



Queensland, Australia Trimester

|                     |                             |
|---------------------|-----------------------------|
| Course Code:        | 1014MSC                     |
| Course Name:        | Cells, Tissues & Regulation |
| Trimester:          | Trimester 2, 2017           |
| Program:            | Diploma of Health Sciences  |
| Credit Points:      | 10                          |
| Course Coordinator: | Dr Michael Hahn             |
| Document modified:  | 22 May 2017                 |

### Teaching Team

Your lecturer/tutor can be contacted via the email system on the portal.

Dr Michael Hahn      [michael.hahn@staff.griffithcollege.edu.au](mailto:michael.hahn@staff.griffithcollege.edu.au)

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### Staff Consultation

Your lecturer/tutor is available each week for consultation outside of normal class times. Times that your lecturer/tutor will be available for consultation will be given in the first week of lectures. A list of times and rooms will be published on the Griffith College Portal under the “myTimetable” link.

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## **Prerequisites**

**There are no prerequisites for this course**

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## **Brief Course Description**

Cells, Tissues and Regulation is a 10 Credit Point course situated within the first trimester of the Diploma of Health Science. The Diploma of Health Science is designed to provide students with a pathway to:

- \* further university studies in the Health Sciences, or
- \* direct employment.

This course describes the functions of cells and the tissues they form, and how the trillions of cells within the body communicate with one another. In addition, how cells and tissues are regulated to control variables such as body temperature, blood glucose levels and blood pressure in maintaining the body's internal balance (homeostasis). More specifically, the following topics are covered: (1) cellular structure and function, as well as the features of different tissues types formed by the different cell types; (2) cell-to-cell communication within the nervous and endocrine systems; (3) homeostatic mechanisms that maintain internal balance within the body by controlling variables such as temperature, blood glucose levels and blood pressure. The roles of the nervous and endocrine systems in homeostatic control will also be discussed; (4) the importance of microbiology and the mechanisms by which microbes can produce sicknesses, disrupting body homeostasis. The material covered in this course will provide background knowledge that will assist in the understanding of topics covered in the Anatomy and Physiology courses in all trimesters.

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## **Rationale**

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### **Aims**

The primary aims are:

- \* to discuss in general the cellular basis of life
- \* to describe how the human body is constructed, beginning with cells types and how these form tissues
- \* to provide an overview on how tissues provide the functional framework for the rest of the body and to cover, in some detail, the control systems which allow cells and tissues to communicate and function within the body.

Cells Tissues and Regulation is one of eight courses delivered in the Diploma of Health Sciences to provide a foundation for entry into a wide range of other programs and fields of study, from microbiology and molecular genetics to biochemistry, pharmacy, physiotherapy, dentistry and medicine.

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## Learning Outcomes

On completion of this course you should be able to :

- |   |
|---|
| <p><b>1</b> Describe the cellular basis of life, and discuss the fundamentals of human body construction and function at the cellular level, linking body organization with the different cells types that constitute the tissues of the body.</p>  |
| <p><b>2</b> Describe the structure of the cell membrane and explain its involvement in the concepts of: diffusion, transport, osmosis, tonicity; resting membrane potentials and action potentials; neural activity and synapses; endocrine activity and receptors; and renal control over blood pressure using salt and water balance.</p> |
| <p><b>3</b> Explain how endocrine and neural mechanisms allow communication between cells and tissues, controlling their function in order to maintain homeostasis and how disruption to homeostatic mechanisms can induce patho-physiological states, such as heat stroke and diabetes.</p>  |
| <p><b>4</b> List and describe the different types of microorganisms, their growth conditions and explain how they are cultured, identified and can live and cause disease in different cells and tissues of the human body.</p>   |
| <p><b>5</b> Demonstrate competency in laboratory skills including operation of a light microscope, cell and tissue identification, bacterial staining and identification, collecting, recording and interpretation of data, and working cooperatively in groups to generate and present results.</p>  |

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## Texts and Supporting Materials

### Required Texts:

Marieb E. N., Hoehn K. N. and MyiLibrary (2016). Human Anatomy & Physiology, Global Edition. [S.l.]: Pearson Education Limited.

