

Course Outline (Higher Education)

School: School of Science, Psychology and Sport

Course Title: ORGANIC SYNTHESIS FOR DRUG DESIGN

Course ID: SCCHM3004

Credit Points: 15.00

Prerequisite(s): (SCCHM2001)

Co-requisite(s): Nil

Exclusion(s): Nil

ASCED: 010501

Description of the Course :

In this course 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.

Grade Scheme: Graded (HD, D, C, etc.)

Work Experience:

No work experience: Student is not undertaking work experience in industry.

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks.

Program Level:

Level of course in Program	AQF Level of Program					
	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 common reactions of alcohols, alkenes, alkyl halides, aromatic compounds, carbonyl compounds, carboxylic acids and their derivatives and organometallic compounds.
- K3.** Describe the mechanisms of substitution and elimination 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.

Course Content:

In this course, students will study the structure, synthesis, reactivity and analysis of simple organic molecules with a focus on pharmaceuticals and bio-chemicals.

Topics may include:

- Reactive intermediates and molecular rearrangements
- Elimination reactions from alkenes
- Nucleophilic substitution and elimination
- Aromatic and heterocyclic chemistry
- Carbonyl compounds and their derivatives
- Organometallics

Values:

- V1.** In this course, students will continue to develop an inquiring and curious attitude to science.
- V2.** Students will have the opportunity to collaborate with others in solving authentic synthetic problems.
- V3.** As they work through the content students will continue to acquire the ability for reflective, life-long learning.

Graduate Attributes

The Federation University FedUni graduate attributes (GA) are entrenched in the Higher Education Graduate Attributes Policy (LT1228). FedUni graduates develop these graduate attributes through their engagement in explicit learning and teaching and assessment tasks that are embedded in all FedUni programs. Graduate attribute attainment typically follows an incremental development process mapped through program progression. **One or more graduate attributes must be evident in the specified learning outcomes and assessment for each FedUni course, and all attributes must be directly assessed in each program**

Graduate attribute and descriptor		Development and acquisition of GAs in the course			
		Learning Outcomes (KSA)	Code A. Direct B. Indirect N/A Not addressed	Assessment task (AT#)	Code A. Certain B. Likely C. Possible N/A Not likely
GA 1 Thinkers	Our graduates are curious, reflective and critical. Able to analyse the world in a way that generates valued insights, they are change makers seeking and creating new solutions.	S2	A	AT1, AT2, AT3	A, A, A
GA 2 Innovators	Our graduates have ideas and are able to realise their dreams. They think and act creatively to achieve and inspire positive change.	S2, S3, A1	B, A, A	AT1, AT2	A, A
GA 3 Citizens	Our graduates engage in socially and culturally appropriate ways to advance individual, community and global well-being. They are socially and environmentally aware, acting ethically, equitably and compassionately.	S3	B	AT2	B
GA 4 Communicators	Our graduates create, exchange, impart and convey information, ideas, and concepts effectively. They are respectful, inclusive and empathetic towards their audience, and express thoughts, feelings and information in ways that help others to understand.	S2, S3, A1	A, A, A	AT2	A
GA 5 Leaders	Our graduates display and promote positive behaviours, and aspire to make a difference. They act with integrity, are receptive to alternatives and foster sustainable and resilient practices.	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1, K2, K3, S1, S2, A1	Weekly tutorial/online assessments including short answer questions, synthesis problems, application of key chemical concepts to reactivity	Weekly tutorial/online assessment problems	20-30%
S1, S2, S3, A1	Design and carry out organic synthesis in the laboratory	Laboratory performance and written reports	20-30%
K1, K2, K3, S1, S2, A1	Short answer questions, synthesis problems, application of key chemical concepts to reactivity	Written examination (3 hours)	50-60%

Adopted Reference Style:

Australian Harvard