

Discipline: Supply Chain Automation

## **Integrated Course Outline of Record**

### **Mechanics XX**

Mechanics -XX: Introduction to Mechanics and Mechanical Applications

College:  
Lecture Hours: 36  
Lab Hours: 54  
Units: 3.00

### **COURSE DESCRIPTION**

Prerequisites: None

Introduction to fundamental mechanics to include; Safety, Measurement, Tools, Physical Properties, Structures, Mechanical drives, Fabrication, Maintenance and Troubleshooting. 36 hours lecture and 54 hours laboratory.

### **SHORT DESCRIPTION FOR CLASS SCHEDULE**

Introduction to Mechanics and Mechanical Applications.

### **ADVISORY ENTRY SKILLS**

None.

### **STUDENT LEARNING OUTCOMES**

Upon successful completion of the course, the students should be able to:

- List safety procedures for mechanical applications
- List the different types of measuring devices
- Apply measurement applications
- List and describe the operation of common hand and power tools
- Describe the physical properties of mechanical devices
- Describe the different types of structures
- Identify and use the proper lifting and rigging applications
- Identify the common types of drive devices
- Service mechanical drive systems
- Demonstrate basic fabrication skills
- Describe the basic maintenance types and applications
- Select the proper procedures for troubleshooting failed components
- Identify and use critical thinking to acquire information

## COURSE CONTENT

### TOPICS

1. Safety
  - a. Basic first aid
  - b. Personal protection equipment
  - c. Fume controls
  - d. Fire control (flammable surroundings)
  - e. Electrical shock hazard
  - f. Heat hazards
  - g. Welding preparation
  
2. Measurement
  - a. English/Metric systems
  - b. Rulers and Tape Measures
  - c. Precision Measurement
  
3. Tools and Applications
  - a. Hand tool
  - b. Power tools
  - c. Tool Safety
  
4. Physical Properties
  - a. Conversions and Formulas
  - b. Geometric components
  - c. Pressures
  - d. Hydraulics
  - e. Pneumatics
  
5. Structures
  - a. Stairways
  - b. Mezzanines
  - c. Support beams
  - d. Racking
  - e. Supporting structures
  
6. Lifting and Rigging
  - a. Physical limitations and Safety
  - b. Personal lifting
  - c. Material lifting
  - d. Hoists
  - e. Load calculations
  - f. Attachments
  - g. Strapping/Slings

## 7. Mechanical Drives

- a. Motor applications
- b. Energy Transfer
- c. Belt Drives/Pulleys
- d. Gear Drives
- e. Chain/Sprockets
- f. Bearings
- g. Lubrication
- h. Vibration
- i. Alignment

## 8. Fabrication

- a. Planning
- b. Materials
- c. Fasteners
- d. Welding
- e. Cutting
- f. Anchoring

## 9. Maintenance

- a. Lean Principles Energy Savings
- b. Maintenance Personnel
- c. Scheduled Maintenance
- d. Unscheduled Maintenance
- e. Work Prioritization
- f. Record Keeping
- g. Certifications

## 10. Troubleshooting and Failure Analysis

- a. Safety
- b. Support information
- c. Electronic Monitoring
- d. Outside services
- e. Root cause failure analysis
- f. Team approach to troubleshooting

## 11. Critical Thinking

- a. Students identify, organize, plan and allocate resources to complete welding assignments.
- b. Interpersonal skills
- c. Acquire and use information
- d. Understand complex interrelationships in welding technologies
- e. Work with and understand a variety of technologies in the welding industry
- f. Work ethics, habits and accountability
- g. Understand employer profitability

## **METHODS OF INSTRUCTION**

Methods of instruction used to achieve student learning outcomes may include, but are not limited to:

- Class Lectures will cover information that will further a student's knowledge of mechanics, mechanical applications and cutting methods. Lectures will include class discussion, slide shows, drawing on the board, videos and other methods to help further the students' understanding of the subject.
- Class notebook – A notebook will be kept for the class which includes course notes, handouts and other information which pertains to the course. The notebook will also include the syllabus and course outline.
- Mechanics exercises and laboratories will reinforce lectures and teach skills required in mechanical applications.
- Educational videos, and slide show presentations that accompany the information being presented to enhance the information.
- Guest speakers may be used to reinforce mechanical applications techniques and/or theory.

## **METHODS OF EVALUATION**

Students will be evaluated for progress in and/or mastery of learning outcomes by methods of evaluation which may include, but are not limited to:

- Midterm examinations designed to assess students mastery of practical aspects of mechanics and mechanical applications
- Quizzes/examinations designed to assess students' ability to recall, critically analyze and apply concepts of mechanics and mechanical applications
- Final examination designed to assess students' mastery of mechanics and mechanical applications
- Oral question and answer sessions about mechanics and mechanical theory to test the students' knowledge and understanding of the subject
- Laboratory exercises designed to develop hands-on skill in mechanical practices
- Student presentations designed to evaluate the students' understanding of the broader impact of mechanics

## **SAMPLE ASSIGNMENTS**

### **Outside-of-Class Reading assignments**

Instructors may bring in outside articles for students to read and further their knowledge and understanding of mechanics and applications

### **Outside-of-Class Writing Assignments**

Weekly written problems and terms from the book, due back within one week of the given assignment date, focus on direct applications. They require students to prove a working understanding of the subjects being presented.

**Other Outside-of-Class Assignments**

Perform internet research, as directed in class, in preparation for labs and lectures. Then, students return printouts to turn-in for credit, or send them electronically.

**COURSE MATERIALS**

All materials used in this course will be periodically reviewed to ensure that they are appropriate for college level instruction. A recommended text is:

Industrial Mechanics 3<sup>rd</sup> edition, ISBN 978-0-8269-3705-6,  
Albert W. Kemp, American Technical Publishers, Inc., 2012