Available at:

<http://libraryproxy.griffith.edu.au/login?url=http://lib.myilibrary.com?ID=803991>.

Marieb E. N., Mitchell S. J., Smith L. A. and MyiLibrary (2013) Human Anatomy and Physiology Laboratory Manual, Main Version: Pearson New International Edition. [S.l.]: Pearson Education, Limited. Available at:

<http://libraryproxy.griffith.edu.au/login?url=http://lib.myilibrary.com?ID=527314>.

### Recommended Reading:

Bear M. F., Connors B. W. and Paradiso M. A. (2016) Neuroscience: exploring the brain. Philadelphia: Wolters Kluwer.

Gillies J. and Marieb E. N. (2015) Laboratory manual for foundation year health. Frenchs Forest, N.S.W.: Pearson Australia.

Lee G., Bishop P. and MyiLibrary (2013) Microbiology and infection control for health professionals. Frenchs Forest, NSW: Pearson Australia. Available at:  
<http://libraryproxy.griffith.edu.au/login?url=http://lib.mylibrary.com?id=760181>.

Silverthorn D. U. (2013) Human physiology: an integrated approach. Boston: Pearson.

Silverthorn D. U., Johnson B. R., Ober W. C., Garrison C. W. and Silverthorn A. C. (2016) Human physiology: an integrated approach. [San Francisco]: Pearson.

NOTE: A bound copy of the entire lecture notes can be purchased from the Griffith bookshop.

Please note that the Marieb text and lab manual will be used for the rest of the Diploma.

### **Required Support Materials (available from Science Store G26\_3.12):**

- \* Laboratory coat
- \* Laboratory kit

Please Note: It is necessary to purchase only one set of laboratory support materials for use across your Diploma program.

The Laboratory Rules document is available on the course site via the Griffith College Student Portal.

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### **Organisation and Teaching Strategies**

Teaching methods will include lectures, as well as practical laboratories and tutorials. The teaching methods aim to provide students with the necessary tools to develop a strong knowledge base in cells, tissues and regulation. Students will gain practical skills, and develop competence in team work and problem solving in the laboratory setting.

Lecture notes, lecture slides and laboratory requirements, together with advice and/or links to study skill assistance etc will be included on the course site on Griffith College's Student Portal.

### **Class Contact Summary**

Classes for Cells, Tissues and Regulation include the following:

- \* **Lectures:** 3 hours per week.
- \* **Tutorials/Workshops:** 2 hours per week (week 1 – 12 inclusive).
- \* **Laboratories:** Two (2) hour laboratory sessions in weeks 3, 5, 7, 8, 10 . The first lab in week 3 will include an induction session.

Students will complete the Competency-Based Lab Examination during the last lab session in week 10 and present their Research Project in a seminar in week 11.

Laboratory (competency based) examination to cover material and skills that likely include:

- \* operation of light microscope
- \* use of oil immersion to identify bacteria
- \* identification of histological sections
- \* osmolarity calculation/estimation

**Note: ATTENDANCE AT LABORATORIES AND LABORATORY TUTORIALS IS COMPULSORY.** . These practical sessions provide learning activities that are essential to the learning outcomes in this course. Students will work in small groups to conduct experiments and develop problem solving skills. Students are expected to attend their scheduled laboratory class except in extenuating circumstances.

An attendance roll will be maintained for all laboratories. Students must read the Laboratory Safety requirements prior to attending their first laboratory, and comply with the dress and behaviour codes as described; Students **MUST WEAR LABORATORY COATS AND CLOSED IN SHOES FOR ALL LABORATORIES.** Students will be required to bring their laboratory manuals to laboratories. Content covered in these laboratories complements lecture material and hence will be assessed in both laboratory reports and examinations.

**IMPORTANT: All students must undertake the on-line health and safety training prior to being permitted entry into laboratories, and be familiar with the contents of the Laboratory Rules booklet.**

As part of your studies you are required to complete the following online Health and Safety Induction modules before you commence your formal learning activities.

