



COURSE OUTLINE

<u>UTI 110</u> Course Number	<u>Introduction to Power Plant Operations and Maintenance</u> Course Title
6 Credits	5/2 Lecture/Laboratory Hours

Approved catalog description:

Provides an overview of the electric generation process, power plant systems and functions. Topics include an overview of generating site facilities, power company philosophy, interdepartmental responsibilities, communication practices, and health, industrial and environmental safety. Students also learn the skills necessary for safe power plant operation.

Prerequisites: UTI 101, UTI 102 and UTI 103

Corequisites: None

Required texts/other materials:

UTI 110 Course Materials (all created and provided by PSE&G training staff):

- General Physics Computer-Based Training – Introduction to Power Generation, modules 1-6.
- UTI 110 Participant Guide (prepared by PSE&G Power Fossil Training Group)
- Participant supplemental handouts
 - Power Plant System Drawings
 - Power Plant System Descriptions

Last revised: Spring 2005

Course coordinator: Dominick T. DeFino defino@mccc.edu extension 3456

Library resources: (Identify resources relevant to the course, including books, videos, journals, electronic databases, recommended websites.)

None.

Learning Center resources: (Are there tutors for the discipline? Study groups?)

None.

Course goals

The student will be able to:

- Demonstrate an understanding of the electric power generation process and its importance within the current energy industry business environment.
- Correctly identify and describe the energy conversion process as it relates to the generation of electric power.
- Correctly identify and describe the major steam generation plant components and systems and explain their purpose and sequence in the electric power generation process.
- Demonstrate the ability to define and strictly comply with power plant workplace health, industrial and environmental safety, and communication practices.

Units of study in detail

Unit I: Introduction to Power Generation

Learning Objectives

The student will be able to...

- Identify the major components of the PSEG Power Corporate Organizational Structure and Mission statement.
- Identify the sources of different types of energy and describe the energy conversion process.
- Describe a combustion system and its components, including the relationship between and among components and how each component works.
- Explain the fluidized bed combustion process and determine the functions of the inert material within the combustion process.
- Describe what takes place in a boiler steam/water cycle process and determine the functions of the components in the steam drum system.
- Describe the basic turbine operations and determine the function of components in the steam turbine.
- Explain the function and operation of power plant auxiliary systems and their components, including the principles of regenerative feedwater heating, the functions of the boiler feed pumps, and feedwater de-aeration concepts.

Unit II: Power Plant Systems and Operation

Learning Objectives

The student will be able to...

- Locate and identify the major plant equipment, control room, switchyard, assigned work areas, and—in the event of an emergency—a safe route to an assigned assembly area within the generating station.
- Demonstrate the ability to locate and identify the use of plant documents including Administrative, Operations and Maintenance Procedures in the performance of daily responsibilities.
- Demonstrate the ability to read plant electrical and piping prints and one-line diagrams using basic symbols in an assigned job function.
- Describe the plant organizational structure, the student's assigned job duties and responsibilities that the student will be responsible for during the term of the internship.

Unit III: Power Plant Operations/Human Performance Fundamentals

Learning Objectives

The student will be able to...

- Define and explain the key concepts and purposes of Human Performance Fundamentals including:
 - pre-job brief
 - STAR (Stop, Think, Act, Review)
 - human error reduction techniques
 - operating experience lessons learned
 - post-job recap
 - three-way communication

Unit IV: Environmental Health and Safety for Power Plants

Learning Objectives

The student will be able to...

- Demonstrate the ability to follow OSHA and PSEG Power Health, Safety and Environmental requirements for power plant safety to 100% compliance.

Evaluation of student learning

Students will be evaluated on the content knowledge within Units I – IV in the following manner:

- Six quizzes will be administered, one after the completion of each module, within the Introduction to Power Generation computer-based training series (Unit I).
- Two written quizzes will be administered on the classroom portion of power plant systems and operations (Unit II).
- One written final exam will be administered on the combination of all of the aforementioned topics plus Human Performance Fundamentals as the Power Plant Basics Final Exam (Units I – III).
- Students will demonstrate environmental, health and safety knowledge and application through the “on the job qualification process” (Unit IV).

The final grade for the course will be calculated as follows:

Quizzes (Unit I)	10%
Quizzes (Unit II)	10%
Final Exam (Units I – III)	30%
On the Job Qualification Process (Unit IV)	<u>50%</u>
TOTAL	100%