

NUC K118 Nuclear Chemistry

☒ Required ☐ Elective

Catalog Description: Introduction to the basic concepts of nuclear reactor chemistry. Topics covered include oxidation-reduction reactions, principles of corrosion, corrosion control practices, and important nuclear chemical reactions.

Prerequisites: CHE K121, MAT K186, NUC K100

Textbook(s) or other materials: Handouts

Course learning outcomes/Expected performance criteria:

The student will gain a good background in general inorganic chemical concepts. The student will become familiar with corrosion problems in power plants with an emphasis on how these problems can be minimized or prevented. Additionally, the development of plant analysis and their application to plant operational performance will be perfected as a diagnostic tool.

Topics covered:

	HOURS
<u>INTRODUCTION</u>	3
1. Chemistry as it pertains to nuclear power plants	
2. Chemicals used in power plants	
3. Electrolytes and conductivity	
<u>ACIDS AND BASES</u>	3
1. Neutralization equations	
2. Complete and incomplete neutralization	
3. pH	
<u>OXIDATION – REDUCTION</u>	3
1. Basic redox reactions	
2. Lead-acid battery	
3. Nernst Equation	
<u>PRINCIPLES OF CORROSION AND CORROSION PREVENTION</u>	3
1. General corrosion	
2. Galvanic corrosion	
3. Stress corrosions	
4. Pitting corrosions	
5. Hydrides	
6. Zircaloy crevice corrosion	
<u>ASSOCIATED TOPIC IN REACTOR CHEMISTRY</u>	3
1. Radionuclides in coolant	
2. Plant analysis	
3. Ion Exchange	
Total Hours	15

Class/Lab schedule: Once class session per week

Relationship of course to Criterion 5 and Program Outcomes:

Prepared by: Nuclear Staff