**1. Student Basic Health and Safety Induction module (no need to print off completion certificate)**

**2. Health Lab Safety Induction module (you are required to print off the completed certificate and present it at your first laboratory session.)**

### **Attendance**

100% attendance is expected for all classes. You are reminded that your attendance in class will be marked for all elements. To receive full attendance, you must be present in the classroom on all occasions.

You are expected to bring work done at home to class for group and individual discussion.

Further development of ideas is expected during tutorial time.

### **Preparation and Participation in Class**

You are expected to read your text book and the lecture notes plus attempt any tutorial/workshop exercises before class so that each week you can actively contribute to your learning and the learning of others in your classes. You are expected to ask and answer questions and to initiate discussions and stimulate debate in group and class situations.

### **Consultation Times**

Attendance during consultation times is optional but you are encouraged to use this extra help to improve your learning outcomes.

### **Course Materials**

Lecture notes will be made available to you on the Griffith College student portal and you are advised to print these out and bring them to each class so that extra notes can be added.

### **Independent Study**

Independent study requires that you spend time outside classes engaged in research necessary to complete your assignments. Research includes reading the required text books, using library and internet facilities. For this 10 CP course, you will need to spend at least 10 hours per week engaged in activities that will help your learning and fulfil the course objectives. Thus, provided you have well used the formal contact hours each week, you would then complete any remaining hours engaged in independent study.

### **Program Progression**

You are reminded that satisfactory Program Progression requires that attendance in classes is maintained at equal to or greater than 80%, and that GPA is maintained at equal to or greater than 3.0 in any trimester [please see Griffith College Policy and Procedures Library - Program Progression Policy - for more information].

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## **Content Schedule**

The contents of the course include:

- \* an overview of body organisation with the different cells types which constitute the tissues of the body.
- \* an overview of how endocrine and neural mechanisms allow communication between cells and tissues, controlling their function.
- \* an overview of homeostatic control
- \* coverage of:

- cells; variation in cell type and function; tissues: connective, epithelial, neural and muscular;
- cell membranes: diffusion, transport, osmosis and tonicity; cell membranes: resting membrane potentials and action potentials; neural activity and synapses;
- endocrine activity and receptors;
- introduction to renal control over blood pressure, salt and water balance;
- homeostasis: overview and specific examples;

- introduction to microbiology

\* an overview of how disruption to homeostatic mechanisms can induce pathophysiological states, such as heat stroke and diabetes. Disease and dysfunction are not the major foci of the course, yet the topic of 'health' does receive some attention.

\* basic light microscopy and cell and tissue identification, and how osmolarity and tonicity are investigated experimentally.

**Laboratory topics:**

**Week 3 :** Compulsory Laboratory Introduction /Induction and Light Microscopy

**Week 5 :** Tissues

**Week 7 :** Osmolarity and tonicity

**Week 8 :** Introduction to microbiology

**Week 10 :** Competency based laboratory exam

**Weekly Teaching Schedule**

| <b>Week</b> | <b>Topic</b>  | <b>Activity</b> | <b>Readings</b>     |
|-------------|---|-----------------|---------------------|
| 1           | Structure and function of cells   | Lecture         | Marieb; Silverthorn |
|             | Introduction to course and assessment.  | Tutorial        |                     |
|             | Introduction to course and assessment.  | Workshop        |                     |
| 2           | From cells to tissues: Reviews the four basic tissue types- epithelium, connective tissue, nervous tissue and muscle (including The Integumentary System) | Lecture         | Marieb; Silverthorn |
|             | From cells to tissues: Reviews the four basic tissue types- epithelium, connective tissue, nervous tissue and muscle.                                     | Tutorial        |                     |
|             | From cells to tissues: Reviews the four basic tissue types- epithelium,   | Workshop        |                     |

