REGULAR COURSE SYLLABUS

College of: Professional Studies

Department: Engineering and Engineering Technology

Prefix & Course Number: SSE 3160 Crosslisted With*: ___

Course Title: Mechanics of Dynamic Systems

Transcript course title (30 characters): MECHANICS OF DYNAMIC SYSTEMS

Check All That Apply: Required for Major: X Required for Minor: ___ Specified Elective: ___

Required for Concentration: ___ Elective: ___ Service Course: ___

To receive Title IV financial aid funds, all institutions of higher education must comply with the federal definition of a credit hour. The Higher Learning Commission requires institutions to maintain policies and procedures for verifying compliance with this definition.

Federal Credit Hour Definition: A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than:

(1) one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or (2) at least an equivalent amount of work as required in paragraph (1) of this definition for other activities as established by an institution, including laboratory work, internships, practica, studio work, and other academic work leading toward the award of credit hours. 34CFR 600.2 (11/1/2010)

Credit Hours: 3(3+0)

Face-to-Face or Equivalent Hours per course:

Lecture 45 Lab___ Internship ___ Practicum ___ Other (please specify type and hours):

Additional Student Work Hours per course: 90

Schedule Type: L Grade Mode: L

Variable topics umbrella course: No X Yes ___ If Yes, number of credit hours allowed ___

Specified repeatable course: No X Yes ___

APPROVED: _______________________________ 10/12/2015

Department Chair OR Program Director

_____________________________ 10-14-15

Dean OR Associate Dean

_____________________________ 1/28/16

Associate VP, Academic and Student Affairs

*If crosslisted, attach completed Course Crosslisting Agreement Form
Prefix and Course Number: SSE 3160

Prerequisite(s): SSE2150 AND MTH 3420 with ‘C’ or better grades or permission of instructor
Corequisite(s): ______
Prerequisite(s) or Corequisite(s): ______

Banner Enforced:
Prerequisite(s): SSE2150 AND MTH 3420 with ‘C’ or better grades
Corequisite(s): ______
Prerequisite(s) or Corequisite(s): ______

Registration restrictions: Level _____ Class _____ Program/Major _____ Student attribute ______

Catalog Course Description:
In this course students will be introduced to dynamics systems including kinematics, and kinetics of particles and rigid bodies with engineering applications. Students will also study the vibration systems in engineering applications.

Specific Variable Topics Course Description (if applicable, umbrella course description included above):

Required Reading and Other Materials will be equivalent to:

Specific, Measurable Student Behavioral Learning Objectives:
Upon completion of this course the student should be able to:
1. Apply the principle of kinematics of particles: Newton’s second law;
2. Apply the principle of kinetics of particles: Energy and Momentum;
3. Define system of particles;
4. Apply the principle of kinematics and kinetics of Rigid bodies; translation, Rotation, plane motion;
5. Analyze the plane motion of rigid bodies; forces and acceleration;
6. Develop equations and solve special problems dealing with impact, relative motion, and conservation of energy;
7. Analyze vibration systems.

Detailed Outline of Course Content:
I. Kinematics of Particles – Rectilinear
   A. Position, Velocity, Acceleration
   B. Cartesian Coordinate Components
   C. Uniform Accelerated Motion
   D. Motions of Several Particles
   E. Direct Integration
II. Kinematics of Particles – Curvilinear
   A. Position, Velocity, Acceleration
   B. Projectile Motion
   C. Tangential and Normal Components
   D. Radial and Transverse Components
III. Kinetics of Particles – Newton’s 2nd Law
    A. Linear and Angular Momentum
    B. Equations of Motion
    C. Alternate Components
    D. Newton’s Law of Gravitation
IV. Kinetics of Particles - Energy/Momentum
    A. Work of a Force
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B. Kinetic Energy and Principle of Virtual Work
C. Potential Energy
D. Conservation of Energy
E. Principle of Impulse and Momentum
F. Central Impact
G. Mixed Problems

V. System of Particles
A. Motion of Mass Center Newton's 2nd law
B. Newton's 2nd Law
C. Momentum formulations
D. Energy
E. Alternate Components

VI. Kinematics of Rigid Bodies
A. Translation, Rotation
B. General Plane Motion
C. Relative Motion
D. Instantaneous Center
E. Coriolis Acceleration

VII. Kinetics of Rigid Bodies - Plane Motion
A. Equations of Motion
B. Angular Momentum I Plane Motion

VIII. Kinetics of Rigid Bodies - Energy/Momentum
A. Kinetic Energy and Principle of Virtual Work
B. Conservation of Energy
C. Principle of Impulse and Momentum
D. Impact

IX. Vibration Systems
A. Free Vibrations
B. Forced Vibrations
C. Damped Forced Vibrations

Evaluation of Student Performance:
1. Assignments
2. Examinations