

# Three Rivers Community College

## Introduction to Nuclear Systems

John Abel, Adjunct Professor

### Instructor's Contact Information:

Office: [860.437.2809]  
Phone: [860.984.8771]  
Email: [jcabel@gwu.edu]  
Office Hours:[On Request]

### Course Information:

[NUC\*K100-T1]  
[Fall, 2018]  
[Mon, Wed 1530]  
[Room D122]

*Prereq - none*

### Course Description

This introductory course introduces developing nuclear professionals to the world of commercial nuclear power generation and nuclear generating technology. The course is designed as an overview of common reactor and reactor plant designs and specifically focuses on 'Pressurized Water Reactors' and their various supporting systems.

### Course Objectives

By the end of this course, students will be able to:

- (1) Describe the basic challenge of electrical power generation and distribution.
- (2) Describe the unique process by which heat energy is made available for the purpose of producing electrical power at a nuclear power plant.
- (3) Describe diverse reactor types to include Pressurized Water Reactors, Boiling Water Reactors, and other special-purpose or special-design reactors.
- (4) Describe the major components, fluid paths, and physical processes that comprise or are facilitated by the 'primary loop components' of a Pressurized Water Reactor Plant.
- (5) Describe the major components, fluid paths, and physical processes that comprise or are facilitated by the 'secondary loop components' of a Pressurized Water Reactor Plant.
- (6) Describe the major components, fluid paths, and physical processes that comprise or are facilitated by the 'tertiary loop components' of a Pressurized Water Reactor Plant.

### Required Texts

Text and related materials are provided by Dominion Nuclear Connecticut.

## **Expectations**

The course on 'Nuclear Systems' is presented exclusively in lecture format. Active participation in scheduled lectures is crucial to your success.

## **Policies**

Grading scale. Indicate the numerical ranges for each letter grade. Here is a commonly used scale. Some instructors instead use a range using total points earned in the course, instead of an average.

94-100	= A
90-93	= A-
87-89	= B+
84-86	= B
80-83	= B-
77-79	= C+
74-76	= C
70-73	= C-
67-69	= D+
64-66	= D
60-63	= D-
<60	= F

**Accommodations for Students with Disabilities:** If you have a disability for which you are or may be requesting accommodation, please contact both your instructor and the Office of Academic Support Services, as early as possible in the semester. You must have documentation from the Academic Support Services office before accommodations can be granted.

## **Schedule (Week by Week Break-Down)**

Week 1: Introduction to 'Nuclear Systems' and Course Kick-Off. What's Fission? We'll start a detailed analysis of the 'fission' process as well as an examination of a nuclear reactor and its unique design which facilitates control and confinement of the fission process.

Week 2: Primary Systems: Reactor Coolant System

Week 3: Primary Systems: Chemical & Volume Control System (Letdown & Charging)

Week 4: Primary Systems: Emergency Core Cooling Systems

Week 5: Primary Systems

Week 6: Secondary Systems: Main Steam System

Week 7: Secondary Systems: Main Turbine & Turbine Control

Week 8: Secondary Systems: Condensate System

Week 9: Secondary Systems: Feedwater

Week 10: Secondary Systems

Week 11: Tertiary Systems: Circulating Water System

Week 12: Tertiary Systems: Service Water System

Week 13: Tertiary Systems