|   |  |            |                           |
|---|--|------------|---------------------------|
|   | connective tissue, nervous tissue and muscle                                   |            |                           |
| 3 | Tissues  | Lecture    | Silverthorn ; Marieb      |
|   | Tissues  | Tutorial   |                           |
|   | Tissues  | Workshop   |                           |
|   | Compulsory Laboratory Introduction/Induction and Light Microscopy              | Laboratory | Lab Manual                |
| 4 | Diffusion, Osmosis and Active Transport  | Lecture    | Silverthorn ; Marieb      |
|   | Diffusion, Osmosis and Active Transport  | Tutorial   |                           |
|   | Diffusion, Osmosis and Active Transport  | Workshop   |                           |
| 5 | Introduction to Microbiology   | Lecture    | Marieb                    |
|   | Introduction to Microbiology   | Tutorial   |                           |
|   | Introduction to Microbiology   | Workshop   |                           |
|   | Osmolarity and tonicity  | Laboratory | Lab Manual                |
| 6 | Cellular neuroscience: structure of the neuron, the resting membrane potential | Lecture    | Marieb; Silverthorn; Bear |
|   | Cellular neuroscience: structure of the neuron, the resting membrane potential | Tutorial   |                           |
|   | Cellular neuroscience: structure of the neuron, the resting membrane potential | Workshop   |                           |
|   |  |            |                           |
| 7 | Cellular neuroscience: the action potential                                    | Lecture    | Lab Manual ; Lee & Bishop |
|   | Cellular neuroscience: the action potential                                    | Tutorial   |                           |
|   | Cellular neuroscience: the action potential                                    | Workshop   |                           |
|   | Tissues Osmolarity and tonicity  | Laboratory | Lab Manual                |
| 8 | Cell-to-cell communication: fast (synapses) and slow (hormones)                | Lecture    | Marieb                    |



|    |  |            |                      |
|----|--|------------|----------------------|
|    | Cell-to-cell communication: fast (synapses) and slow (hormones)          | Tutorial   |                      |
|    | Cell-to-cell communication: fast (synapses) and slow (hormones)          | Workshop   |                      |
|    | Introduction to Microbiology   | Laboratory | Lab Manual           |
| 9  | Cell-to-cell communication: slow (hormones) endocrine overview.          | Lecture    | Silverthorn ; Marieb |
|    | Cell-to-cell communication: slow (hormones) endocrine overview.          | Tutorial   |                      |
|    | Cell-to-cell communication: slow (hormones) endocrine overview.          | Workshop   |                      |
|    |  |            |                      |
| 10 | Principles of Homeostasis, Thermoregulation.                             | Lecture    | Silverthorn ; Marieb |
|    | Principles of Homeostasis, Thermoregulation.                             | Tutorial   |                      |
|    | Principles of Homeostasis, Thermoregulation.                             | Workshop   |                      |
|    | Lab prac exam  | Laboratory | Lab Manual           |
| 11 | Homeostasis: renal function, control over blood pressure, fluid balance. | Lecture    | Silverthorn ; Marieb |
|    | Homeostasis: renal function, control over blood pressure, fluid balance. | Tutorial   |                      |
|    | Homeostasis: renal function, control over blood pressure, fluid balance. | Workshop   |                      |
|    |  |            |                      |
| 12 | Homeostasis: blood calcium, blood glucose.                               | Lecture    | Silverthorn ; Marieb |
|    | Homeostasis: blood calcium, blood glucose.                               | Tutorial   |                      |
|    | Homeostasis: blood calcium, blood glucose.                               | Workshop   |                      |

## Assessment

This section sets out the assessment requirements for this course.

## Summary of Assessment

| Item | Assessment Task  | Weighting | Relevant Learning Outcomes | Due Date Week     |
|------|--|-----------|----------------------------|-------------------|
| 1    | Mid trimester examination  | 25%       | 1-2                        | 6                 |
| 2    | Competency based laboratory examination  | 15%       | 1-4                        | 10                |
| 3    | Research project   | 15%       | 1-2-3-4                    | 11                |
| 4    | Final examination<br><i>- Students must pass this assessment with a mark of at least 20 out of 50 to pass the course</i> | 45%       | 1-4                        | Final Exam period |

## Assessment Details

### 1. Health and safety induction module

**Rationale:** As a new student enrolled in the health sciences we wish to ensure that your period of study with us is a safe and enjoyable one. As part of your studies you are required to complete the following Health and Safety Induction modules before you commence your formal learning activities.

Assessment strategy: completion of online modules prior to the first laboratory session.

Presentation of a printed copy of the Health Lab Safety Induction module to your laboratory demonstrator.

