Industrial Power Plant Systems (INMT 1355)

Credit: 3 semester credit hours (2 hours lecture, 2 hours lab)

Prerequisite/Co-requisite: INMT 1305

Course Description

A study of the principles of operation and maintenance of industrial power plants. The major engine systems will be studied. Emphasis will be placed on component replacement, tune-up, and field adjustments.

Required Textbook and Materials

1. *Audel Millwrights & Mechanics Guide* by Davis & Nelson, 5th edition

   ISBN number is 0-7645-4171-4

2. Equipment to be furnished by students:
   a. Hard Hat (red)
   b. Hearing protection (Ear plugs or Muffs 29 NRR+)
   c. Fire retardant clothing (Nomex or equal)
   d. Safety Glasses (Z87+)
   e. Gloves (leather or equal)
   f. Shoes or Boots (substantial leather or equal w/heels- no open toes)

Course Objectives

Upon completion of this course, the student will be able to:

1. Describe the principles of operation for gasoline, diesel, and steam turbine industrial engines.
2. Identify the major components in all three types of engines.
3. Explain the functions of the four engine systems: air, fuel, cooling, and lubrication.
4. Perform minor repairs including component assembly replacement, tune-up, and adjustments.)
5. Perform routine maintenance and inspection on industrial engines.

Course Outline

1. Safety
   a. Safety in Lab
   b. Safety in tool use
2. Types of turbines
   a. Types of turbines
   b. Turbines in the lab
3. Steam type turbines
   a. Steam Safety requirements
   b. Uses of Steam Turbines
4. Gas type turbines
   a. Gas Safety requirements
   b. Uses of Gas Turbines
5. Engine systems
   a. Gasoline engine systems
   b. Diesel engine systems
6. Turbine repair
   a. Disassembly and parts of a turbine

Approved 12/2013

   b. Reassembly and balance of turbines
7. Seals and rings
   a. Purpose of seals
   b. Purpose of rings
8. Governor systems
   a. Governor System?
   b. How does the system work?
9. Trip mechanisms
   a. What is a Trip?
   b. How does the Trip work?
10. Tune-up and adjustments
   a. What is a Tune-up?
   b. Who does the Tune-up?
11. Maintenance and inspection
   a. What is required Maintenance?
   b. Who does the inspections?
12. Safety and testing
   a. What are the dangers in testing a turbine
   b. Run and test turbine

Grade Scale

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
0 – 59	F

Course Evaluation

Final grades will be calculated according to the following criteria:

Activity	***Percentage***
Major test	75%
Class participation	25%

Late Penalties will be assessed on all work turned in late. 5 points per day

Course Requirements

1. Certificate Graduates must pass the WorkKeys Exam during this course for Graduation.
2. Certificate Graduates must pass the NCCER Core Curriculum Exam during this course for Graduation.
3. Introduction to Power Plant Systems
4. Identify Industrial Power Plants in Lab
5. Remove and Disassemble selected units
6. Reassemble and Install selected units

Attendance Policy

1. Students in a 2 day class are allowed 2 unexcused absences.
2. An absence, excused or unexcused is counted 6 pts. off final grade.
3. More than 2 unexcused absences can result in an “F” in the course.
4. Being tardy 3 times equals 1 absence. (2 pts. each)

5. Students in a 1 day class are allowed 1 unexcused absence.(12 pts. off final grade)

Course Policies

1. **Students must possess and present LIT ID to attend class.**
2. No food, drinks, or use of tobacco products in class.
3. No foul or harsh language will be tolerated
4. Turn off all Cell Phones during lectures
5. Headphones may be worn only upon Instructor approval
6. Do not bring children to class.
7. No Cheating of any kind will be tolerated. Students caught cheating or helping someone to cheat can and will be removed from the class for the semester. Cheating can result in expulsion from LIT.
8. If you wish to drop a course, the student is responsible for initiating and completing the drop process. If you stop coming to class and fail to drop the course, you will earn an 'F' in the course.
9. Proper Dress. Any intentional display of undergarments will not be tolerated and can result in the student being removed from the class. Pants will be worn belted at the waist as to allow the student to walk, climb, stoop and bend as required. It is the student's responsibility to dress for work as if in an industrial environment, long pants, shirts with sleeves, substantial footwear (full leather shoes or boots with heels, composition oil resistant soles, no sandals, flip flops, cloth shoes). Safety glasses and hard hats will be necessary as the class requires.
10. Internet Usage
    a. Classroom computers have access to the internet.
    b. Student usage of the internet will be monitored.
    c. Proper usage of the internet will be allowed. Used for classroom research or as directed.
    d. Any unauthorized use of the internet will not be tolerated.
    e. Improper usage of the internet, such as profanity, pornography, gambling, etc… will result in disciplinary action not limited to expulsion from LIT.

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

Student Code of Conduct Statement

It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the LIT Catalog and Student Handbook. The LIT Catalog and Student Handbook may be accessed at www.lit.edu or obtained in print upon request at the Student Services Office.

Course Schedule

Week	Topic	Reference
1	Course introduction and policies • Lecture • Lab: Practice	Handouts
2	Introduction to Power Plant Systems • Lecture • Lab: Practice	Lab
3	Basic Tool Box • Lecture • Lab: Practice Tool Identification • Test 1	Chapter 3
4	Mechanical Fasteners • Lecture • Lab: Practice	Chapter 8
5	Lubrication and Oil Analysis • Lecture • Lab: Practice	Chapter 19
6	A/C Motors • Lecture • Lab: Practice • Test 2	Chapters 23/24
7/8	Gasoline Engines • Lecture • Lab: Practice	Lab
	Diesel Engines • Lecture • Lab: Practice • Test 3	Lab
11/12	Turbines • Lecture • Lab: Practice	Lab
13-16	Preventive & Predictive Maintenance • Lecture • Lab: Practice • Final Exam	Chapter 21