REVISED: Spring 2013

SYLLABUS

DIVISION: Business & Engineering Technologies

CURRICULA IN WHICH COURSE IS TAUGHT: Drafting and Design

COURSE NUMBER/TITLE: MEC 211 Machine Design I

CREDIT HOURS: 4 **HOURS/WK LEC:** 3 **HOURS/WK LAB:** 3 **LEC/LAB COMB:** 6

I. CATALOG DESCRIPTION:

Introduces analytical design of bearings, clutches, couplings, brakes, springs, and power shafting. Also the catalog selection of power train mechanisms.

II. RELATIONSHIP OF THE COURSE TO CURRICULA OBJECTIVES:

Emphasizes the performance of elementary mechanical design principles to machine elements, the choice of proper machine tools, manufacturing processes and selection of materials, and the knowledge of safety practices.

III. REQUIRED BACKGROUND/PREREQUISTIES:

Each student must have a working knowledge of materials covered in MEC 131and MEC 132.

IV. COURSE CONTENT:

- Work of the Machine Designer
- Properties of Materials
- Force and Motion
- Stress and Loading
- Power and Power Transmission
- Keys and Keyways
- Pulleys and Belts
- Gears and Friction Wheels
- Couplings, Bearings, and Clutches
- Thin Walled Cylinders
- Fasteners and Seals
- Springs
- Fits, Allowances and Tolerances

V. THE FOLLOWING GENERAL EDUCATION OBJECTIVES WILL BE ADDRESSED IN THIS COURSE (Place X by all that apply)

___X___Communications

__X____Computational and Computer Skills

___X__Learning Skills

_____Understanding Culture/Society

___X___Critical Thinking

___X___ Understanding Science and Technology

___X___Interpersonal Skills and Human Relations

_____Wellness

VI. LEARNER OUTCOMES

VII. EVALUATION

Learner outcome • Understand how to distinguish between properties of different materials.	**Evaluation method** Lab exercises Written test
Learner outcome • Understand how to solve problems of force and motion	**Evaluation method** Lab exercises In class assignments Written test
Learner outcome • Understand and demonstrate an understanding of screw jacks and hydraulic jacks.	**Evaluation method** Lab exercises In class assignments Written test
Learner outcome • Understand and perform the number of teeth and gear train ratio calculations.	**Evaluation method** Lab exercises In class assignments Written test
Learner outcome • Understand and calculate various stresses, safety factors, impact loads, dynamic loads, and stress concentrations.	**Evaluation method** Lab exercises In class assignments Written test
Learner outcome • Understand and demonstrate understanding of force work and power relationships including; speed, torque and shaft design.	**Evaluation method** Lab exercises In class assignments Written test
Learner outcome • Understand and demonstrate the ability to design keys and keyways for power transmission including; square keys, flat keys and woodruff keys, springs etc.	**Evaluation method** Lab exercises In class assignments Written test
Learner outcome • Understand and demonstrate an understanding of pulley and belt selection procedures	**Evaluation method** **Lab exercises** **In class assignments** **Written test**

Learner outcome • Understand and demonstrate the ability to design and select gears, including; spur, helical, miter, worm gears and speed reducers.	**Evaluation method** **Lab exercises** **In class assignments** **Written test**
Learner outcome • Understand and demonstrate the ability to design and select bearings and journals including; ball bearings, roller bearings, thrust bearings and journal bearings	**Evaluation method** **Lab exercises** **In class assignments** **Written test**
Learner outcome • Understand and demonstrate the ability to demonstrate knowledge of design and selection of clutches, including flat clutches, cone clutches, centrifugal clutches and overrunning clutches.	**Evaluation method** **Lab exercises** **In class assignments** **Written test**