

# NATS 7007 DRUG BIOTRANSFORMATION AND MOLECULAR MECHANISMS OF TOXICITY

**Credit Points** 10

**Legacy Code** 301139

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

**Description** This subject provides a strong conceptual foundation of enzymology and mechanisms of drug biotransformation pathways. As a foundation for learning we will provide examples of drugs and other xenobiotics that exhibit toxicity related to biotransformation. This subject is taught by the University of Florida as part of a collaborative venture between the University of Florida and Western Sydney University. Note: Further information on this subject is available from the University of Florida.

**School** Science

**Discipline** Forensic 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** Postgraduate Coursework Level 7 subject

**Pre-requisite(s)** NATS 7030

## Restrictions

Students must be enrolled in 3741 Master of Forensic Science, 3742 Graduate Diploma in Forensic Science or 3743 Graduate Certificate in Forensic Science.

## Learning Outcomes

On successful completion of this subject, students should be able to:

1. Predict from the structure of a xenobiotic, the structures of its probable metabolites including intermediates and final products
2. Predict the enzymes (including isozymes where known) likely to be involved in the biotransformation of a xenobiotic and its primary metabolites
3. Understand and correctly use the terminology of the field
4. Understand and be able to predict the effects of prototype inducers of xenobiotic biotransformation on enzymes present in liver and other organs
5. Understand and be able to predict the effects of prototype inhibitors of various xenobiotic biotransformation reactions
6. Understand the role of route of administration on the fate of a xenobiotic or the action of a modulator of xenobiotic transformation
7. Understand the roles of transporter proteins in directing uptake and efflux of xenobiotics and their metabolites
8. Understand the basis for interaction between reactive metabolites and cellular macromolecules, and be able to predict the potentially reactive metabolites of a particular xenobiotic

9. Comfortably navigate the WWW and know how to locate and use web based resources for their interest and further education
10. Use web based tools for communication and for the education of themselves and others

## Subject Content

Module 1 Overview of Xenobiotic Metabolism  
 Module 2 Cytochrome P450  
 Module 3 Flavin Monooxygenase and Other Oxidative Enzymes  
 Module 4 Ester/Amide Hydrolysis  
 Module 5 Epoxide Hydrolases  
 Module 6 Glucuronosyltransferases and Glucosyltransferase  
 Module 7 Sulfotransferases  
 Module 8 Glutathione S-transferases  
 Module 9 Other Phase II Reactions  
 Module 10 Transport of Xenobiotics and Their Metabolites  
 Module 11 Metabolism and Toxicity General Concepts  
 Module 12 Metabolic Activation of Drugs  
 Module 13 Metabolic Activation of Industrial Chemicals  
 Module 14 Metabolic Activation of Pyrolysis Products  
 Module 15 Metabolic Activation of Natural Products

## 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	Mandatory Task
Final Exam	Not specified	100	N	Individual	N

Teaching Periods

## Uni of Florida - Term 3 (2025)

### Online

### Online

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

View timetable ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=NATS7007\\_25-FT3\\_ON\\_2#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=NATS7007_25-FT3_ON_2#subjects))