Course Name: Dynamics
Course Code: ENSC-306
Semester: Spring Semester

Classroom Number: 306
Scheduling: Mon.-Wed 3:35 pm-5:00 pm

Instructor Data:
Name: Marzena Ciszak, PhD
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Office hours: t.b.a.

Prerequisites: according to the Gonzaga Spokane requirements (check on-line)

Course Description
In this course we will develop and apply the physical principles and mathematical techniques for the analysis of motion of masses, that is Dynamics. Topics will include mainly the kinematics and kinetics of a particle and an introduction to the dynamics of rigid bodies. In particular we will analyse the equations of motion in different reference frames, the principle of work and energy, impulse-momentum formulations, the conservation of energy and momentum (linear and angular) as well as relative motion. It is important to develop a "feel" for what the various equations and vector representations signify, and for how properly represent a given physical situation using scientific diagrams. The students will be able to identify the correct tools to solve a particular problem and to interpret the physical significance of the equations used. The realization of an experimental project will help them to appreciate the link between theory and real world experience.

Learning Outcomes
At the completion of this course, students will be able to:

- demonstrate the basic understanding of theory and fundamental physical concepts in Dynamics
- apply mathematical methods, diagrams and calculus to solve problems
- work in a team to solve problems and communicate solutions of the problems to the class
- realize simple experiments, analyse, interpret and communicate observational data
- apply the Dynamics concepts to interdisciplinary problems

Outdoor Activities
- Class visit to the Museum FirST (Firenze Scienza e Tecnica), the Physics Cabinet equipped with a remarkable collection of instruments for the teaching and experimentation of physics.
- Class visit to the Museum “Le Macchine di Leonardo” in Florence, the world’s biggest collection of Leonardo da Vinci machines.

Teaching Method and Assignments
The course will mainly consist of blackboard and power point presentations, supported with multimedia and in-class demonstrations. Particular attention will be payed to classical physics and engineering problems, though some interdisciplinary examples will be discussed. Students will be encouraged to divide themselves in small groups and work on assigned homework problems which will be then presented at the blackboard. Student teams will be asked to prepare a final project consisting in the design of an in-class experiment demonstrating given topic from Dynamics.
Assessment of Achievements
The course grade will be established using the following weight factors:

- attendance 10%
- homework 20%
- project 20%
- midterm exam 25%
- final exam 25%

Students will carry on one midterm and one final comprehensive exam. The midterm exam will cover the first half of the course, and the final exam will be comprehensive. A study guide will be provided before the midterm and final exams. The class attendance and active participation are essential to success with the course.

Grades Conversion
A = 94-100; A - = 90-93; B+ = 87-89; B = 84-86; B- = 80-83; C+ = 77-79; C = 74-76; C- = 70-73; D+ = 67-69; D = 65-66; F = below 65

Reference textbook
*Engineering Mechanics–DYNAMICS* by Hibbeler, Pearson, 12th or 13th Ed.