BARTON COMMUNITY COLLEGE
COURSE SYLLABUS

I. GENERAL COURSE INFORMATION

Course Number: PHYS 1604
Course Title: Engineering Physics I
Credit Hours: 5 Credit hours
Prerequisites: Prerequisite or concurrently MATH 1832 Analytic Geometry and Calculus I
Division/Discipline: Academics Division-Liberal Arts and Sciences/Physics
Course Description: Engineering Physics I (and associated laboratory experience) is the study of translational and rotational motion, force, work, mechanical and thermal energy, linear and angular momentum, mechanical waves, and fluid mechanics using the tools of algebra, trigonometry, and calculus.
Students enrolled in Engineering Physics I are required to enroll in the accompanying Engineering Physics I Lab.

II. INSTRUCTOR INFORMATION

III. COLLEGE POLICIES

Students and faculty of Barton Community College constitute a special community engaged in the process of education. The College assumes that its students and faculty will demonstrate a code of personal honor that is based upon courtesy, integrity, common sense, and respect for others both within and outside the classroom.

Plagiarism on any academic endeavors at Barton Community College will not be tolerated. The student is responsible for learning the rules of, and avoiding instances of, intentional or unintentional plagiarism. Information about academic integrity is located in the Student Handbook.

The College reserves the right to suspend a student for conduct that is determined to be detrimental to the College educational endeavors as outlined in the College Catalog, Student Handbook, and College Policy & Procedure Manual. (Most up-to-date documents are available on the College webpage.)

Any student seeking an accommodation under the provisions of the Americans with Disability Act (ADA) is to notify Student Support Services via email at disabilityservices@bartonccc.edu.

IV. COURSE AS VIEWED IN THE TOTAL CURRICULUM

Engineering Physics I is a general education course, satisfying the requirements of science-related majors which require a calculus-based physics course. It also fulfills the general education 5-hour laboratory class requirement in non-science curricula. This course transfers to all Regent schools in Kansas. However, requirements vary among institutions, and even within departments, and often without much notification. Thus, it is the student's responsibility to be in contact with the transfer institution throughout his/her tenure at Barton Community College to ensure that the student is enrolling in the most appropriate set of courses for the transfer program.

The learning outcomes and competencies detailed in this course syllabus meet or exceed those specified for this course by the Kansas Core Outcomes Groups project, and as approved by the Kansas Board of Regents – http://kansasregents.org/transfer_articulation.

V. ASSESSMENT OF STUDENT LEARNING

Barton Community College is committed to the assessment of student learning and to quality education. Assessment activities provide a means to develop an understanding of how students learn, what they know, and what they can do with their knowledge. Results from these various activities guide Barton, as a learning college, in finding ways to improve student learning.

<u>Course Outcomes, Competencies, and Supplemental Competencies:</u>

A. Evaluate situations involving Engineering Physics I topics by choosing the appropriate conceptual frameworks.
   1. Use clues within the statement of a problem to choose appropriate equations and/or principles.
   2. Express answers to conceptual questions (either orally or in writing) based on an understanding of basic physics principles.

B. Recall relevant physical models and successfully apply these models using techniques of symbolic and numerical analysis in order to generate solutions to problems in Physics I topics.
   1. Recall (verbally or in writing) overarching principles and models – along with key associated equations – related to Physics I.
      a. Kinematics: describing motion in terms of position, displacement, velocity, acceleration, angular velocity, and/or angular acceleration.
      b. Scalars, vectors, and vector components.
      c. Newtonian mechanics: predicting motion using force, mass, momentum, work, kinetic and potential energy, and torque.
      d. Conservation of energy, momentum, and angular momentum.
      e. Pressure, density, and flows within fluids.

2. Symbolically manipulate linear equations, quadratic equations, trigonometric functions, derivatives and integrals to solve to problems.

C. Think critically by utilizing problem solving techniques to evaluate and analyze context rich, multi-step problems in Engineering Physics I topics, selecting relevant information, selecting an approach to solving the problem and carrying out the analysis needed to generate and communicate solution(s).
   1. Convert “story problems” into appropriate mathematical form.
   2. Apply skills from algebra, trigonometry, and calculus to solve problems.
   3. Apply graphical methods to describe and solve kinematics problems.
   4. Apply proportional reasoning to relate and/or rank values in two or more related situations.
   5. Write clear, organized solutions to problems.

D. Perform measurements using physical apparatus, analyze the collected data including appropriate treatment of errors and uncertainties, generate and communicate conclusions based on the data and analysis for experimental investigations in Engineering Physics I topics.
   1. Demonstrate the use of apparatus found in an Engineering Physics I laboratory, such as metersticks, spring scales, protractors, computer-based sensors, low-friction carts & tracks, assorted masses, springs, and pendulums.
   2. Accurately collect and record data, including appropriate units and appropriate expressions of uncertainty.
   3. Propagate uncertainties to obtain uncertainties in calculated results from initial measurements to final calculated results.
   4. Complete laboratory reports that summarize the knowledge gained by doing the experiments.

VI. INSTRUCTOR'S EXPECTATIONS OF STUDENTS IN CLASS

VII. TEXTBOOKS AND OTHER REQUIRED MATERIALS

VIII. REFERENCES

IX. METHODS OF INSTRUCTION AND EVALUATION

Since laboratory activities are integral to the learning outcomes of this lab science course, students must pass the laboratory portion of the class in order to successfully complete (“pass”) the course.

X. ATTENDANCE REQUIREMENTS

XI. COURSE OUTLINE