

ENVS3004: Ecotoxicology

Callaghan

Semester 1 - 2024



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

OVERVIEW

Course Description	The course provides students with an introduction to the field of ecotoxicology: the study of the fate and effects of contaminants in ecosystems. Students will gain knowledge of the principles and current theoretical issues within the field. The course models the process of conducting collaborative scientific research in the field of ecotoxicology from hypothesis formulation, to design, sampling, analysis and dissemination of findings through a variety of scientific contexts. As such, the course provides students with an understanding of experimental design and analysis, designing and performing ecotoxicological research, and the skills of presenting findings in both written and oral scientific settings.
Academic Progress Requirements	Nil
Requisites	This course replaces BIOL3350. If you have successfully completed BIOL3350 you cannot enrol in this course.
Assumed Knowledge	STAT1070; BIOL1002 or BIOL1070 (or BIOL1050)
Contact Hours	Callaghan Computer Lab Face to Face On Campus 21 hour(s) per term starting Week 1 Lecture Face to Face On Campus 2 hour(s) per week(s) for 13 week(s) starting Week 1
Unit Weighting	10
Workload	Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

COURSE OUTLINE

CONTACTS

Course Coordinator	Callaghan A/Pr Geoff Macfarlane Geoff.Macfarlane@newcastle.edu.au (02) 4921 7858 Consultation: by appointment
Teaching Staff	Dr Richard Yu Richard.Yu@newcastle.edu.au (02) 4921 6990 Dr Mezbaul Bahar mezbaul.bahar@newcastle.edu.au (02) 4913 8747 A/Pr Mahmud Rahman Mahmud.Rahman@newcastle.edu.au (02) 4913 8754
School Office	School of Environmental and Life Sciences Room C228 Chemistry Building Callaghan CESE-SELS@newcastle.edu.au +61 2 4921 5080 9am-5pm (Mon-Fri)

SYLLABUS

Course Content

- Contaminants and their fate in ecosystems
- Major classes of contaminants
- Routes by which contaminants enter ecosystems
- Environmental fate of contaminants in individuals and ecosystems
- The effects of contaminants on individual organisms
- Toxicity testing
- Biochemical and molecular effects of contaminants
- Physiological, organ level, individual and behavioural effects of contaminants
- Interactive effects of contaminants
- Biomonitors
- Biomarkers
- Effects of contaminants on populations and communities
- Population level effects and population dynamics
- Evolutionary responses to environmental stressors
- Community and ecosystem level effects Experimental design and data analysis
- Ecological risk assessment and environmental management
- Bioremediation

Course Learning Outcomes

On successful completion of this course, students will be able to:

1. Navigate and synthesise the scientific literature to gain a detailed knowledge of the sub-discipline area of ecotoxicology;
2. Apply knowledge of ecotoxicological theory to new environmental situations;
3. Interpret, summarise, validate and critique ecotoxicological data from the scientific literature;
4. Analyse field and/or laboratory data.
5. Interpret and analyse statistical data;
6. Make informed management decisions based on data;
7. Work as part of a team to design, plan, carry out, analyse and report the findings of an experiment in ecotoxicology;
8. Communicate findings to a scientific audience in both written and oral formats.

SCHEDULE

Week	Week Begins	Lecture	Tutorial	Assessment Due
1	26 Feb	Experimental design	no tutorial	
2	4 Mar	Major classes of pollutants and the routes by which they enter ecosystems	Paper 1 - Critique and discussion.	
3	11 Mar	Major classes of pollutants and the routes by which they enter ecosystems	Data Analysis Microplastics tutorial	Critique 1 due Friday 15th March midnight
4	18 Mar	Toxicity Testing	Writing a paper and peer review PFAS tutorial	
5	25 Mar	Biochemical and molecular mechanisms of toxicity	no tutorial	
6	1 Apr	Interactions of chemicals	no tutorial	Draft Scientific paper due Friday 5th April midnight
7	8 Apr	Biomonitoring and biomarkers	no tutorial	Peer review due Friday 12th April midnight
Mid-Semester Recess				
Mid-Semester Recess				
8	29 Apr	Fate of metals in ecosystems and bioremediation	Paper 2 Critique and discussion	Final Paper and letter to editor due Friday 3rd May midnight
9	6 May	Remediation of metals: physico-chemical methods and bioremediation	no tutorial	Critique 2 due Friday 10th May midnight
10	13 May	Ecological risk assessment	ERA tutorial	
11	20 May	Arsenic in the environment	Arsenic tutorial	
12	27 May	Revision and exam preparation	Lab tour	Research Proposal due Friday 31st May midnight
13	3 Jun	no lecture	no tutorial	
Examination Period				
Examination Period				

