



SYLLABUS

CATALOG DESCRIPTION

An introduction to the maintenance of equipment utilizing mechanical, electrical and instrumentation concepts. Topics include: Hand tools, bearing fundamentals, equipment lubrication, material handling, electrical safety, battery systems, diagrams, electrical production and distribution, transformers, breakers, switches, AD and DC motors, motor controllers and operation, and introduction to automation and instrumentation control.

Prerequisites: IPOP-110,130,& 133

Semester Offered: All

Common Student Learning Outcomes

Upon successful completion of San Juan College programs and degrees, the student will demonstrate competency in...

BROAD AND SPECIALIZED LEARNING

Students will actively and independently acquire, apply, and adapt skills and knowledge with an awareness of global contexts.

CRITICAL THINKING

Students will think analytically and creatively to explore ideas, make connections, draw conclusions and solve problems.

CULTURAL AND CIVIC ENGAGEMENT

Students will act purposefully, reflectively, and ethically in diverse and complex environments.

EFFECTIVE COMMUNICATION

Students will exchange ideas and information with clarity in multiple contexts.

INFORMATION LITERACY

Students will be able to recognize when information is needed and have the ability to locate, evaluate, and use it effectively.

INTEGRATING TECHNOLOGIES

Students will demonstrate fluency in the application and use of technologies in multiple contexts.

Student work from this class may be randomly selected and used anonymously for assessment of course, program, and/or institutional learning outcomes. For more information, please refer to the Dean of the appropriate School.

Course Learning Outcomes

Upon successful completion of the course, the student will be able to...

1. Understand the field of Process Operations within the Process Industry.
2. Learn the various roles and responsibilities of the Process Operator, the environment in which they work
3. Describe grease guns, operation of drip feed oilers, and typical circulating oil system. List items to be found on a typical lubrication schedule or chart, and three things to check in a circulating oil system. Define the various types of oil seals.

4. Describe situations in which oil is a better lubricant than grease, and grease is a better lubricant than oil. Describe lubricant action in sleeve bearings, how rolling elements help reduce friction, and thrust loads and radial loads on shafts and bearings.
5. State three basic functions of bearings. Describe journal and thrust bearings and how they are constructed. Describe common types of sliding surface and rolling surface bearing failures. Identify the various types of bearings from the bearing display.
6. Describe the basic electrical quantities of current, voltage, and resistance. Describe what shock is, the hazard associated with working near electrical equipment, and describe ways of providing protection to personnel from hazards associated with electricity. Describe how to give aid to an electrical shock victim and how to respond to an electrical fire.
7. Describe a typical battery system, the electrochemical reaction during charging and discharging. List the components of a lead-acid cell, common components of most battery chargers, and the protective equipment and safety procedures associated with working on batteries.
8. Describe how flow diagrams can be used to become familiar with a system, and line-up valves. Describe how electrical one-line diagrams can be used to learn the components and layouts of electrical systems, and how to isolate equipment for maintenance and repairs.
9. List sources of on-site power generation. Identify and explain the function of the major components in a typical electrical power distribution system. Explain how power comes into an industrial facility from an off-site source.
10. Explain the function of a transformer and how it works, different types of pushbutton switches and rotary switches operate. Identify the basic components of transformers. List the general steps associated with a resetting a circuit breaker that has tripped, and the general steps associated with racking out a circuit breaker.
11. Explain the purpose of a motor and the principles of motor operation. Describe how a simple AC-motor and DC-motor operates. Identify the components of a typical AC and DC-motor. Identify the various components of electric motors on the display.
12. Explain the purpose of a motor controller and how it can protect a motor. State the purpose of overload devices. List typical steps for starting up a motor. Describe the normal operating checks associated with motor operation.
13. Define terms associated with the input side of a control system. Identify and describe common types of temperature, pressure, flow and level sensors. Identify and describe common loop arrangements used in automatic control systems.
14. Perform positive displacement pump calibrations and create pump curve.
15. Be able to perform the following water lab tests: turbidity, sulfate, low range and high range silica.