

BIOL2220: Plant Adaptation to Climate Change

Callaghan

Semester 2 - 2023



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

OVERVIEW

Course Description

Plants are multicellular, sessile organisms composed of many different cell types originated from restricted regions of plant tissues called meristems. The coordinated development of different plant cell types requires cell division, expansion and differentiation and their organisation into specific tissues and organs to produce a functional plant. Much of this highly ordered cell development is driven by gene expression in response to the surrounding environment. Building on this knowledge, this course explores the adaptive response of plant vegetative and reproductive development to a changing environment. Understanding this complex interaction between plants and their environment is of high importance as it can be exploited to sustain and improve plant fitness and productivity to benefit ecosystem health and/or agriculture. The course provides opportunities to (i) achieve a systematic understanding of plant development and function, and (ii) hone skills in developing logical arguments via the analysis and interpretation of scientific data.

Assumed Knowledge Contact Hours

BIOL1001 and BIOL1002 or BIOL1010 and BIOL1020.

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Lecture

Face to Face On Campus

3 hour(s) per Week for Full Term

Tutorial

Face to Face On Campus

1 hour(s) per Week for Full Term

Unit Weighting Workload

10

Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

COURSE OUTLINE

www.newcastle.edu.au

CRICOS Provider 00109J

CONTACTS

Course Coordinator **Callaghan**
Dr Joseph Pegler
Joseph.Pegler@newcastle.edu.au
(02) 4921 6129
Consultation: Consultation: By email. If urgent by phone or office (Biology Building B112)

Teaching Staff Dr. Ben Long (delivering content Week 6 to 12)
Ben.Long@newcastle.edu.au

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9am-5pm (Mon-Fri)

SYLLABUS

Course Content The development of a plant cell progresses from cell division, to expansion and finally differentiation with each stage of this process regulated by various external signals that regulate gene expression. Thus, the course contains the following components which are taught sequentially:

- Cell division
- Cell expansion
- Cell differentiation
- Plant cell structure and organelles
- Adaptation of vegetative development
- Adaptation of reproductive development

Course Learning Outcomes **On successful completion of this course, students will be able to:**

1. Describe specific plant cell structures and explain their functional significance;
2. Define the core concepts of plant cell development and describe their interaction with the surrounding environment;
3. Define the unique processes specific to plant vegetative and reproductive development;
4. Explain how plant cells perceive and interpret environmental signals;
5. Interpret scientific data and literature;
6. Identify and investigate biological problems.

Course Materials **Other Resources:**

- The Course Canvas site can be accessed at <https://canvas.newcastle.edu.au/>. Lecture notes, assessment details and quizzes, and announcements about the course will all be available on the Canvas site, and you should check it regularly throughout the course.

Recommended Reading:

- Recommended reading material will be posted on the Canvas site.

Recommended Text:

- Taiz, L. and Zeiger, E. (2022). Plant Physiology and Development. Seventh Edition, Sinauer Associates Inc., Massachusetts, USA.

SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	17 Jul	Plant gene expression and the cell cycle	Lecture (x3) Tutorial (x1) Dr. Pegler	
2	24 Jul	Plant cell division	Lecture (x3) Tutorial (x1) Dr. Pegler	
3	31 Jul	Plant cell structure and organelles	Lecture (x3) Tutorial (x1) Dr. Pegler	
4	7 Aug	Plant signalling and hormones	Lecture (x3) Tutorial (x1) Dr. Pegler	Tutorial Exercise 1 (in class) due 1 pm Wednesday 9th August
5	14 Aug	Plant signalling and hormones	Lecture (x3) Tutorial (x1) Dr. Pegler	Online Quiz 1 due by 5 pm Friday 18th August
6	21 Aug	Plant cell expansion	Lecture (x3) Tutorial (x1) Dr. Long	
7	28 Aug	Plant cell expansion	Lecture (x3) Tutorial (x1) Dr. Long	Tutorial Exercise 2 (in class) due 1 pm Wednesday 30th August
8	4 Sep	Plant cell differentiation	Lecture (x3) Tutorial (x1) Dr. Long	Online Quiz 2 due by 5 pm Friday 8th September
9	11 Sep	Plant cell differentiation	Lecture (x3) Tutorial (x1) Dr. Long	
10	18 Sep	Plant stress responses and acclimation	Lecture (x3) Tutorial (x1) Dr. Long	Tutorial Exercise 3 (in class) due 1 pm Wednesday 20th September
Mid Term Break				
Mid Term Break				
11	9 Oct	Plant stress responses and acclimation	Lecture (x3) Tutorial (x1) Dr. Long	Online Quiz 3 due by 5 pm Friday 13th October
12	16 Oct	Plant stress responses and acclimation	Lecture (x3) Tutorial (x1) Dr. Long	
13	23 Oct		Lecture (x3) Tutorial (x1) Dr. Long	
Examination Period				
Examination Period				

ASSESSMENTS

This course has 3 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Tutorial Exercises	In tutorial on Wednesday of Weeks 4, 7 and 10	Individual	30%	1, 2, 3, 4, 5, 6
2	Online Quizzes	Must be completed by 5pm on Friday of Weeks 5, 8 and 11.	Individual	30%	1, 2, 3, 4, 5
3	Final Exam	Formal Examination Period	Individual	40%	1, 2, 3, 4

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 - Tutorial Exercises

Assessment Type	Tutorial / Laboratory Exercises
Description	Tutorial Exercises
Weighting	30%
Due Date	In tutorial on Wednesday of Weeks 4, 7 and 10
Submission Method	In Class
Assessment Criteria	Exercises will be submitted to Canvas prior to the tutorial session (Wednesday 1 pm, Weeks 4, 7 and 10). Answers will be discussed, and exercises marked during the sessions. The marked assessment will be submitted to Canvas (Wednesday 11:59 pm, Weeks 4, 7 and 10). Short answer questions will assess understanding of the field of Plant Adaptation to Climate Change. Full marks will be allocated for responses which provide comprehensive and correct information. Partial marks will be allocated for answers which incompletely address the question or display a lack of understanding of the topic.
Return Method	In Class
Feedback Provided	In Class

Assessment 2 - Online Quizzes

Assessment Type	Quiz
Description	Online Quizzes (Canvas)
Weighting	30%
Due Date	Must be completed by 5pm on Friday of Weeks 5, 8 and 11.
Submission Method	Online
Assessment Criteria	Multiple choice questions will assess understanding of the delivered Plant Adaptation to Climate Change content. Full marks will be allocated for the selection of the correct answer. No marks will be allocated for the selection of an incorrect answer.
Return Method	Not Returned
Feedback Provided	Online - Answers will be provided online after the due date, and discussed in class.

Assessment 3 - Final Exam

Assessment Type	Formal Examination
Description	Formal examination
Weighting	40%
Due Date	Formal Examination Period
Submission Method	Formal Exam
Assessment Criteria	Demonstrated conceptual understanding of scientific principles through clear written responses to exam questions.
Return Method	Not Returned
Feedback Provided	No Feedback

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/no-room-for/policies-and-procedures> that support a safe and respectful environment at the University.

Other Information

Reasonable Adjustment Plans (RAP)

If you are registered with AccessAbility and have been provided with a Reasonable Adjustment Plan (RAP), please ensure that you provide your Course Coordinator with a copy as soon as you can, or let your Course Coordinator know that you are still waiting for your RAP.

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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