

13. Ansari, F. L., Qureshi, R. and Qureshi, M. L., *Electrocyclic Reactions: From Fundamentals to Research*, Wiley-VCH, Germany, (1999).
14. Kürti, L. and Czako, B., *Strategic Applications of Named Reactions in Organic Synthesis: Back ground and Detailed Mechanisms*, Elsevier Inc., (2005).

**Semester-VI (3<sup>RD</sup> YEAR)**

**Course Title: ADVANCED PHYSICAL CHEMISTRY-I (ELECTROCHEMISTRY AND NUCLEAR CHEMISTRY)**

**Code:**

**CHEM-371**

**Credit Hours:**

**3**

**Course Objectives:**

Students will acquire knowledge and understanding about the theoretical and instrumental as well as application related aspects of conductometric, electrochemical techniques, alternative energy resources. They will also acquire information regarding nuclear binding energy, nuclear instabilities and decay mechanisms as well as the fission and fusion processes.

**Conductometry:**

Ions in solution, measurement of conductance and Kohlrausch's law, mobility of ions and transport number, conductometric titrations, Debye-Hückel theory and activity coefficient, determination of activities, application of conductance measurement.

**Electrochemistry:**

Redox reactions, spontaneous reactions, electrochemical cells, standard electrode potentials, liquid junction potential, electrochemical series, Nernst's equation, thermodynamic of redox reactions, measurement of pH and pKa, dynamic electrochemistry, Latimer Diagram, Frost Diagram, electrolytic cells, potentiometry, reference and indicator electrodes, voltammetry, fuel cells, corrosion and its prevention, fuel cell and hydrogen economy.

**Nuclear Chemistry:**

Atomic nucleus, nuclides, nuclear stability, modes of decay, nuclear energetics, nuclear models (shell + liquid drop model), fusion and fission, non-spontaneous nuclear processes, nuclear reactors, beta decay systematic.

**Course Title: ADVANCED PHYSICAL CHEMISTRY-II (GROUP THEORY & SYMMETRY)**

**Code:**

**CHEM-371**

**Credit Hours:**

**3**

**Group Theory and Symmetry:**

Symmetry in general perspective, symmetry operations (rotation, reflection, inversion) with graphical and mathematical expression, Unit cell, indexing of the crystal faces,