

Course Predix/Number: FTP1220 Course Action Number of Credits: 2 Clock Hours: Clock Hours: Course Action Add New Course Nodify tasking Course Delete Course Degree Type BAS. BS. C.P.P. A.A. AAS. DAAS. DAT.C. C.C.C. Course Type DEGREE A.K. DAS.	COURSE INFORMATION				
Course Action Image: Add New Course Modify Existing Course Delete Course Degree Type B.A.S. B.S. C.P.P. A.A. A.S. A.T.C. C.C.C. Course Appet D.C.C. C.C.C. C.C.C. C.C.C. C.C.C. Course Type D.C.R.P. A.A. A.S. A.T.C. C.C.C. Course Appet D.C.T.C. C.C.C. C.C.C. C.C.C. C.C.C. Course Appet D.C.T.C. C.C.C. C.C.C. C.C.C. C.C.C. Course Appet Course Course Course Course Competence Appet Course Competence Appet Course Cour		ETP1220	Course Title:	Power Plan	t Fundamentals
Degree Type BAS. BAS. CP.P. AA. AAS. AAT.C. CCC. credit Type D1 (A&P) 02 (PSV/OCCUP) D3 (College Prep) D5 (PSAV) D15 (EPI) Course Type D texture Lab Cetture/Lab Combo Internship Collincial College Prep Course Dispectation BY January 2012 Course Competitions Students will learn how power plants and their operations. Students will learn how power plants operate, as well as general administrative procedures for completing routine tasks. (1 hr. lecture; 2 hr. lab.) Prerequisite(s): Co-requisite(s): Course Competence(s): COURSE COMPETENCIES Estimation Uteracy 9. Aesthetic / Creative Activities 1. Contract Uninking 8. Computer / Technology Usage 8. Computer / Technology Usage 2. Cutical thinking 8. Computer / Technology Usage 8. Computer / Technology Usage 3. Explaining the basic process of how a nuclear reactor produces electricity 8. Computer / Technology Usage 9. Identifying the major systems of the nuclear reactor used to produce electricity is distributed. 8. Computer / Technology Usage 9. Meentifying the general organization of a nucle	Number of Credits:	2	Clock Hours:		
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maintenance activities associated with environmentally qualified and safety-related components and equipment.10. Environmental Responsibility	4. Describing the and manual op				
Competency 3:	5. Explaining the maintenance a qualified and	activities associa	ted with enviro	onmentally	10. Environmental Responsibility
	Competency 3:				

The student will demonstrate an understanding of basic mechanical components by: 1. Identifying types of valves and dampers. 2. Discussing the limitations of different valve types 3. Explaining the lubrication principles associated with components, including the problems associated with improper lubrication. 4. Explaining the construction, function and operation of strainers, filters, and traps, including demineralizers,
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strainers filters and trans including demineralizers
screens, and centrifuges.
5. Describing the types of steam traps (such as lever-operated,
piston-operated and float-operated) and their applications.
ompetency 4:
he student will demonstrate a basic knowledge of mechanical
quipment used in the power plant by:
1. Describing the theory, construction, and application of
diesel engines including:
Accessories/support systems
Failure mechanisms and systems
Main structural components
Main moving components
Principles of operations
2. Explaining the theory, construction, and application of
rotating equipment including motors, generators, and
motor-generators
3. Discussing the theory, construction and application of
structural and auxiliary equipment
4. Discussing the basic operation and rescue methodology of
elevators.
5. Describing the type and operations of hangers and snubbers
for support and restraint and the different types of water
hammer (including water slug, valve slam, column
rejoining and condensate induced
6. Explaining the operations and applications of manual and
electric hoists and cranes.
7. Distinguishing between electric, gas-fired, and fuel-oil-fired
boilers and explaining their basic construction function, and
how they operate.
8. Describing the construction and application of fire barriers
including how to identify barrier degradation.
9. Explaining the principles, types, and uses of pumps,
ejectors, and educators, to include:
• The requirements of minimum flow and effects of
dead-heading pump.
• The causes and indications of cavitation and how to
prevent it.
ompetency 5:
he student will demonstrate a basic understanding of electrical
ontrol components by:

