

# COURSES FOR COURSE BASKET FOR INTERDISCIPLINARY COURSES-2022

## CC S 520 – Retrosynthetic Approach for Organic Synthesis (Credit-2)

Teacher Name: Dr. Neeraj Gupta

### UNIT I: Types of organic compounds and functional group transformations

Types of common functional groups in organic compounds, Emphasis on the functional group inter-conversions and preparation of conversion flowcharts, Practice of common organic conversion by taking examples of simple organic compounds (mainly the alkyl and aryl halides, alcohols, Phenols, aldehydes, ketones and carboxylic acids). Types of organic reactions such as substitution, elimination and addition elimination (basic introduction only).

### UNIT-II Disconnection approach (Basic concept only)

Introduction to synthons and synthetic equivalents, importance of the order of events in organic synthesis. One group C-X and C-C disconnections only, Case studies of representative molecules are required, representative molecules for practice should include the simple organic compounds and not the complex molecules such straight chain molecules or monocyclic or bicyclic ring compounds.

## CCS 518: Nanoscienc (Credit-2)

Teacher Name: Dr. Pramod Kumar Gangwar

### UNIT I:

**Properties of Nanomaterials :Introduction:** Properties of materials & nanomaterials, role of size and shape in nanomaterials.

**Electronic Properties:** Classification of materials: Metal, Semiconductor, Insulator, Band structures, Brillouin zones, Mobility, Resistivity.

**Magnetic Properties:** Superparamagnetism, blocking. Important properties in relation to nanomagnetism.

**Optical Properties:** Photoconductivity, Optical absorption & transmission, Photoluminescence, Fluorescence, Phosphorescence, Electroluminescence. Thermal Properties and Mechanical Properties;

### UNIT II:

#### **Synthesis of Nanomaterials :**

**Chemical Methods:** Metal nanocrystals by reduction, Solvothermal synthesis, Photochemical synthesis, Electrochemical synthesis, Nanocrystals of semiconductors and other materials by arrested precipitation, Thermolysis routes, Sonochemical routes, Post-synthetic size-selective processing. Sol-gel, Micelles and microemulsions.

**Biological Methods of Synthesis:** Use of bacteria, fungi, Actinomycetes for nanoparticles synthesis, Magnetotactic bacteria for natural synthesis of magnetic nanoparticles; Mechanism of formation; Viruses as components for the formation of nanostructured materials; Synthesis process and application, Role of plants in nanoparticle synthesis.