

Course Information / *Ngā Whakamārama* - 2024

BIOL254

Principles of Plant Physiology

0.125 EFTS 15 Points

TERMS 3 and 4, Semester 2

Description / *Whakamahuki*

To introduce the principles of plant growth and development, including the basic anatomy of vascular plants, physiology of acquisition of vital resources (water, minerals and carbon), and how they grow and reproduce. To give an overview of the processes associated with the uptake and transport of water and mineral nutrients in plants, acquisition of carbon through photosynthesis, and the responses of plants to external stimuli and adverse growth conditions. To relate the relevance of plant physiology principles to developments in agriculture and biotechnology.

Course Co-ordinator / *Kairuruku Akoranga*

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Teachers / *Pūkenga*

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Intended Learning Outcomes (*Hua Akoranga*) and Associated Assessment (*Aromatawai*)

As a student in this course, I will develop the ability to:

- * Understand the scientific practice and principles of plant functional and developmental biology (Graduate Attribute 1: Mastery of discipline), and how knowledge about these concepts is relevant to traditional and contemporary realities of Māori society (Graduate Attribute 4: Biculturally competent and confident) and has led to improved productivity in modern agriculture (Graduate Attribute 2: Employable, innovative and enterprising): (assessment item: *final exam*).

- * Understand basic skills in plant laboratory science, and interpret experimental data (Graduate Attribute 2: Employable, innovative and enterprising): (*assessment items: lab reports*).
- * Access and utilise the scientific literature on plant physiology (Graduate Attribute 1: Mastery of discipline and 2: Employable, innovative and enterprising): (*assessment items: lab reports*)

Transferable Skills / Pūkenga Ngaio

As a student in this course, I will develop the following skills:

1. Completing tasks in a laboratory. Important in many science-related courses and jobs. *We will have lab. instructions on what is required in each lab. session.* (Graduate Attribute 2: Employable, innovative and enterprising): (*assessment items: lab reports*).
2. Providing required information in a written form of acceptable standard. This is necessary in most science-related courses and jobs. *We will provide feedbacks on lab reports.* (Graduate Attribute 2: Employable, innovative and enterprising): (*assessment items: lab reports*).
3. Synthesising information. In everyday life and in many job situations you will be required to read information from different sources, construct your own understanding and shape your own viewpoint. *In lectures we will discuss recent research papers in a group environment and this will develop your abilities to identify the essential elements of research outputs - you will then use in report writing.* (Graduate Attribute 2: Employable, Innovative and Enterprising): (*assessment items: lab reports and final exam*).

Assessment / Aromatawai

In-course assessment: (40% of the course marks)

Lab reports, based on the lab classes 2, 3, 5 and 6.

- * Lab class 2 report 10%
- * Lab class 3 report 10%
- * Lab class 5 report 10%
- * Lab class 6 report 10%

Due dates will be shown in the section of Assessment on LEARN.

Final Examination (60% of the course marks)

A 3-hour final exam covering the contents of the entire course will be held during the examination period following the end of TERM 4.

Passing the Course

In BIOL, we require a satisfactory level of achievement in both the theoretical aspects of the discipline and in practical activities. This means you must attend all class activities and submit all items of assessment unless you have a very good reason not to (e.g. medical reasons). **A student must achieve a combined score of at least 40% in both in-course assessment and tests/exams (as defined in the course outline), AND a total score of at least 50%, to be awarded a passing grade (C or better).** If

you fail to achieve the 40% minimum requirement, a grade of D will be awarded, even if your total score is greater than 50%.

Textbook

Taiz *et al* (2015) *Plant Physiology and Development*, 6th edition
Or Taiz and Zeiger (2010) *Plant Physiology* 5th ed,

Lectures

There are 2 lectures per week for this course in TERMS 3 and 4. Please check the latest details on CIS.

Lecture topics

Whole Plant Physiology (12 lectures by David)

Introduction to the course

Plant cells, tissues and organs

Plant cell division and meristems

The structures and functions of the phloem and xylem including discussion on secondary xylem

Acquisition of water and mineral resources

Acquisition of carbon - photosynthesis (2 lectures by Claudia)

Photosynthesis – introduction + light reactions I

Photosynthesis – carbon assimilation I

Photosynthesis – carbon assimilation II

Photosynthesis – physiological considerations/stress

Plant Growth and Development (6 lectures by Claudia)

Introduction to signals and signal transduction

Hormones

Examples for signal transduction and hormones in plants:

- 1) Seed development, dormancy and germination
- 2) Seedling responses to light and gravity
- 3) Flowering
- 4) Fruit development, Senescence, including fruit ripening, and abscission

Introduction to biotic interaction (4 lectures by Steven)

Laboratory Work

Information on the laboratories is provided in the laboratory manual. You will be provided with a copy of this manual during week 1 of lectures. You should read the lab manual before coming to the lab classes.

