

I. COURSE DESCRIPTION:

A. Department Information:

Division: Technical
Department: Machine Trades
Course ID: MACH 091A
Course Title: Rigging Systems and Techniques
Units: 3
Lecture: 2 Hours
Laboratory: 3 Hours
Prerequisite: None

B. Catalog and Schedule Description:

Rigging system fundamentals and their various applications in the manufacturing, construction, and transportation industry. Students will study rigging equipment, rigging processes, and how to operate rigging systems such as power hoists, sling and assemblies, and overhead crane operations.

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOMES FOR STUDENTS:

Upon completion of this course, students will be able to:

- A. Identify the seven major safety factors when rigging a given load.
- B. Explain the basic concepts of rigging techniques.
- C. Distinguish and apply three major applications when hoisting material.
- D. Apply slings and lifting techniques to raise a given load.
- E. Examine various types of rope and calculate safe working loads and maintenance procedures.
- F. Name three chain sling techniques in lifting materials.
- G. Recognize four types of cranes and their applications.

IV. COURSE CONTENT:

- A. Safety in Rigging Processes
 1. Proper loading procedures with a given load
 2. Safe load weight calculations
 3. Safe load balance and center of gravity determination
 4. Proper hook and eye bolt identification
- B. Basic Rigging Concepts and Techniques
 1. Load and weight calculations of given materials
 2. Define calculations to determine load balancing
 3. Hook configuration in lifting materials
 4. Distinguish the major difference with eyebolts
- C. Hoist Types and Their Applications
 1. Block and tackle, safety functions, operation, and application
 2. Manual hoist operation
 3. Power-operated hoists
 4. Hoist selection and inspection
- D. Major Slings and Lifting Techniques
 1. Sling force calculations
 2. Sling assembly: Double basket, choker, bridle slings
 3. Sling efficiency: Describe, calculate
- E. Rope Identification, Calculations, and Maintenance
 1. Structure and types identification: Wire and fiber rope
 2. Termination and break-in procedures, applications
 3. Slings, shackles, and wedge sockets
 4. Selection and maintenance procedures
 5. Load calculations for using wire rope

- F. Chain Sling Techniques for Lifting Loads
 1. Chain types: Construction, applications, specification, identification
 2. Chain sling operation
 3. Chain sling, selection and maintenance
- G. Identify Major Industrial Cranes and Their Applications
 1. Crane Types: Overhead, gantry, jib and boom
 2. Crane Operations: Safety rules and hand signals
 3. Special Lifting Applications
 - a) Tag lines
 - b) Control of loads using two hoists
 4. Load Turning: 1-point, 2-point

V. METHODS OF INSTRUCTION:

This course is designed for a hands-on laboratory environment where rigging components and systems can be assembled and operated. The instructional methods to be used include: Teacher Lecture and Demonstration, Student Experimentation.

- A. Multimedia Curriculum (CD-ROM), Written Text, Activity Packets
- B. Hands-on Skill Demonstration - Authentic Assessment
- C. Formula Calculations
- D. Research: Industry Resources

VI. TYPICAL ASSIGNMENTS:

- A. Discuss major safety items with rigging, basic load concepts, major applications, slings/lifting, ropes and industrial cranes.
- B. Read Learning Activity Packets on Rigging Methods and Techniques and answer the following questions:
 1. What are the three proper loading techniques when rigging a given load?
 2. Identify and discuss proper safety techniques when utilizing rigging equipment.
- C. Hands-on Skill Demonstration:
 1. Each student will demonstrate a major safety factor on the rigging machine related to a sling.
 2. Each student will demonstrate how to balance a load, using slings, hooks, and eyebolts.
- D. Research: Write a paper on Industrial Awareness & Career Exploration.

VII. EVALUATION(S):

- A. Methods of Evaluation
 1. Objective and Subjective comprehensive examinations
Typical Question: Explain the basic concepts of rigging techniques.
 2. Subjective evaluation of student developing a notebook that will be evaluated by the instructor for a final grade on content and materials.
 3. Subjective evaluation of student calculating and determining proper lifting procedures.
Typical Calculation:
Calculate the load for a 1000 lb. weight, utilizing the following formula: $\text{Weight of Object} / \text{Divided by Total Weight} = \text{Load Weight}$
- B. Frequency of Evaluation:
 1. Seven computerized tests after each of the major content sections
 2. Seven hands on application tests utilizing rigging equipment
 3. One notebook graded on content and materials

VIII. TYPICAL TEXT(S):

Integrated Systems Technology, Learning Activity Packets 1-8, Amtrol Corporation, Jeffersonville, Indiana, 1999
Edward Hoffman, Student Shop Reference Handbook, Industrial Press, New York, 1999
C. Weingartner, Machinist Ready Reference, 10th Edition, Prakken Publication, Ann Harbor, Michigan, 2000

IX. OTHER SUPPLIES REQUIRED OF STUDENTS:

Calculator