Physics 305

Classical Dynamics

Fall, 2012

Prerequisites:	Students must have taken and passed General Physics II(PHY122) & Differential Equations(MAT300).
Instructor:	Charles Benesh
Phone:	x5265
e-mail:	cbenesh@wesleyancollege.edu
Web:	http://www.wesleyancollege.edu/faculty/cbenesh
Office Hours:	M 1:30-2:30 Tu-Th 9:45-11 W 10-11 F 4:30-5:30
Grading:	44% - 4 Exams 45% - Weekly Homework and Quizzes 11% - Laboratory Project
Text:	*Classical Dynamics of Particles and Systems* by Marion & Thornton, Fifth Edition,
Web:	http://pierce.wesleyancollege.edu/faculty/cbenesh
Office Hours:	to be announced
Grading:	44% - 4 Exams 45% - Weekly Homework and Quizzes 11% - Project

- **Exams:** Periodic exams will be given in class, per the attached schedule. The exams will consist of questions similar/related to the homework problems.

  There will be four exams given, the last during the scheduled final exam period.

- **Lecture Attendance:** Regular attendance in class is both expected and recommended. Generally, quizzes are only given when attendance falls below 70%. Therefore, the day you don't show up is more likely to have a quiz.....

- **Quizzes:** I reserve the right to give unannounced in class quizzes which will count towards the homework portion of your grade. No makeup quizzes will be given.

- **Homework:**Homework will be due on Fridays, at 5 pm.

- **Late Homework:** Homework or other assigments that are turned in late will be penalized one point per day, including weekends and holidays.

- **Student Project:**Each student is required to complete a project on a topic that is related to the topic of this course. Projects will have a significant practical component involving the successful completion of an experiment or simulation, and a presentation of results at the end of the semester. The topic and scope of each project is to be determined in consultation with the instructor.

  A successful Project will consist of a short(1-2 page) proposal outlining the nature and scope of the project, due three weeks into the semester(10 points, due three weeks into the semester on Sept 10), two progress report(15 points, due at mid-term, oct 10, and Nov 9), a twenty minute final oral presentation of your results(20 points), and a final written report(50 points).

Class Schedule - Classical Dynamics

Aug	22	Coordinate Transformations
	24	Rotations
		READ: Chapter 1
Aug	27	Matrices
	29	Vector Calculus Review I
	31	Vector Calculus Review II
		READ: Chapter 1
Sep	3	NO CLASS
	5	Newton's Laws
	7	Retarding Forces
		READ: Chapter 2
Sep	10	Conservation Laws - Project Proposal Due
	12	Energy Methods
	14	Exam I - Chapters 1 and 2
		READ: Chapter 2&3
Sep	17	Harmonic Motion
	19	Damped Oscillators
	21	Driven Oscillators
		READ: Chapter 3
Sep	24	Superposition and Fourier Series
	26	Non-Linear Oscillations
	28	Phase Diagrams
		READ: Chapter 4
Oct	1	Plane Pendulum
	3	Hysteresis
	5	Chaos
		READ: Chapter 4
Oct	81	NO CLass
	10	Gravitational Potential - Project Progress Report Due
	12	Exam II (Ch 3-5)
		READ: Chapter 5

Oct	15	Equipotentials
	17	Calculus of Variations
	19	Euler's Equation
		READ: Chapters 5 and 6
Oct	22	Constrained Systems
	24	tba
	26	tba
		READ: Chapter 6 and 7
Oct	29	Functional Derivatives
	31	Hamilton's Principle
Nov	2	Lagrangian Dynamics
		READ: Chapter 7
Nov	5	Virial Theorems
	7	Conservation Laws
	9	Hamiltonian Dynamics - Progress Report Due
		READ: Chapter 7 and 8
Nov	12	Central Force Motion
	14	The Effective Potential
	16	Orbits in a Central Field(Exam III)
		READ: Chapter 8
Nov	19	Orbital Dynamics
	21	NO CLASS
	23	NO Class
Apr	26	Stability of Circular Orbits
	28	Multi-particle Systems
	30	Collisions
		READ: Chapter 9
Dec	3	Cross Sections
	5	Rutherford Scattering
Dec	10	Final Exam(10:45 AM) - Project Presentations