BS Chemistry Semester-IV					
Programme	**BS (Chemistry)**	**Course Code**	**CHEM-217**	**Credit Hours**	2
Course Title	**Chemistry of F-Block Elements**		**Course type**	**Major**	

Course Introduction

This course will familiarize to students about lanthanides and actinides chemistry. The students will get knowledge about their discovery, extraction, separation, electronic configuration and their applications.

Here is a brief description of course outlines:

Lanthanides:

General characteristics, occurrence, extraction and general principles of separation, electronic structure and position in the periodic table, lanthanides contraction, oxidation states, spectral and magnetic properties and uses.

Actinides:

General characteristics, electronic structure, oxidation state and position in the periodic table, Extraction and applications of Uranium and Thorium, artificial transmutation, synthesis of tracer elements, their role in nuclear, industrial and chemical reactions.

Learning Outcomes

Upon successful completion of the course, the student will:

1. Have an in-depth knowledge of electronic configuration f- block elements and its impact on their magnetic, spectral and radioactive properties.
2. Importance of Lanthanides and Actinides in industry.
3. Understand the extraction processes of lanthanides and synthesis of actinides by artificial transmutation.

Course Content		Assignments/Readings
Week 1	Introduction of f-block elements and Lanthanides	Reading from recommended books
		Examples solving practices
Week 2	General characteristics	Reading from recommended books
		Examples solving practices
Week 3	Occurrence and extraction , Cracking of ores	Reading from recommended books
		Examples solving practices
Week 4	Separation of individual Lanthanides	Reading from recommended books
		Examples solving practices
Week 5	Electronic structure, oxidation and position in the periodic table	Reading from recommended books
		Examples solving practices
Week 6	Lanthanides contraction	Reading from recommended books
		Examples solving practices
Week 7	Spectral and magnetic properties and uses.	Reading from recommended books
		Examples solving practices
		Reading from recommended books

Week 8	Revision of all aspects of Lanthanides' chemistry	Examples solving practices
Week 9	Mid term assessment	
Week 10	General characteristics of Actinides.	Reading from recommended books
		Examples solving practices
Week 11	Electronic structure, oxidation state and position in the periodic table.	Reading from recommended books
		Examples solving practices
Week 12	Extraction and applications of Uranium	Reading from recommended books
		Examples solving practices
Week 13	Extraction and applications of Thorium	Reading from recommended books
		Examples solving practices
Week 14	Artificial transmutation, synthesis of tracer elements	Reading from recommended books
		Examples solving practices
Week 15	Their role in nuclear, industrial and chemical reactions.	Reading from recommended books
		Examples solving practices
Week 16	Revision of all aspects of actinides' chemistry	Reading from recommended books
		Examples solving practices

Textbooks and Reading Material

1. Housecraft, C. and Sharpe, A. G., (2012), "*Inorganic Chemistry"*, 4th ed., Prentice Hall.
2. Shriver, D. and Atkins, P.,(2010), "*Inorganic Chemistry"*, 5th ed., W. H. Freeman & Company.
3. Ullah, S., (2020) *"Inorganic Chemistry"*, Ilmi Kitab Khana, Lahore.
4. Atkins, P. and Jones, L.,(2010), "*Chemicals Principles",* 5th ed., W. H. Freeman & Company.
5. Huheey, J. E., Kieter, E. A. and Kieter, R. L.,(1997), "*Inorganic Chemistry: Principles of Structure and Reactivity",* 4th ed., Prentice Hall.
6. 6. Rehman, R., and Bhatti, H.N., (2015) "*Advanced Inorganic Chemistry", Volume I*, Carvan Book House Lahore.

Teaching Learning Strategies

1. Lecture Based Examination (Objective and Subjective)
2. Assignments
3. Class discussion
4. Quiz
5. Tests

Assignments: Types and Number with Calendar

1. Lanthanides: Extraction and applications
2. Actinides: synthesis and applications / Uranium extraction and applications