	Miami Dade
	College

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1.	Describing the theory, construction and application of	
	resistive electrical equipment (including heaters and the	
	reasons for using heat tracing).	
2.	Describing the theory, construction and application of	
	electrical supply components, including:	
	• Switchgear, load centers, and motor control centers	
	(such as protective relaying and schematics of a basic	
	system from high voltage to lower voltage).	
	• Transformers (such as step-up transformers and step-	
	down transformers, winding configurations).	
	• Inverters and uninterruptible power supplies.	
	• Circuit breakers (such as protection).	
	• Batteries and chargers.	
3.	Describing the theory, construction and application of	
	electrical control components, including:	
	• Relays (such as schematics to show operation of relays	
	that energize to actuate, time delay energize and time	
	delay de-energize).	
	• De-energize to actuate, time delay energize and time	
	delay de-energize).	
	• Meters (such as voltage and current and how a change	
	in meter indication could indicate circuit degradation of	
	a change in process (pump discharge valve opened for	
	increased flow).	
	• Control circuits (such as proportional, integral and derivative or a combination thereof).	
	• Cables (such as routing for train separation and methods of fire detection/protection for cables/cable	
	trays).	
	Huys).	
4.	Differentiating between various valve actuator types e.g.,	
	motors, pneumatic, hydraulic and describing their uses and	
	operation, including the impact of environmental	
	conditions.	
5.	Describing the theory and application of electronic	
	equipment such as analyzers and signal converters.	
Comp	petency 6:	
-	udent will demonstrate a basic understanding of the function	
and op	peration of heating, air conditioning, and ventilation systems	
in the	power plant environment by:	
1.	Describing the theory, construction and application of heat	
	exchangers (such as cross-flow, counter-flow and parallel	
	flow	
2.	Explaining the purpose, construction, and operation of	
	steam condensers and steam generators (U-tube and once-	
	through).	
3.	Explaining the process of heat transfer across the heat	
	exchanger	
4.	Identifying indications of heat exchanger fouling.	
5.	Discussing the function, construction, and operation of air	

	College	
	compressors, including rotary, reciprocating, and	
	centrifugal.	
6.	Explaining the basic components, functions and operations	
	of air conditioning and	
	refrigeration systems in the power plant.	
Comp	etency 7:	• 6. Social Responsibility
_	Ident will demonstrate knowledge of the role and history of	• 7. Ethical Issues
	r energy production by:	
_	Researching and reporting on major milestones and	• 1. Communication
1.	developments in nuclear power energy production.	 4. Information Literacy
2.	Identifying and discussing key issues concerning nuclear power, including social, economic, environmental, and political.	
3.	Summarizing basic information about major industry	
	operating experience, including the events and lessons learned from:	
	Three Mile Island Nuclear Station accident	
	 Chernobyl Nuclear Power Plant accident Salem Generating Station turbine blade throw 	
	 Browns Ferry Nuclear Plant fire 	
	 Idaho Falls stuck rod accident 	
	 Davis-Besse Nuclear Power Station event 	
	Duvis Desse rucical rower Station event	
The stu	etency 8: Ident will demonstrate an understanding of general Igical controls and policies affecting nuclear plant operations	
1.	Describing the sources of radiation, the basic types of	
	radiation found in a nuclear plant and their characteristics,	
	and explaining the risks associated with radiation.	
2.	Stating the federal and plant administrative limits on	
3.	radiation dose.	
1	Explaining the basic methods to minimize radiation	
	Explaining the basic methods to minimize radiation exposure.	
4.	Explaining the basic methods to minimize radiation exposure. Describing how to use dosimeter devices to monitor dose	
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9.	Recognizing and interpreting the plant radiological postings.	3. Critical thinking
10	Recognizing and responding to radiological alarms.	
	Explaining the importance of and the methods used for	
	minimizing the generation of	
	radioactive waste.	
	Explaining individual rights and responsibilities regarding	
	working within radiological areas.	
13.	Showing how to wear protective clothing, enter a	
	radiologically contaminated area,	
	remove tools, and exit the radiological area in accordance	
	with plant	
	procedures.	
Compe	etency 9:	
The stu	dent will demonstrate understanding and use of	
schema	tics, blueprints, and other plant drawings in a maintenance	
setting	by:	
1.	Identifying the various types of plant drawings and	
	demonstrating their use, such as	
	electrical schematics and piping/instrument drawings.	
2.	Identifying and explaining the various symbols used on	
	drawings.	
3.	Interpreting schematic drawings.	
	Explaining and interpreting the coding system for drawing numbers.	
	Explaining and interpreting the coding system for plant	
	equipment.	
6.	Discussing the importance of the station configuration	
	control program and the purpose of using controlled	
	drawings.	
Compe	etency 10:	
The stu	dent will demonstrate an understanding of communication	1. Communication
practice	es in power plants by:	
1.	Describing the types of communication systems and	
	equipment used by Maintenance personnel in a power plant	
	environment.	
2.	Demonstrating the method for conducting clear and concise	
	communication when using plant communication	
	equipment and when conducting face-to-face	
	communication in accordance with plant standards.	
3.	Describing the use and restrictions of communication	
	systems and equipment to accomplish the following:	
	Directing work activities.	
	 Performing test procedures. A complishing americanaly communities 	
	Accomplishing emergency communities.	
	Explaining how to contact key personnel, including the following:	
	Shift supervisor and control room operators.Work supervisor.	

