Syllabus
ME 56200 – Advanced Dynamics
(Spring 2017)

Instructor Contact Information:
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Teaching Assistants:
Devin Kalafut – (dkalafu@purdue.edu)
Haitian Hao – (haoh@purdue.edu)

Class Time and Location:
TR 1:30– 2:45 pm, Seng-Liang Wang Hall room #2555
Attendance at class lectures is required. You will be responsible for additional information provided during class time.

Attendance:
Attendance at class lectures is required for on-campus students. All students are responsible for additional information provided during class time.

Access to recorded lectures:
Access to recorded lectures is granted to all students. However, on-campus students are required to attend lectures and should use the recordings only in exceptional cases (e.g. missed class due to conferences or illness). The access information will be provided in a separate file uploaded on Blackboard.

Office Hours:
On-campus students: MW 2-3pm (1016 HLAB) or by appointment.
Off-campus students: Webex sessions will be hold on TR at 7-8pm EST. Webex login information will be provided in a separate email. Phone appointment with the instructor or the TAs can also be required.

A "Discussion Board" on Blackboard is setup for Q&A about the topics discussed in the course. This method of communication is preferred over individual emails. The threads will be organized by chapters and topics. Students having questions should read existing threads and, if the question is not addressed, should start a new thread. The discussion board will be administered by the instructor and the TAs.

Catalog Description

The course will cover fundamental concepts on the dynamics of multi-degrees-of-freedom mechanical systems, holonomic and non-holonomic constraints, Lagrange's equations of motion, Hamilton's principle for holonomic systems, kinematics and kinetics of rigid body motion, including momentum and energy methods, linearized equations of motion, classification of vibratory systems, stability of linear systems, divergence and flutter, applications to gyroscopes and satellite dynamics.

Course Objectives:

Upon successful completion of this course, you will be able to understand advanced concepts necessary for the analysis of the dynamics of complex systems. In particular, you will be able to:

- Develop equations of motion of complex systems of particles and rigid bodies.
- Understand and analyze the kinematics of particles, systems of particles, and rigid bodies.
- Write equations of motion of complex dynamical systems using Lagrangian and Hamiltonian mechanics approaches.
- Classify and model different types of constraints.
- Understand and utilize different sets of coordinates to describe the dynamic motion.
- Assess the stability of a linear system.

Study Material:

The course will use a combination of study material:

- **Course textbook:** "*Principle of Dynamics", Greenwood D. T.*, Prentice Hall, 2th Ed., 1988. (Required)
- **Class notes**: you are strongly encouraged to collect comprehensive class notes throughout the entire course. Several information complementary to the textbook will be provided in class.

Homework:

Homework will be assigned following completion of major topics. Homework assignments will be posted on Blackboard. Please return electronic scans of your homework via Blackboard by the deadline indicated online. Note that Blackboard will not accept submissions after the deadline. Timely submission is your responsibility.

Assignments can be typed or neatly hand-written. The solution procedure must be clearly presented.

You are allowed to discuss homework with your classmates, however the work that you submit should be your own original contribution.

Note: some homework might require use of software to perform calculations. The choice of the specific software is left to you. Matlab, Mathematica, Maple, Fortran, C++ can all be used. Please make sure you have access to the software of your choice before assignments start.

Late Assignment Policy:

A grade reduction will be applied for assignments turned in late:

- 30% within 1 day (after due date)
- 60% within 2 days (after due date)
- 100% for more than 2 days

The deadline is the official date specified on Blackboard for any homework. Homework turned in any time after the deadline are considered late. Exceptional cases can be discussed with the instructor ahead of the homework deadline.

Exams:

The examination will consist in one midterm exam (administered during regular lecture time) and a final exam. Exams are **closed** books/notes. Only a handwritten formulary is admitted. A one page, single-side formulary (letter paper format) will be admitted for the midterm. A one page, double-side formulary (letter paper format) will be admitted for the final. The formulary must be turned in with the exam and will be returned to you with the graded exam.

	Date*	Time	Room
Midterm	02/28/2017	1:30-2:45 PM	Seng-Liang Wang Hall room #2555
Final	TBA	TBA	TBA

*Tentative date

Off-campus students: the general exam rules discussed above apply also to off-campus students. The exam will be administered via a local proctor. The student is responsible for taking arrangements with the proctor for the exam. Specific questions about local proctors and the detailed exam modalities should be addressed to Sarah Post (sepost@purdue.edu).

Note: there will be no make-up examinations unless a student contacts the instructor prior to an exam about extenuating circumstances that do not allow the student to take the exams on schedule.

Re-Grading Policy:

Any request of re-grading (either homework or exams) should be made within 7 days from the day the homework/test is returned.

Course Grading Policy:

Final course grades will be based on the following:

- Homework 15%
- Midterm exam 40%
- Final exam 45%

Honor Code:

You are expected to understand and abide by the principles and procedures set forth in the Purdue University Academic Code of Honor and uphold the pledge: "we students must follow the Regulations Governing Student Conduct of Purdue University out of a sense of mutual respect, rather than out of fear of the consequences of their violation". This code is strictly enforced by ME 56200 course personnel. For questions regarding the honor code, please visit the following website: http://www.purdue.edu/studentregulations/student_conduct.

Students with Disabilities:

Any student who has a documented disability and is registered with Disability Services should speak with the professor as soon as possible regarding accommodations. Students who are not registered should contact the Disability Resource Center - http://www.purdue.edu/disabilityresources/.