

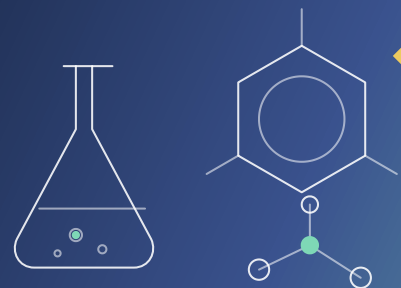
Module code

SPC-3301

Type of module

Undergraduate: Chemistry – Major Option

Reactive Intermediates in Organic Syntheses



Modular credits

2

Total student
engagement

28 hours

Prerequisite

**SPC-1202
Fundamental
Concepts in
Chemistry**

Anti-requisite

None

Aims

To explore the generation, reactivity and mechanisms of reactive intermediates such as free radicals, carbenes, and nitrenes in organic transformations, with emphasis on bond formation, rearrangements and photochemical processes that influence stereochemical outcomes.

Module learning outcomes (MLO)

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

MLO 1

Analyse the principles of free radical generation and apply their reactivity in carbon–carbon bond formation.

MLO 2

Evaluate the formation and reactivity of carbenes and nitrenes, and predict their stereochemical outcomes in organic reaction.

MLO 3

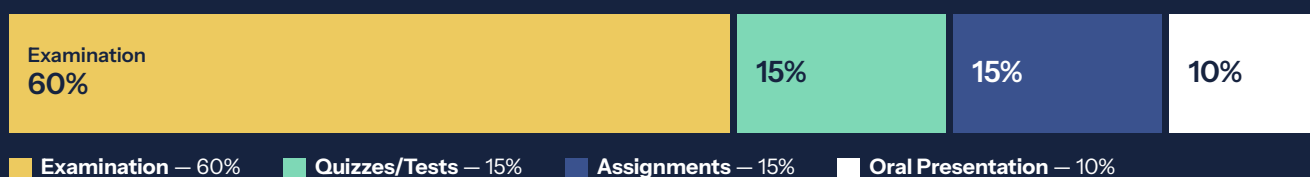
Analyse photochemical excitation principles and predict mechanisms and products of key organic photochemical reactions.

Module contents

Principles of free radical chain reactions	Reactivity and stability of free radicals	Use of free radicals in carbon-carbon bond formation
Introduction to the various radical initiators	Formation of singlet and triplet carbenes as well as nitrenes	Addition of carbenes and nitrenes to C–C double bonds
Mechanisms of 1,4- and 1,6-addition reactions	Stereochemistry of addition of carbene and nitrene to double bonds	Photochemical transformations for C–C double bonds, diazo compounds and azides
Photochemistry of carbonyl compounds		

Assessment

60% Examination
40% Coursework



Formative assessment

Weekly discussion and feedback

Summative assessment

COMPONENT	WEIGHTING
Examination	60%
Coursework	40%
Individual	30%
Quizzes/Tests	15%
Assignments	15%
Group	10%
Oral Presentation	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)
- Presentation software (e.g. PowerPoint)
- Organisational tools (e.g. Outlook calendar)
- Chemical drawing software (e.g. ChemSketch or ChemDraw)
- 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

Office **ODVCE** Document date **27 June 2026** Status **New** Approval **GBF (12/02/2026)**