 Quality control personnel. Fire response and first-aid personnel. Radiological protection personnel. Security personnel. Emergency personnel (e.g., technical support center personnel). Discussing lessons learned from actual plant and industry experience where improper communications adversely impacted the performance of maintenance jobs. Competency 11: The student will demonstrate an understanding of general plant knowledge and station policies by: Identifying the function of station departments. Stating company policies when working in the station. Describing the layout of the major plant buildings and how 	
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the plant basically operates	
4. Describing basic station industrial safety policies, including	
identifying and reporting workplace hazards.	
5. Describing how to minimize the potential for causing a fire	
and how to properly respond to a fire should one occur.	
6. Explaining the purpose of the quality program, how the	
program is accomplished, and how to report quality-related	
problems.	
7. Stating how to enter and exit the plant and comply with	
plant security requirements.	
8. Describing how to respond to emergency plan activation.	
9. Describing the radiological restrictions placed on non-	
radiation workers and some of the basic risks associated	
with radiation.	
10. Describing the trustworthiness and reliability requirements	
for unescorted access to the protected area, discussing the	
importance of being fit for duty, discussing the potential	
consequences of substance abuse, and working in	
compliance with the station access authorization and	
fitness-for-duty policies.	
11. Explaining a supervisor's responsibility and recognizing	
individual behavioral changes which, if left unattended,	
could lead to acts detrimental to public health and safety.	
Competency 12:	
The student will demonstrate an understanding of maintenance	
work control by:	
1. Discussing the purpose of instructions and how they are to	
be followed.	
2. Explaining the key elements of effective work instructions.	
3. Describing the conditions and situations that would require	
a revision to work instructions.	
4. Explaining how work instruction revisions are processed.	
5. Discussing the methods and importance of controlling	
system/equipment status during maintenance.	
6. Discussing the consequences of improper work control and	
giving examples	

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7.	Describing environmental equipment qualification control	
	information and explaining the reasons for such controls.	
8.	Describing the administrative controls and limitations	
	associated with temporary modifications and providing	
	examples.	
Comp	etency 13:	
The stu	Ident will demonstrate an understanding of station	
proced	ures by:	
1.	Describing plant procedure use and adherence requirements	
	(e.g., differences, if any, with words "shall," "should," and	
	"may"; when verbatim compliance applies).	
2.	Explaining the purpose of and maintenance actions	
	associated with the following types of procedures:	
	Administrative.	
	• Operating (including abnormal and emergency).	
	Maintenance repair and replacement (including troublack acting)	
	troubleshooting).Surveillance and/or test.	
	• Emergency plan.	
3.	Describing the administrative control of procedures and the	
5.	importance and purpose of using controlled procedures.	
4.	Describing maintenance department personnel	
4.	responsibilities for obtaining procedures to support	
	maintenance activities.	