Due date: before your first laboratory session in week 3.

Marking criteria: online submission.

### 2. Mid-trimester examination

**Rationale:** to examine knowledge acquired up to the end of week 5.

Assessment strategy: the exam will contain multiple choice questions as well as a number of short answer questions.

Marking criteria: Answers to multiple choice questions and comparison with model short question answers.

### **3. Competency-based laboratory examination**

**Rationale:** assessment of knowledge gained from laboratories, including laboratory skills and procedures.

Assessment strategy: This will consist of 6-10 exercises to be completed in the laboratory. Satisfactory completion of these tasks is required if students are to pass the course.

Laboratory (competency based) examination to cover material and skills that likely include: operation of light microscope

use of oil immersion to identify bacteria

identification of histological sections

osmolarity calculation/estimation

Marking criteria: demonstration of procedures and written answers to questions

### **4. Research project:**

**Rationale:** development and assessment of research and referencing skills, and capacity to work in a cohesive group. The laboratory research project is designed to introduce students to scientific research and the role it plays in the creation of original knowledge. Students will complete the project in small groups and present their results in poster format in class of week 11. Details of the marking criteria will be available on the student portal. Students will be required to submit the text of their research project to Turnitin (plagiarism detection software) before completing the creation of their posters. A guide to the use of Turnitin will be provided on the student portal.

Assessment strategy: students will work in groups throughout the trimester to prepare a poster for submission in week 10. This poster will then be presented to the rest of the class in week 11.

Marking criteria: peer and staff assessed.

### **5. Final examination:**

**Rationale:** to examine knowledge acquired throughout the course.

Assessment strategy: the final examination will cover material from the entire year, but with more emphasis on material covered after the mid- trimester examination. This will be a three hour examination.

Marking criteria: the exam will contain an approximately equal weighting of multiple choice and written answer questions.

Further detailed explanations of assessment expectations will be provided during class and where necessary on the course site on the student portal.

**IMPORTANT NOTE:** In order to pass this course and in addition to meeting the laboratory requirements, students must:

- 1. attend and attempt all assessment items; AND**
- 2. obtain at least 40% (20/50) in the final examination, AND**
- 3. achieve an overall course result (sum of all assessments) of 50%.**

### **Submission and Return of Assessment Items**

Normally you will be able to collect your assignments in class within fourteen [14] days of the due date for submission of the assignment.

## **Retention of Originals**

You must be able to produce a copy of all work submitted if so requested. Copies should be retained until after the release of final results for the course.

## **Extensions**

To apply for an extension of time for an assessment item you must submit a written request to your lecturer via the Student Website at least 48 hours before the date the assessment item is due. Grounds for extensions are usually: serious illness, accident, disability, bereavement or other compassionate circumstances and must be able to be substantiated with relevant documentation [e.g. medical certificate]. Please refer to the Griffith College website - Policy Library - for guidelines regarding extensions and deferred assessment.

## **Penalties for late submission without an approved extension**

Penalties apply to assignments that are submitted after the due date without an approved extension. Assessment submitted after the due date will be penalised 10% of the TOTAL marks available for assessment (not the mark awarded) for each day the assessment is late. Assessment submitted more than five days late will be awarded a mark of zero (0) For example:

- > 5 minutes and <= 24 hours 10%
- > 24 hours and <= 48 hours 20%
- > 48 hours and <= 72 hours 30%
- > 72 hours and <= 96 hours 40%
- > 96 hours and <= 120 hours 50%
- > 120 hours 100%

Note:

- Two day weekends will count as one day in the calculation of a penalty for late submission.
- When a public holiday falls immediately before or after a weekend, the three days will count as one day in the calculation of a penalty for late submission.
- When two public holidays (e.g. Easter), fall immediately before or after, or one day either side of a weekend, the four days will count as two days in calculating the penalty for late submission.
- When a single public holiday falls mid-week, the day will not be counted towards the calculation of a penalty.

Please refer to the Griffith College website - Policy Library > Assessment Policy for guidelines and penalties for late submission.

