Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	Organic Synthesis for Drug Design
Unit ID:	SCCHM3004
Credit Points:	15.00
Prerequisite(s):	(SCCHM1001 and SCCHM1002)
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	010501

Description of the Unit:

In this unit students will study the structure, synthesis, reactivity and analysis of simple organic molecules with a focus on pharmaceuticals and biochemicals. Specific topics will include reactive intermediates, molecular rearrangements, elimination reactions, nucleophilic substitution, aromatic and heterocyclic chemistry, carbonyl compounds and organometallic compounds. Students will apply these synthetic processes to drug design problems, both in theory and in the laboratory. It is highly recommended that you have completed SCCHM2001 Analytical Techniques (or are concurrently enrolled).

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment.

Course Level:

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory						
Intermediate						
Advanced			✔			

Learning Outcomes:

Knowledge:

K1. Apply the key concepts of chemical structure and bonding to an understanding of reactivity of organic molecules and intermediates.

K2. Discuss the reactivity of organic functional groups and write equations for their common reactions.

K3. Describe the mechanisms of key organic reactions and predict the conditions which favour these reactions.

Skills:

S1. Predict the products of a range of organic reactions.

S2. Demonstrate problem solving skills and ability to work both independently and in small groups.

S3. Design and undertake organic synthesis in the laboratory and use modern instrumental techniques to identify and characterize products.

Application of knowledge and skills:

A1. Suggest reaction pathways and favourable conditions for the synthesis of simple organic molecules from readily available materials and design and undertake these syntheses in the laboratory.

Unit Content:

In this unit, students will study the structure, synthesis, reactivity and analysis of simple organic molecules with a focus on pharmaceuticals and bio-chemicals.
•Reactive intermediates and molecular rearrangements
•Elimination reactions from alkenes
•Nucleophilic substitution and elimination
•Aromatic and heterocyclic chemistry
•Carbonyl compounds and their derivatives
•Organometallics
•Retrosynthesis

FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**ttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are be embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly assessed in each Course.*

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 1 Interpersonal	Students will demonstrate the ability to effectively communicate, inter-act and work with others both individually and in groups. Students will be required to display skills in-person and/or online in: • Using effective verbal and non-verbal communication • Listening for meaning and influencing via active listening • Showing empathy for others • Negotiating and demonstrating conflict resolution skills • Working respectfully in cross-cultural and diverse teams.	Not applicable	Not applicable
FEDTASK 2 Leadership	Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in: • Creating a collegial environment • Showing self -awareness and the ability to self-reflect • Inspiring and convincing others • Making informed decisions • Displaying initiative	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	Students will demonstrate an ability to work in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in: • Reflecting critically • Evaluating ideas, concepts and information • Considering alternative perspectives to refine ideas • Challenging conventional thinking to clarify concepts • Forming creative solutions in problem solving.	Not applicable	Not applicable
FEDTASK 4 Digital Literacy	Students will demonstrate the ability to work fluently across a range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in: • Finding, evaluating, managing, curating, organising and sharing digital information • Collating, managing, accessing and using digital data securely • Receiving and responding to messages in a range of digital media • Contributing actively to digital teams and working groups • Participating in and benefiting from digital learning opportunities.	Not applicable	Not applicable
FEDTASK 5 Sustainable and Ethical Mindset	Students will demonstrate the ability to consider and assess the consequences and impact of ideas and actions in enacting ethical and sustainable decisions. Students will be required to display skills in: • Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts • Committing to social responsibility as a professional and a citizen • Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses • Embracing lifelong, life-wide and life-deep learning to be open to diverse others • Implementing required actions to foster sustainability in their professional and personal life.	Not applicable	Not applicable

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
S1, S2, S3, A1	Design and carry out organic synthesis in the laboratory	Laboratory performance and written reports	30-50%
K1, K2, K3, S1, S2, A1	Short answer questions, synthesis problems, application of key chemical concepts to reactivity	Formative Tests and Summative Tests/Exams	50-70%

Adopted Reference Style:

Other (APA, IEEE or Royal Society of Chemistry (RSC) style)

Refer to the library website for more information

Fed Cite - referencing tool