

# STEAM ENGINEERING INSTITUTE

## CONTINUING EDUCATION PROGRAM

Course: INDUSTRIAL MECHANICS

Continuing Education Hours: Twenty Six hours

Textbook: "Industrial Mechanics" American Technical Publishers,  
Second Edition (2008) Author: Albert W. Kemp  
ISBN-978-0-8269-3698-1  
Included with text a CD Rom containing: Quick Quizzes  
Illustrated Glossary and Media Clips.

Please put your name and date on each assignment.

Course will concentrate on Industrial Mechanics as it  
applies to high-pressure steam plants.

- Lesson 1. **Precision Measurement**  
Precision measurement-Rulers-Conventional Protractors-Machinist Steel  
Protractors-Reversible Protractors-Dial Calipers-Electronic Calipers-  
Outside Micrometers- Inside Micrometers-Electronic Micrometers-Dept  
Micrometers-Precision Measuring Instrument Maintenance.
- Lesson 2 **Print reading**  
Pictorial Drawings-Application Drawings-Location Drawings-Detail  
Drawings-Assembly Drawings-Instructional Drawings-Plot Plane-  
Structural Plans-Utility Plans-Prints-Print Abbreviations and Symbols-  
Print Schedules-Print Revisions-Print Notes-Specifications.
- Lesson 3 **Tools**  
Tools-Hand Tools-Power Tools-Tool Safety-Hand Tool Safety-Power  
Tool Safety.
- Lesson 4 **Calculations**  
Formulas-Common Formulas-Units of Measurement-Plane Figures-  
Lines-Angles-Linear Measurement-Area-Circles-Triangles-  
Regular Polygons-Quadrilaterals-Solids-Regular Solids-Prisms-  
Cylinders-Pyramids-Cones-Spheres-Volume-Finding Volume.
- Lesson 5 **Rigging**  
Load balance- Calculating Load Weights-Slings-Sling Hitches-Rope-  
Rope Construction-Rope Strength-Wire Rope-Fiber Rope-Webbing-Basic  
Rigging with Web Slings-Chain Construction-Rigging Chain Strength-  
Rigging Chain Attachments-Rigging Component Inspection.

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## Lesson 6

### **Lifting**

Lifting Devices-Block and Tackle-Manually Operated Hoists-Power Operated Hoists-Hoist Safety-Inspection Programs and Procedures-Hoist Motor Brake Inspection-Conducting Load Tests-Eyebolts-Eyebolt Loads-Industrial Cranes-Gantry Cranes-Jib Cranes-Overhead Cranes-Crane Operation.

## Lesson 7

### **Ladders and Scaffolds**

Wood Ladders-Metal Ladders- Fiberglass Ladders-Fixed Ladders-Single Ladders-Extension Ladders-Stepladders-Scaffolds- Sectional Metal-Frames Scaffolds-Suspension Scaffolds-Safety Nets-Ladder Climber Fall Protection-Ladder Safety-Scaffold Safety.

## Lesson 8

### **Hydraulic Principles**

Hydraulics-Hydrostatics-Hydrodynamics-Hydraulic System History-Liquid Characteristics-Pressure-Flow-Mechanical Advantage-Energy And Work-Horsepower-Torque.

## Lesson 9

### **Practical Hydraulics**

Hydraulic Circuitry-Hydraulic Diagrams-Hydraulic Circuit Components-Fluid-Reservoirs-Piping-Pumps-Valves-Actuators-Hydraulic Circuit Maintenance-Fluid Maintenance.

## Lesson 10

### **Pneumatic Principles**

Pneumatics-pressure-volume-Gas Laws-Compression-Multistage Compression-Air Temperature and Moisture Content-Air Contaminants-Contaminant Removal.

## Lesson 11

### **Practical Pneumatics**

Pneumatic Circuitry-Pneumatic Systems-Air Compressors-Safety Relief Valves-Pneumatic Systems Piping-Check Valves-Pneumatic Circuit Components-Conditioning Compressed Air-Controlling and Directing Air-Actuators-Pneumatic Logic-Pneumatic Logic Elements.

## Lesson 12

### **Lubrication**

Lubrication-Coefficient of Friction-Boundary Lubrication-Gas Lubricants-Liquid Lubricants-Semisolid Lubricants-Effects of Temperature-Solid Lubricants-Lubricant Application-Oil Application-Grease Application-Lubricant Contamination-Oil Analysis.

## Lesson 13

### **Bearings**

Bearings-Rolling-Contact Bearings-Plain Bearings-Bearing Removal-Bearing Failure Investigation-Parts Preparation-Bearing Installation-Proper Bearing Selection-Bearing Mounting-Machine Run-In.

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- Lesson 14    **Flexible Belt Drives**  
Flexible Belt Drives-V-Belts-V-belt Pulleys-Double V-belts-Timing Belts-Variable Speed Belt Drives-Changing Speeds- Calculating Pulley Speed and Size-Flexible Belt Drives-Safety-Proper Clothing-Clean Environment-Removing and Locking Out Energy Supplies.
- Lesson 15    **Mechanical Drives**  
Transformation of Energy-Compound Gear Trains-Gear Form and Terminology-Backlash-Measuring Backlash-Gears-Helical-Rack-Herringbone-Bevel-Miter-Worm-Hypoid-Gear Wear-Hunting Teeth-Gear Wear Identification.
- Lesson 16    **Vibration**  
Vibration Effects-Machinery Vibration-Vibration Cycle-Vibration Velocity-Vibration Acceleration-Vibration Measurement Methods-Transducer Selection-Transducer Placement-Reading Amplitudes-Vibration Monitoring Programs.
- Lesson 17    **Alignment**  
Misalignment-Alignment Sequence-Anchoring Machinery-Controlled Machine Movements-Soft Foot-Thermal Expansion-Dial Indicators and Alignment-Alignment Methods-Straightedge Method-Rim and Face Method-Reverse Dial Method-Electronic Reverse Dial Method-Laser Rim and Face Method.
- Lesson 18    **Electricity**  
Electricity-Ohms Law-Magnetism-Electromagnetic Induction-National Electric Code-Grounding-Hazardous Locations-Continuity Testers-Voltage Testers-Multimeters-Transformers-Contactors and Starters-Fuses and Circuit Breakers-Switches-Solenoids-Electrical Safety.