REGULAR COURSE SYLLABUS

College of: Professional Studies

Department: Engineering and Engineering Technology

Prefix & Course Number: SSE 3070  

Course Title: Machine Element and Mechanical Systems

Transcript course title (30 characters): Machine Element

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:

Department Chair OR Program Director  Date  10/12/2015

Dean OR Associate Dean  Date  10-14-15

Associate VP, Academic and Student Affairs  Date  1/25/16

*If crosslisted, attach completed Course Crosslisting Agreement Form
Prefix and Course Number: SSE 3070

Prerequisite(s): SSE2200, SSE3135 AND SSE3160 with ‘C’ or better grades or permission of instructor

Corequisite(s): ______

Prerequisite(s) or Corequisite(s):

Banner Enforced:
Prerequisite(s): SSE2200, SSE3135 AND SSE3160 with ‘C’ or better grades
Corequisite(s): ______
Prerequisite(s) or Corequisite(s):

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

Catalog Course Description:
The students will be introduced to the fundamental principles required to design the machine elements. The students will study combined stresses, gearing, brakes, curved beams, etc., and undertakes the design of a complete machine. The economics of design is stressed along with strength and safety considerations. The selected software will be utilized to perform engineering analyses and to produce preferred designs.

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. Demonstrate the application of methods learned to solve representative mechanical design problems.
2. Apply the fundamental principles of solid mechanics as associated with design.
3. Analyze stress factors, combine and apply principles of statics, dynamics, and material properties factors to a machine design problem.
4. Analyze a design problem establishing basic criteria and assumptions, material specifications, manufacturing processes, and estimate production costs.
5. Apply lubrication techniques and lubricants to meet various design applications.
6. Design and analyze design problems using computer software.
8. Practice recommended design procedures.

Detailed Outline of Course Content:

I. Fundamental principles
   A. Design process and iteration
   B. Problem formulation
   C. Computer-aided design and engineering
   D. Engineering report
   E. Safety factors and design codes

II. Materials
   A. Properties of metals
   B. Properties of nonmetals
   C. Material selections

III. Kinematics and loads
   A. Degree of freedom
   B. Four bar linkage
   C. Load classification and analysis

IV. Stress, strain, and deflection
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A. Principal stresses  
B. Stress concentration  
C. Deflection analysis

V. Failure theories and analysis [stacking portion]  
A. Static failure  
B. Fatigue failure  
C. Surface failure

VI. Finite element analysis[stacking portion]  
A. Finite element method  
B. Elements and meshing  
C. Boundary conditions

VII. Parts and components design  
A. Shafts, keys, and coupling  
B. Bearings and lubrication  
C. Spur gears  
D. Helical, bevel, and worm gears  
E. Springs  
F. Screws and fasteners  
G. Welding  
H. Mechanical Clutches and Brakes

VIII. Design Project  
A. Group Division  
   1. Frame  
   2. Power Transmissions  
   3. Energy Source  
   4. Notebook Keeping  
B. Mathematical Design  
C. Layout Design  
D. CAD/CAM Detail  
E. Cost Calculations-Economic  
F. Technical Presentation of Project

Evaluation of Student Performance:
1. Examinations  
2. Assignments  
3. Class projects and/or presentations and/or reports