SYLLABUS

Department: Engineering and Physics   **Credit Hours:** 3 hours
Course Number: PHY 530

I.   **Title**:
        PHY 530 – Mechanics I

II.   **Catalog Description**: Dynamics of particles, coordinate transformation, and non-inertial reference
        systems, Celestial mechanics, Dynamics of systems of particles. Prerequisites: PHY 255 and MAT 338 (or
        concurrent registration).

        Prerequisites by Topic:
        1.   Calculus-Based Treatment of Elementary Statics and Dynamics
        2.   Motion in One, Two, and Three Dimensions
        3.   Newton's Law of Motion
        4.   Conservation of Energy, Momentum, and Angular Momentum
        5.   Torque and Moment of Inertia
        6.   Coulomb's Law of Electrostatics
        7.   Electric Force and Electric Field
        8.   Electric Potentials, Capacitors, Resistors
        9.   Magnetic Force and Magnetic Field
        10.   Magnetic Flux and Electromotive Force
        11.   LRC Circuits and Kirchoff's Rules
        12.   Geometric Optics, Reflection and Refraction
        13.   Ordinary Differential Equations
        14.   Linear Equations with Constant Coefficients
        15.   Systems of Equations

III.   **Purpose**: This course is designed to provide students with an understanding of dynamics of macroscopic
        world and quantitative description of motion, force, and acceleration.

IV.   **Course Objectives**: The student should gain an understanding of, and proficiency in the following:
        A. The experimental foundations upon which physics is based.
        B. The development of physical laws, and their expression in the form of mathematical models.
        C. The application of physical laws in the solution of problems.
        D. The development of analytical, logical thought processes which are required for problem solution, and
            which are also applicable in analyzing situations which occur in everyday life.

V.   **Content Outline**:
        1.   Introduction to Vector Algebra and Vector Calculus
        2.   Rectilinear Motion of a Particle
        3.   Time, Position, and Velocity Dependent Forces
        4.   Harmonic, Damped, Nonlinear, Forced Oscillators
        5.   General Motion of a Particle in Three Dimensions
        6.   Noninertial Reference Systems and Dynamics of a Particle in Such Systems
        7.   Central Force and Celestial Mechanics (5 classes)
        8.   Dynamics of System of Particles and Rocket Motion
        9.   Mechanics of Rigid Bodies
        10.   General Motion of Rigid Bodies
        11.   Lagrangian Mechanics
        12.   Hamilton's Equations

VI.   **Instructional Activities**: Lecture, discussion, problem solution, and examinations.

VII.   **Field, Clinical, and Laboratory Experiences**: N/A

VIII. **Resources**:
Semester: Spring 2013
Instructor: H. R. Kobraei, BL 169 & BL 112
Classroom: Blackburn 135
Class times: 8:00-9:15 TR
Office hours: Posted outside office door. Appointments may be made at times other than posted office hours.

IX. **Grading Procedures**: Performance on regular examinations, homework sets, and a comprehensive final exam will be considered in determining the course grade.

Three Hourly Exams   60%
Homework   40% - To be completed according to assigned format

A= 90-100   B= 80-89   C= 70-79   D= 60-69   E= 0-59

X. **Attendance Policy**: **Attendance record will be kept**. Each student will be held responsible for all material covered, homework assignments made, changes in exam time, etc. that have occurred during the class periods.

Make-up: Permission from the instructor prior to the due date is necessary for the make-up of any assignment. Permission from the instructor prior to the scheduled exam time is necessary for the make-up of any missed exam. Exceptions will be made in the case of sudden illness or accident if supporting statements are received from a qualified physician, addressed to the instructor, stating that the student was prevented from performing the missed task.

XI. **Academic Honesty Policy:** ACADEMIC HONESTY POLICY:
Murray State University takes seriously its moral and educational obligation to maintain high standards of academic honesty and ethical behavior. Instructors are expected to evaluate students' academic achievements accurately, as well as ascertain that work submitted by students is authentic and the result of their own efforts, and consistent with established academic standards. Students are obligated to respect and abide by the basic standards of personal and professional integrity.

Violations of Academic Honesty include:

Cheating - Intentionally using or attempting to use unauthorized information such as books, notes, study aids, or other electronic, online, or digital devices in any academic exercise; as well as unauthorized communication of information by any means to or from others during any academic exercise.

Fabrication and Falsification - Intentional alteration or invention of any information or citation in an academic exercise. Falsification involves changing information whereas fabrication involves inventing or counterfeiting information.

Multiple Submission - The submission of substantial portions of the same academic work, including oral reports, for credit more than once without authorization from the instructor.

Plagiarism - Intentionally or knowingly representing the words, ideas, creative work, or data of someone else as one's own in any academic exercise, without due and proper acknowledgement.

Instructors should outline their expectations that may go beyond the scope of this policy at the beginning of each course and identify such expectations and restrictions in the course syllabus. When an instructor receives evidence, either directly or indirectly, of academic dishonesty, he or she should investigate the instance. The faculty member should then take appropriate disciplinary action.

Disciplinary action may include, but is not limited to the following:

1) Requiring the student(s) to repeat the exercise or do additional related exercise(s).
2) Lowering the grade or failing the student(s) on the particular exercise(s) involved.

3) Lowering the grade or failing the student(s) in the course.
If the disciplinary action results in the awarding of a grade of E in the course, the student(s) may not drop the course.

Faculty reserve the right to invalidate any exercise or other evaluative measures if substantial evidence exists that the integrity of the exercise has been compromised. Faculty also reserve the right to document in the course syllabi further academic honesty policy elements related to the individual disciplines.

A student may appeal the decision of the faculty member with the department chair in writing within five working days. Note: If, at any point in this process, the student alleges that actions have taken place that may be in violation of the Murray State University Non-Discrimination Statement, this process must be suspended and the matter be directed to the Office of Equal Opportunity. Any appeal will be forwarded to the appropriate university committee as determined by the Provost.

XII. **Text**: Analytical Mechanics, 7th Ed., Fowles and Cassiday.

XIII. **Prerequisites**: Prerequisite- PHY 235 and 55, MAT 250, MAT 308

XIV: **NON-DISCRIMINATION POLICY STATEMENT:**
Murray State University endorses the intent of all federal and state laws created to prohibit discrimination. Murray State University does not discriminate on the basis of race, color, national origin, gender, sexual orientation, religion, age, veteran status, or disability in employment, admissions, or the provision of services and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford individuals with disabilities equal access to participate in all programs and activities. For more information, contact the Director of Equal Opportunity, 103 Wells Hall. 270-809-3155 (voice), 270-809-3361 (TDD).