

# NATS 3058 PHARMACOLOGICAL CHEMISTRY

**Credit Points** 10

**Coordinator** Christopher Gordon ([https://directory.westernsydney.edu.au/search/name/Christopher Gordon/](https://directory.westernsydney.edu.au/search/name/Christopher%20Gordon/))

**Description** This interdisciplinary subject covers the principles of medicinal chemistry, which combines chemistry, physiology, biochemistry, and pharmacology. The subject focuses on the principles of medicinal chemistry and aims to provide students with an understanding of the relationships between atomic interactions and molecular structure to biomolecular targets and quantitative structure-activity relationships of drugs. Through the exploration of lead compounds design and discovery strategies, chemical synthesis, structure-activity relationship analysis, and in silico-aided methods, students will gain an understanding of the principles of drug design. The subject also emphasises on selected topics of medicinal chemistry including anti-microbial and chemotherapeutic agents to understand and explore their chemistry and structure-activity relationships. Practical experience in compound isolation, synthesis, purification, and characterization is also provided, allowing students to gain hands-on knowledge of the dynamic field of medicinal chemistry.

**School** Science

**Discipline** Medical Science

**Student Contribution Band** HECS Band 2 10cp

Check your fees via the Fees ([https://www.westernsydney.edu.au/currentstudents/current\\_students/fees/](https://www.westernsydney.edu.au/currentstudents/current_students/fees/)) page.

**Level** Undergraduate Level 3 subject

**Pre-requisite(s)** CHEM 1012

**Restrictions**

Successful completion of 120 credit points

## Learning Outcomes

After successful completion of this subject, students will be able to:

1. Identify the types of physicochemical forces and functional groups that govern the drug-target interactions
2. Describe the stereochemical and conformational requirements of drug-target interactions that impact drug activity
3. Appreciate the design of drug analogues using quantitative structure-activity relationship (QSAR) methodologies.
4. Compare and contrast the different strategies involved in new lead compound design and discovery.
5. Explore the chemistry and structure-activity relationships of selected antimicrobial and chemotherapeutic agents
6. Apply modern drug synthesis, purification, and analysis techniques through hands-on experiments
7. Present laboratory results using scientific writing conventions and graphical presentations

## Subject Content

1. Introduction to pharmacological chemistry
2. Functional groups and impact on drug activity

3. Introduction to Structure-Activity Relationships
4. Quantitative Structure-Activity Relationships (QSAR)
5. Metabolic pathways of drugs and reactions
6. Biotechnology in drug design and discovery
7. Strategies in search for new lead compounds
8. Natural-products-based approach to drug design and discovery
9. Computer-aided drug design and discovery
10. Fragment-based drug design and discovery
11. In silico methods of drug design and discovery
12. Selected topics in pharmacological chemistry - Antibacterial agents.
13. Selected topics in pharmacological chemistry – Antifungal agents
14. Selected topics in pharmacological chemistry - Antiviral agents
15. Selected topics in pharmacological chemistry - Anticancer agents
16. Practical molecular synthesis, compound isolation, purification, and structural characterisation

## Special Requirements

Essential equipment

Laboratory PPE including an approved lab coat, enclosed footwear, safety goggles and hair ties for beyond-shoulder-length hair.

## Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task	Mandatory
Quiz	8 x MCQs and 2 x short answer responses per each quiz	25	N	Individual	N
Practical	180 mins ea.(x6)	20	N	Group	N
Report	1000 words	15	N	Individual	N
Report	3000 words	40	N	Group/ Individual	N

Teaching Periods

## Autumn (2025)

### Campbelltown

#### On-site

**Subject Contact** Christopher Gordon ([https://directory.westernsydney.edu.au/search/name/Christopher Gordon/](https://directory.westernsydney.edu.au/search/name/Christopher%20Gordon/))

View timetable ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=NATS3058\\_25-AUT\\_CA\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=NATS3058_25-AUT_CA_1#subjects))