

Analytical Dynamics
EML 5215 Sections 13191-13194
Class Periods: MWF, Period 8, 3:00 – 3:50 PM
Location: Online
Academic Term: Fall 2020

Instructor:

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Office Hours: Wednesday/Friday 2:00-3:00 PM, Zoom Meeting ID: 981 7469 1764

Teaching Assistant:

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Course Description

EML 5215 Analytical Dynamics I: 3 Credits.

Analytical methods of statics and dynamics. Principle of virtual work, holonomic and nonholonomic constraints. Lagrange equations for constrained and unconstrained systems, conservation laws, stability analysis by perturbation about steady state, Jacobi first integral, generalized impulse and momentum.

Course Pre-Requisites / Co-Requisites

N/A

Course Objectives

The objective of this course is to provide a thorough and systematic introduction to the subject of dynamics of particles and rigid bodies from a Newton-Euler and analytical mechanics perspective. The course emphasizes a first-principles approach to the development of theory and its application to a range of problems of interest.

Required Textbooks and Software

DYNAMICS OF PARTICLES AND RIGID BODIES: A SYSTEMATIC APPROACH

Author: ANIL V. RAO

ISBN: 0521858119

Publisher: CAMBRIDGE

Year: 2006

Approximate Course Schedule

Week 1-2:	Introductory concepts	(Rao, Chapter 1)
Week 3-5:	Kinematics	(Rao, Chapter 2)
Week 6-7:	Kinetics of particles	(Rao, Chapter 3)
Week 8-9:	Kinetics of systems of particles	(Rao, Chapter 4)
Week 10-11:	Kinetics of rigid bodies	(Rao, Chapter 5)
Week 12-14:	Lagrangian dynamics	(Rao, Chapter 6*)

[*Chapter 6 of the textbook is not included in the print version but will be provided]

Online Course Recording

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

Attendance Policy, Class Expectations, and Make-Up Policy

All classes will be recorded and made available online through Canvas. Some classes may be held synchronously at the class time to allow student participation through Zoom. These classes will also be recorded and made available on Canvas. Please note the course policy on **Online Course Recording**

Notes from online classes will **not** be available. It is your responsibility to make your own record of the class content. You are expected to follow and review the course content in the **Course Textbook** for additional material that I may not have time to present fully in class.

The dates of the class exams are available at the beginning of the course. It is your responsibility to ensure you will be able to complete the exams on those date. In extreme cases I will consider arranging a make-up exam for students with extenuating circumstances. Contact me at your earliest possible opportunity if you feel this applies to you. Excused absences must be in compliance with university policies in the Graduate Catalog (<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>) and require appropriate documentation.

ONLY FOR STUDENTS IN HYBRID SECTION – 13191

Students enrolled in the hybrid section are required to participate in one in-person class during the semester. This activity will be scheduled and arranged once class numbers are finalized

Face-to-Face Course Policy

In response to COVID-19, the following policies and requirements are in place to maintain your learning environment and to enhance the safety of our in-classroom interactions.

- You are required to wear approved face coverings at all times during class and within buildings. Following and enforcing these policies and requirements are all of our responsibility. Failure to do so will lead to a report to the Office of Student Conduct and Conflict Resolution.
- This course has been assigned a physical classroom with enough capacity to maintain physical distancing (6 feet between individuals) requirements. Please utilize designated seats and maintain appropriate spacing between students. Please do not move desks or stations.
- Sanitizing supplies are available in the classroom if you wish to wipe down your desks prior to sitting down and at the end of the class.
- Follow your instructor's guidance on how to enter and exit the classroom. Practice physical distancing to the extent possible when entering and exiting the classroom.
- If you are experiencing COVID-19 symptoms ([Click here for guidance from the CDC on symptoms of coronavirus \(Links to an external site.\)](#)), please use the UF Health screening system and follow the instructions on whether you are able to attend class. [Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms \(Links to an external site.\)](#).
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. [Find more information in the university attendance policies \(Links to an external site.\)](#).

Evaluation of Grades

Assignment	Percentage of Final Grade
Exam 1 (take-home)	50%
Exam 2 (take-home)	50%
TOTAL	100%

Grading Policy

Percent	Grade	Grade Points
92.0 - 100	A	4.00
89.0 - 91.9	A-	3.67
86.0 - 88.9	B+	3.33
82.0 - 85.9	B	3.00
79.0 - 81.9	B-	2.67
76.0 - 78.9	C+	2.33
72.0 - 75.9	C	2.00
69.0 - 71.9	C-	1.67
66.0 - 68.9	D+	1.33
62.0 - 65.9	D	1.00
59.0 - 61.9	D-	0.67
0 - 58.9	E	0.00

More information on UF grading policy may be found at:

<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: <https://care.dso.ufl.edu>.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.