



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

NE452 Nuclear Instrumentation & Control

First Semester 2019-2020

**Course Catalog**

3 Credit Hours. Three credit hours ( 3 h lecture ) encompasses the principles of operation of various types of instruments in the nuclear industry to measure temperature, pressure, level, flow, position, and radiation. The student will gain a broad range of working knowledge of temperature, pressure, level, and flow sensors, position indicators, radiation detectors, and control systems. Component theory and design, system hardware, and integrated operation as applied to commercial nuclear systems will be explored.

**Text Book**

<b>Title</b>	DOE FUNDAMENTALS HANDBOOK INSTRUMENTATION AND CONTROL
<b>Author(s)</b>	U.S. Department of Energy Washington, D.C.
<b>Edition</b>	1st Edition
<b>Short Name</b>	Textbook
<b>Other Information</b>	

**Instructor**

<b>Name</b>	<b>Mr. Neil Abu Ennab</b>
<b>Office Location</b>	E2 L-2
<b>Office Hours</b>	Sun : 10:30 - 11:30 Mon : 08:00 - 09:00 Tue : 10:30 - 11:30 Tue : 11:30 - 12:30 Tue : 12:30 - 13:30 Thu : 10:30 - 11:30 Thu : 11:30 - 12:30
<b>Email</b>	nrabuennab@just.edu.jo

**Class Schedule & Room**

Section 1:

Lecture Time: Sun, Tue, Thu : 09:30 - 10:30

Room: M2006

**Prerequisites**

Line Number	Course Name	Prerequisite Type
2003400	NE340 Nuclear Reactors Theory	Prerequisite / Study
2003510	NE351 Signals And Control Systems	Prerequisite / Study

**Tentative List of Topics Covered**

Weeks	Topic	References
Weeks 1, 2	Temperature and Pressure Detectors	<b>chapters 1+2</b> From <b>Textbook</b>
Weeks 3, 4	Level Detectors and Flow Detectors	<b>chapters 3+4</b> From <b>Textbook</b>
Weeks 5, 6	Position Indicators	<b>chapter 5</b> From <b>Textbook</b>
Weeks 7, 8, 9	Radiation Detection (Part 1 of 2)	<b>chapter 6</b> From <b>Textbook</b>
Weeks 10, 11, 12	Radiation Detectors (Part 2 of 2); Principles of Control Systems (Part 1 of 2)	<b>chapters 6+7</b> From <b>Textbook</b>
Weeks 13, 14, 15	Principles of Control Systems (Part 2 of 2)	<b>chapter 7</b> From <b>Textbook</b>

Mapping of Course Outcomes to Program Student Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Ability to analyze and interpret pressure, temperature, level, flow, and radiation data from nuclear systems in order to identify corrective actions or improvements [11, 14, 17]	18%	first exam, second exam, final exam
Ability to describe the operation and maintenance of standard pressure, temperature, flow, and level sensors including calibration, and explain how the data is electronically transformed into numerical readings in standard pressure, temperature and flow units [11, 17]	18%	first exam, second exam, final exam
Ability to justify the components comprising a radiation detection system that convert the raw data into standard readings of exposure and dose [11, 12, 17]	17%	final exam
Ability to select and locate the necessary pressure, temperature, and flow sensors in a coolant system loop of a commercial PWR [11, 14]	18%	first exam, second exam

Ability to describe the electronic operation of a three-element level control system [11, 12]	14%	first exam, second exam, final exam
Ability to describe a nuclear instrumentation system that is capable of covering the dynamic range such as for a radiation monitoring in a gaseous radioactive waste effluent line in a commercial nuclear power plant [11, 12, 14, 17]	15%	first exam, second exam, final exam

Relationship to Program Student Outcomes (Out of 100%)						
1	2	3	4	5	6	7
40.42	16.42		18.75			24.42

Evaluation	
Assessment Tool	Weight
first exam	30%
second exam	30%
final exam	40%

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