in preparation to leave before class is dismissed.
- Avoid classroom disturbances. Be attentive in class, stay awake, and do not read newspapers, etc. While in class your readings should be confined to the course text and notes.
- If you are late to class or must leave early, please inform your instructor in advance and enter or leave quietly.
- Cell phones, pagers and other communication devices must be **turned off** during class. Confiscation may result for non-compliance or you may be asked to leave the class and be counted absent.
- Be kind and respectful to your fellow students and your teachers.

EMAIL COMMUNICATIONS
Make sure you always use your SFA e-mail account for network correspondence. Messages from your instructor will be sent to your SFA email account periodically. To get a free SFA email account go to https://apache.sfasu.edu/accountman/. You may forward e-mail from your SFA e-mail address to another address of your choice. To do this, use this link: https://apache.sfasu.edu/accountman/mailindex.html.

Academic Integrity (A-9.1)
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

Definition of Academic Dishonesty
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of
another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/4.1-student-academic-dishonesty.pdf

**Withheld Grades Semester Grades Policy (5.5 (Old policy A-54))**
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

**Students with Disabilities**
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

**EMAIL COMMUNICATIONS**
Make sure you always use your SFA e-mail account for network correspondence. Messages from your instructor will be sent to your SFA email account periodically. You may forward e-mail from your SFA e-mail address to another address of your choice. To do this, use this link: http://development.sfasu.edu/mysfa/o365/student/forwarding-email/

**Student Code of Conduct: Policy 10.4**
Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program. Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This policy applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the iCare: Early Alert Program at SFA. Information regarding the iCare program is found at http://www.sfasu.edu/judicial/earlyalert.asp or call the office at 936-468-2703.

**STUDENT COUNSELING CENTER**
Rusk Building 3rd Floor, Phone: (936) 468 -2401; Email: counseling@sfasu.edu
The Student Counseling Center is available free of charge to students and is staffed with professional therapists to meet a variety of needs. All interactions with the Student Counseling Center are guaranteed confidential. Licensed Counselors are available from 8:00 a.m. -5:00 p.m. Monday -Friday. The department is closed on certain holidays, Spring Break and Winter Break when the university is closed. If you are in need of assistance after hours or on the weekend please call: University Police: (936)468-2608 or MHMR Crisis Line: (800)392 -8343. If the situation is life threatening please dial 911.
### Tentative Course Outline and Calendar
### Spring 2019
### Course Calendar

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<th>TUE</th>
<th>WED</th>
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<td><strong>Chapter 11 Kinematics of Particles</strong></td>
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<td>Motions - rectilinear, relative, curvilinear and non-rectangular</td>
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<td>MLK Holiday</td>
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<td><strong>Chapter 12 Kinetics of Particles</strong></td>
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<td><strong>Chapter 13 Energy &amp; Momentum</strong></td>
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<td>Work and energy, impulse and momentum, conservation of energy and momentum</td>
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<td><strong>Chapter 14 Systems of Particles</strong></td>
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<td><strong>Chapter 15 Kinematics of Rigid Bodies</strong></td>
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<td>Translation and fixed axis rotations, general plane motion, rotating reference frames.</td>
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<td><strong>Chapter 16 Plane Motion of Rigid Bodies</strong></td>
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<td>Kinetics of rigid bodies, forces &amp; accelerations</td>
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<td><strong>Chapter 17 Plane Motion of Rigid Bodies</strong></td>
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**Finals**