## Assessment Feedback

Your assessment will be marked by your peers and the convenor so that you can learn from your work. Feedback will be provided so that you can see the level you have reached in any skill. Your tutor will give you comments on your work and will be happy to discuss your assessment further, if you wish. You may see your tutor in his/her consultation time. Marks awarded for assessment items will also be available on the Griffith College Student Portal within fourteen [14] days of the due date for submission of the assessment.

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## Generic Skills

Griffith College aims to develop graduates who have an open and critical approach to learning and a capacity for lifelong learning. Through engagement in their studies, students are provided with opportunities to begin the development of these and other generic skills.

Studies in this course will give you opportunities to begin to develop the following skills:

| Generic Skills                   | Taught | Practiced | Assessed |
|----------------------------------|--------|-----------|----------|
| Written Communication            | Yes    | Yes       | Yes      |
| Oral Communication               |        | Yes       |          |
| Information Literacy             |        | Yes       |          |
| Secondary Research               |        | Yes       | Yes      |
| Critical and Innovative Thinking | Yes    | Yes       | Yes      |
| Academic Integrity               | Yes    | Yes       | Yes      |
| Self Directed Learning           |        | Yes       | Yes      |
| Team Work                        | Yes    | Yes       | Yes      |
| Cultural Intelligence            | Yes    | Yes       |          |
| English Language Proficiency     |        | Yes       | Yes      |

## Additional Course Generic Skills

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## **Additional Course Information**

Your feedback is respected and valued by your lecturers and tutors. You are encouraged to provide your thoughts on the course and teaching, both positive and critical, directly to your lecturer and tutor or by completing course and lecturer evaluations on the Griffith College portal whenever these are available.

Student feedback on their courses can be found by going to ‘Student Feedback’ under Support in the QBT Student Portal.

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## **Academic Integrity**

Griffith College is committed to maintaining high academic standards to protect the value of its qualifications. Academic integrity means acting with the values of honesty, trust, fairness, respect and responsibility in learning, teaching and research. It is important for students, teachers, researchers and all staff to act in an honest way, be responsible for their actions, and show fairness in every part of their work. Academic integrity is important for an individual’s and the College’s reputation.

All staff and students of the College are responsible for academic integrity. As a student, you are expected to conduct your studies honestly, ethically and in accordance with accepted standards of academic conduct. Any form of academic conduct that is contrary to these standards is considered a breach of academic integrity and is unacceptable.

Some students deliberately breach academic integrity standards with intent to deceive. This conscious, pre-meditated form of cheating is considered to be one of the most serious forms of fraudulent academic behaviour, for which the College has zero tolerance and for which penalties, including exclusion from the College, will be applied.

However, Griffith College also recognises many students breach academic integrity standards without intent to deceive. In these cases, students may be required to undertake additional educational activities to remediate their behaviour and may also be provided appropriate advice by academic staff.

As you undertake your studies at Griffith College, your lecturers, tutors and academic advisors will provide you with guidance to understand and maintain academic integrity; however, it is also your responsibility to seek out guidance if and when you are unsure about appropriate academic conduct.

In the case of a breach of academic integrity made against a student he or she may request the guidance and support of a Griffith College Student Learning Advisor or Student Counsellor.

Please ensure that you are familiar with the [Griffith College Academic Integrity Policy](#); this policy provides an overview of some of the behaviours that are considered breaches of academic integrity, as well as the penalties and processes involved when a breach is

identified.

For further information please refer to the Academic Integrity Policy on the Griffith College website – Policy Library.

### **Risk Assessment Statement**

This course follows Griffith College and Griffith University Workplace Health and Safety Laboratory guidelines.

The aim of workplace health and safety is to make sure that people do not get sick or injured at the workplace. The legislation dealing with this in Queensland is called the Workplace Health and Safety Act, 1995. Anyone who can affect workplace health and safety has an obligation under this Act.

As a student, you have an obligation to yourself and others to undertake activities in a safe manner. You must follow instructions which are provided for safety. You must not put yourself or anyone else at risk. Care especially needs to be taken when you are performing activities which can affect others. Please refer to the Laboratory Rules document available on the course site via the Griffith College Student Portal.

**Students must wear closed in shoes to all laboratory sessions for workplace health and safety reasons.**

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