Power Plant Components
Outline of Instruction

Course Information
Organization
Monroe County Community College, Applied Science and Engineering Technology
Development Date
11/18/2010
Course Number
NUET 220
Instructional Area
Nuclear Engineering Technology
Potential Hours of Instruction
60
Total Credits
3

Description
This course presents the fundamental and specific details of power plant components. Course content will include component types and characteristics, principles of operation, failure mechanisms, and how they relate to a system. Specific components discussed are compressors, diesel engines, heat exchangers, pumps, strainers, filters, turbines, valves, switchgear, transformers, circuit breakers, motors, relays, generators, and valve actuators. Maintenance activities such as component tagging, disassembly, troubleshooting, lubrication, reassembly, and testing are also covered.

Major Units:
1. Air Compressors and HVAC
2. Heat Exchangers
3. Centrifugal and positive displacement pumps
4. Strainers and filters
5. Steam Turbines
6. Types of Valves
7. Motors and Generators
8. Diesel Generators, UPS, Switchgear, and Motor Control Centers
9. Circuit Breakers, Transformers, Cables, Relays
10. Motor, Air, and Hydraulic operated Valve Actuators
11. Test Equipment
12. Maintenance Activities, including Precautions and Limitations

Types of Instruction
Instruction Type
Contact Hours
Credits
The methods of instruction for this course will include but will not be limited to, discussion, lecture, demonstration, in-class activity, lab experiments, and examination.
60
3

Textbooks
TBD.

Prerequisites
NUET 100, NUET 130
Exit Learning Outcomes

Program Outcomes
A. Describe and apply the culture of safety, continuous improvement, and peer checking.
B. Explain the requirement for documentation, formal procedures, and recordkeeping for nuclear related activities
C. Describe the main systems in a nuclear power plant, and how they are used in power generation.
D. Identify typical power plant components and explain their function.
E. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding.
F. Identify and define problems in mathematic and scientific terms
G. Recognize assumptions and limits of analysis to the application of technology, including social and ethical implications.
H. Apply instruments to make measurements and analyze data from such measurements.
I. Recognize the need to engage in lifelong learning, and to perform research or conduct investigations to continuously upgrade knowledge and skills.
J. Communicate effectively, and work as part of a team.

General Education Outcomes
A. Apply mathematical approaches to the interpretation of numerical information
B. Apply mathematical approaches to the analysis of numerical information
C. Communicate ideas in writing using the rules of standard American English
D. Demonstrate an understanding of the process of scientific inquiry
E. Use computer technology to retrieve information
F. Use computer technology to communicate information

Course Outcomes
1. Describe the theory, construction, application, and maintenance of air compressors and HVAC.
2. Describe the theory, construction, application, and maintenance of heat exchangers.
3. Describe the theory, construction, application, and maintenance of centrifugal and positive displacement pumps
4. Describe the theory, construction, application, and maintenance of strainers, filters and steam system components.
5. Describe the theory, construction, application, and maintenance of steam turbines.
6. Describe the theory, construction, application, and maintenance of various types of valves (gate, butterfly, relief, safety, globe, ball, needle, etc) and Valve actuators
7. Describe the theory, construction, application, and maintenance of motors and generators.
8. Describe the theory, construction, application, and maintenance of diesel generators, UPS, switchgear, and motor control centers.
9. Describe the theory, construction, application, and maintenance of circuit breakers, transformers, cables, and relays.
10. Describe the theory, construction, application, and maintenance of boilers, fire barriers, and heaters.
11. Describe and demonstrate/perform the proper use of various pieces of test equipment
(dial calipers, meters, and micrometers).

12. Explain and demonstrate component tagging, hazards, disassembly, troubleshooting, maintenance, reassembly, and testing

13. Describe limitations and precautions around maintenance activities (i.e. Foreign Material Exclusion, tagging boundaries, daisy chains, adjacent hazards, common power)