- * There are 6 labs in total that are run during TERMS 3 and 4 .
- * There is only one laboratory stream.
- * Lab class will not run every week.
- * Lab class 4 will be online on Learn; introducing the use of image J for root measurements and expected tools for data presentation, statistics needed for Lab 5 and 6.
- * Two of the laboratory classes (Lab 5 and 6) that you will conduct require plants to be measured after a 24 h treatment. You will need to come back to the lab for about 1 h on the afternoon of the following day after the lab. The time when the lab will be opened is flexible to suit people's timetables.

Laboratory Topics (instructor & date):

1. Plant anatomy during primary growth (David, 23.7)
2. Primary and secondary meristems (David, 30.7)
3. Osmosis, turgor and plasmolysis; mineral nutrition (David, 6.8)
4. Root phenotyping in Image J and lab report writing (Claudia, 20.8, (online on Learn))
5. Seed germination (Claudia, 17.9)
6. Physiological impact of hormones (Claudia, 24.9)

Class material on Learn (*Ako*) & use of *Turnitin*

Resources used or referred to in lectures will be available on-line on the course link in Learn.

Please also note that we may be requesting that you submit written work in both hard copy (for grading) and in electronic form (for assessment of originality using "*Turnitin*"). Instructions will be given on how you do this via Learn.

RULES, REGULATIONS, AND WHAT TO DO WHEN THINGS GO WRONG

[updated March 2023]

If in doubt: ASK! The course coordinator is happy to answer questions. All staff involved in the course are available for advice on specific issues.

What do I do if I have to miss a test/exam or if my performance was impaired?

In Biological Sciences, we require a satisfactory level of achievement in both the theoretical aspects of the discipline and in practical activities. **This means you must attend all class activities (labs, tutorials, fieldtrips)** and submit all items of assessment unless you have a very good reason not to (e.g. medical reasons) and if this has been approved by your course coordinator.

If you feel that **illness, injury, bereavement or other extenuating circumstances beyond your control** prevented you from completing a **test/exam** worth 10% or more of the total course assessment, or if these circumstances affected your performance in such assessments, you should apply for Special Consideration. Applications for Special Consideration should be submitted via the Special Consideration website <http://www.canterbury.ac.nz/study/special-consideration/> within five working days of the assessment or its due date. You should also notify the course coordinator. If you apply for Special Consideration because of medical reasons, you should visit a doctor within a reasonable timeframe (application form available on the website above or from the Student Health Centre).

The Special Consideration provisions are intended to assist students who have covered the work of a course but have been prevented by illness or other critical circumstances from demonstrating their mastery of the material or skills at the time of a text/exam – **they do not excuse you from doing the test/exam** within a reasonable time agreed with the course coordinator.

What do I do if I have to miss a quiz or assignment or if I need an extension?

You cannot apply for Special Consideration if you miss an assessment that is not a test/exam, such as a quiz, lab report, essay, literature review or other assignment, or if the test/exam is worth less than 10% or more of the total course assessment. If this happens or if you need an extension because of **illness, injury, bereavement or other extenuating circumstances beyond your control**, please contact the course coordinator and arrange an alternate activity and/or submission date. You should also do this if you have to miss a laboratory, tutorial or field trip.

What are other valid reasons to miss an assessment or mandatory course activity?

The Special Considerations policy (<https://www.canterbury.ac.nz/about/governance/ucpolicy/student/special-consideration-procedures-and-guidelines/>) outlines only a few kinds of activities that UC considers valid reasons for missing an assessment or mandatory course activity other than those outlined above. These include **involvement in international or national representative sport or cultural groups**. Holiday trips, birthday parties, weddings, work-related commitments etc. are not given special status in this University policy. Please contact your course coordinator to ask for an alternate activity and/or submission date if you are eligible.

Special Consideration for late discontinuation of a course

Students prevented by **extenuating circumstances** from completing the course after the final date for withdrawing, may apply for Special Consideration for late discontinuation of the course. Applications must be submitted via <http://www.canterbury.ac.nz/study/special-consideration/> no later than five working days after the examination period has finished.

Academic Integrity

It is the responsibility of each student to be familiar with the definitions, policies and procedures concerning academic misconduct/dishonest behaviour. Instances of academic misconduct will be dealt with in a serious and appropriate manner. Students should refer to: <https://www.canterbury.ac.nz/about/ako/academic-quality/academic-integrity/>

Plagiarism

It is essential that you are aware that plagiarism is considered a very serious offence by the academic community, the University and the School of Biological Sciences. Plagiarism is defined as taking content from another work or author and presenting it, without attribution, as if it is your own work. Content here includes text (sentences or major parts of sentences), display items (graphs and tables), and overall structure (the detailed sequence of ideas). Plagiarism includes:

- re-use of previous assignments (even if each individual sentence has been rephrased to say the same thing in different words, if the overall structure is re-used).
- copying of another student's work (with or without their consent).
- the unreferenced use of published material or material from the internet, e.g. cutting and pasting of paragraphs or pages into an essay.

