

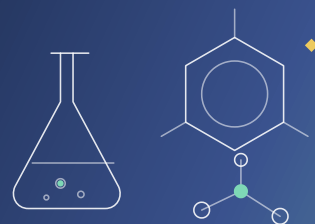
Module code

SPC-2202

Type of module

Undergraduate: Chemistry – Major Core

Chemistry of Functional Groups and Transition Metals



Modular credits

4

 Total student
engagement

56 hours

Prerequisite

None

Anti-requisite

None

Aims

To develop a fundamental understanding of the structure, stereochemistry, syntheses, reaction mechanisms of and spectroscopic methods for molecular identification; to provide a fundamental understanding of the structure, bonding, spectra and reactivity of transition metal complexes.

Module learning outcomes (MLO)

On successful completion of this module, a student will be expected to be able to:

MLO 1

Analyse the fundamental concepts of various organic functional groups.

MLO 2

Design synthetic pathways for target organic molecules and interpret spectroscopic data to determine the structures of organic compounds.

MLO 3

Analyse the nomenclature, stereochemistry, and bonding theories of transition metal complexes.

MLO 4

Interpret electronic spectra and predict the reactivity of d-block transition metal complexes.

Module contents

IUPAC nomenclature	Chemistry of alkyl halides, alcohols, amines, aromatic compounds	Stereochemistry of substitution (SN1, SN2) and elimination (E1, E2) reactions
Electrophilic aromatic substitution and nucleophilic addition reactions	Organic polymers (chain growth and step growth) and their applications	Spectroscopic techniques in the interpretation of organic compounds
Stereochemistry of transition metal complexes and their coordination chemistry	Crystal Field Theory and ligand-field splitting	Correlation with spectroscopic and magnetic properties

Molecular orbital theory for transition metal complexes

Electronic spectra: energies, intensities, and interpretation of electronic transitions

Racah parameters, Tanabe-Sugano diagrams, Latimer and Ebsworth diagrams

Reactivity of transition metals: substitution and redox reactions

Assessment

60%

Examination

40%

Coursework

Examination
60%

Quizzes/Tests
30%

10%

■ Examination — 60% ■ Quizzes/Tests — 30% ■ Assignments — 10%

Formative assessment

Weekly discussion and feedback

Summative assessment

COMPONENT

WEIGHTING

Examination

60%

Coursework

40%

Individual

40%

Quizzes/Tests

30%

Assignments

10%

Graduate attributes and skills

Programme learning objectives (PLO) addressed

1

PLO 1 (Fundamental Knowledge in Chemistry)

3

PLO 3 (Critical Thinking and Problem-Solving Skills)

4

PLO 4 (Communication and Collaborative Skills)

6

PLO 6 (Digital Literacy and Lifelong Learning Skills)

Sustainability concept addressed

4

SDG 4 Quality Education

Digital skills/software used (not limited to)

■ Word processing software (e.g. Microsoft Word, PDF)

■ Organisational tools (e.g. Outlook calendar)

■ Learning management system (e.g. Canvas)

Micro-credentialling option

No

Stackable towards GenBESTARI Undergraduate Degree Programme or other relevant Lifelong Learning Programmes

No

Document details

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Status New

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