



Jordan University of Science and Technology
Faculty of Engineering
Nuclear Engineering Department

NE451 Nuclear Power Plant Systems & Operations (1)
First Semester 2021-2022

Course Catalog
3 Credit Hours. Description of light water power plants systems, NSSS system, secondary systems, reactor safety systems, plant layout, steam cycles, electrical, mechanical, and nuclear system components, practical aspects of NPP system operation.

Text Book	
Title	Nuclear Engineering Handbook
Author(s)	Kenneth D. Kok (Editor) 2009
Edition	2nd Edition
Short Name	Ref#1
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref#2	Lecture Notes	Dr. Salaheddin Malkawi	1st Edition	

Instructor	
Name	Dr. Salaheddin Malkawi
Office Location	E2L2
Office Hours	
Email	salahm@just.edu.jo

Class Schedule & Room

Section 1:
 Lecture Time: Sun : 14:30 - 16:00
 Room: E2113

Section 2:
 Lecture Time: Tue : 14:30 - 16:00
 Room: E2113

Prerequisites

Line Number	Course Name	Prerequisite Type
2003400	NE340 Nuclear Reactors Theory	Prerequisite / Study

Tentative List of Topics Covered

Weeks	Topic	References
Week 1	Introduction	CH1 From Ref#1 , From Ref#2
Week 2	General Description of Pressurized Water Reactors (PWR)	CH2 From Ref#1
Weeks 3, 4	Detailed Description of Present PWR Systems	From Ref#1
Week 5	Component Design	Ch2 From Ref#1
Weeks 6, 7	Auxiliary Systems	Ch2 From Ref#1
Weeks 8, 9	Engineered Safeguards Systems	Ch2 From Ref#1
Weeks 10, 11	Containment Systems	Ch2 From Ref#1
Week 12	Instrumentation, Fuel Handling and Waste Handling	Ch2 From Ref#1
Week 13	Advance Reactor Systems	From Ref#1 , From Ref#2
Week 14	Boiling Water Reactors (BWR)	Ch3 From Ref#1
Weeks 15, 16	Small Modular Reactors	From Ref#2

Mapping of Course Outcomes to Program Student Outcomes

	Course Outcome Weight (Out of 100%)	Assessment method
Understand engineering principles associated with systems and components used in two types of commercial nuclear power plants. [11]	15%	

Become familiar with basic principles of the design and operation of various PWR Plant systems and components, including the primary system, reactor vessel, reactor core, reactor coolant pumps, steam generators, emergency core cooling system, and auxiliary systems. [41, 14]	37%	
Understand the operation of the PWR plant during start up, shutdown and other important evolutions. [41, 14]	33%	
Understand the design and operation of various BWR systems and components, including, the reactor vessel, reactor core, control rods, recirculating system, and reactor water cleanup system. [41, 14]	15%	

Relationship to Program Student Outcomes (Out of 100%)						
1	2	3	4	5	6	7
83			17			

Evaluation	
Assessment Tool	Weight
first exam	25%
second exam	25%
quizes	10%
final exam	40%

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