- the generation of text using artificial intelligence technology without disclosure and when it is not intended to be part of an assignment.

For most pieces of in-term assessment you will be given information concerning the use of direct and indirect quotes from previously published work. If you have any doubt about the appropriate use of published material, please speak with an academic staff member. If you are unsure what plagiarism is, seek advice.

It is a School policy that courses will likely that you submit work electronically for subsequent analysis of originality using *Turnitin*. Students agree that by taking courses in BIOL, assessments may be submitted to Turnitin.com for textual similarity review. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Terms and Conditions of Use as posted on the Turnitin.com site.

Where do I hand in assignments and then collect them once marked?

All assignments should be submitted as directed by the course coordinator. Typically, this will be electronically via Learn for on-line grading and for analysis in *Turnitin*. If a hard copy is requested, assignments should be placed in the designated collection boxes in the foyer of the 2nd floor of the School of Biological Sciences (Julius von Haast building, at the top of the stairs). All assignments must be accompanied by a cover sheet signed by you stating that the submitted work is not plagiarised. Cover sheets are available on top of the collection boxes, or you can download one from the Biology website (<http://www.canterbury.ac.nz/media/documents/science-documents/assignment-coversheet.pdf>).

Marked assignments will be returned through Learn or, if in hard copy, can be collected from the School of Biological Sciences reception, unless directed otherwise by the course coordinator. Teaching staff will endeavour to return work as soon as possible, and should contact you if there are likely to be any delays that will prevent return within the maximum 4-week timeframe.

What if I can't get it finished in time?

Reports and assignments should be handed in on time. Extensions may be granted if you have a valid reason (see above). **If you require an extension, you should request one from the course coordinator** (or the lecturer responsible for marking the work), with as much notice as possible. Please do this BEFORE the deadline for the assignment. **If you have been given an extension and you have been asked to submit a hard-copy of your work, you should hand the work DIRECTLY to the course coordinator** (do not put it in the drop box as it may not be cleared after the due date).

If an extension has not been granted:

- work handed in within 1 hour of the deadline: penalty of up to 5 percentage points of the mark for the assignment (e.g., a mark of 75% might be reduced to 70%).
- work handed in 1 – 24 hours after the deadline: penalty of 10 percentage points of the mark for the assignment (e.g., a mark of 75% is reduced to 65%).
- work handed in 1 – 7 days after the deadline: penalty of 15 percentage points of the mark for the assignment (e.g., a mark of 75% is reduced to 60%).
- work handed in more than 7 days after the deadline will not be marked or earn credit.

What if I have written more than the word or page limit?

If there is a word limit on an assignment, it is usually there to stop you doing too much work and to encourage you to write succinctly. You can be up to 10% over without too much worry, but if the length increases beyond that your mark may suffer due to failure to follow the requirements. If you find yourself way over the word limit talk to the lecturer concerned about how to get your assignment to an acceptable length. Unless specifically advised that there is flexibility, you must adhere to the word limit indicated.

What if I fail part of the course?

In Biological Sciences, we require a satisfactory level of achievement in both the theoretical aspects of the discipline and in practical activities. This means you must attend all class activities and submit all items of assessment unless you have a very good reason not to (e.g. medical reasons). **A student must attain an average score of at least 40% for in-course assessments (e.g. assignments, reports, quizzes) and an average score of at least 40% in the exam and/or tests, AND score at least 50% overall for the course, to be awarded a passing grade. See the course outlines for clarification of the assessment items included in each category and ask the coordinator if you are still unsure.**

What's the best way to give feedback?

We welcome constructive feedback at all times – help us to make this a valuable course for you. We endeavour to remain approachable at all times. If you would rather give feedback anonymously, please use the online course survey or talk to lab demonstrators, or your class rep (who will all report back to the staff-student liaison committee that includes a representative from each of the undergraduate classes). Class representatives will be selected from each class at the start of course.

What's the best way to complain?

If you feel you have not been fairly treated during this course, please raise the issue with the lecturer or course coordinator in the first instance. Other avenues include your class rep., who can raise issues anonymously, or the UCSA education coordinator.

Grading

A+	90% or above
A	85 – 90
A-	80 – 84
B+	75 – 79
B	70 – 74
B-	65 – 69
C+	60 – 64
C	55 – 59
C-	50 – 54

A restricted pass (R) **may** be awarded to those who are close to a pass (i.e. an overall score of 48-49.9%) AND who have achieved at least a 40% overall score in both in-course assessment and tests/exams. If an R grade is awarded you gain credit for the course but **cannot continue into papers that require this course as a pre-requisite**. NB. The R grade is only available at 100 and 200 level - it cannot be awarded for third year papers.

Failing grades: D 40-49 E 0–39