ASSESSMENTS

This course has 4 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Critiques	Friday 15th March midnight Friday 10th May midnight	Individual	10%	1, 2, 3, 6
2	Draft Paper, Peer Review, Final Paper and Letter to Editor	Draft Friday 5th April midnight Peer review Friday 12th April midnight Final Friday 3rd May midnight	Individual	45%	4, 5, 7, 8
3	Research Proposal	Friday 31st May midnight	Individual	15%	1, 2, 3, 4, 5, 8
4	Final Examination	Examination period	Individual	30%	1, 2, 6

Late Submissions

The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - Critiques

Assessment Type	Written Assignment
Purpose	Critiques: students are asked to undertake critiques to gain skills in synthesising, summarising and critiquing the ecotoxicological literature
Description	Students write a 2-page critique of a scientific paper of their choice on the topic advised
Weighting	10%
Length	2 pages
Due Date	Friday 15th March midnight Friday 10th May midnight
Submission Method	Online
Assessment Criteria	Submit critique and original paper you based your critique on to CANVAS
Return Method	Rubric will be provided on CANVAS
Feedback Provided	Online
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 2 - Draft Paper, Peer Review, Final Paper and Letter to Editor

Assessment Type	Written Assignment
Purpose	Scientific paper: undertaking the scientific paper fosters skills in data manipulation, statistical analysis, interpreting data, and communicating findings in writing. Peer review encourages critical assessment of the written work of others and allows one to reflect on their own writing style
Description	Students analyse a dataset and write a scientific paper based on outcomes of analysis
Weighting	45%
Length	see CANVAS
Due Date	Draft Friday 5th April midnight Peer review Friday 12th April midnight Final Friday 3rd May midnight
Submission Method	Online
Assessment Criteria	Rubric provided on CANVAS
Return Method	Online
Feedback Provided	Online.
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 3 - Research Proposal

Assessment Type	Proposal / Plan
Purpose	Research proposal: encourages students to independently propose a scientific hypothesis, design a study and communicate this in writing.
Description	Students write a proposal of an experiment in ecotoxicology of their choice
Weighting	15%
Length	see CANVAS
Due Date	Friday 31st May midnight
Submission Method	Online
Assessment Criteria	Rubric provided on CANVAS
Return Method	Online
Feedback Provided	Online.
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 4 - Final Examination

Assessment Type	Formal Examination
Purpose	Final examination: the final examination is to assess knowledge acquisition in the sub-discipline area of ecotoxicology
Description	A final examination of short answer questions testing theoretical acquisition and application
Weighting	30%
Due Date	Examination period

Submission Method	Online
Assessment Criteria	examination
Return Method	Online
Feedback Provided	Online
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

*Skills are those identified for the purposes of assessment task(s).

Communication Methods

Communication methods used in this course include:

- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.
- Email: Students will receive communications via their student email account.
- Face to Face: Communication will be provided via face to face meetings or supervision.

Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

Oral Interviews (Vivas)

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the [Oral Examination \(viva\) Procedure](#). In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the [Student Conduct Rule](#).

Academic Misconduct

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to <https://policies.newcastle.edu.au/document/view-current.php?id=35>.

**Adverse
Circumstances**

The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:

1. the assessment item is a major assessment item; or
2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;
3. you are requesting a change of placement; or
4. the course has a compulsory attendance requirement.

Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at <https://policies.newcastle.edu.au/document/view-current.php?id=236>.

**Important Policy
Information**

The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at <https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures> that support a safe and respectful environment at the University.

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.

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