# CHEM13082 *Nanotechnology: Health and the environment*
## Term 1 - 2019

Profile information current as at 25/04/2024 05:48 am



## General Information

### Overview
Nanotechnology and nanoscience are an emerging, revolutionary area of science that will lead to exciting developments in health, medicine, the environment, information technology and engineering (among other industries). In this unit, students will become familiar with existing uses of nanotechnology along with future opportunities in the nanoscience domain. Medical and environmental applications and the development of 'emerging technologies' will be discussed and the technical, environmental and social impacts of these technological advances explored.

### Details
Career Level: *Undergraduate*
Unit Level: *Level 3*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

### Pre-requisites or Co-requisites
Pre-requisite: CHEM11041 Chemistry for the Life Sciences or CHEM11042 Fundamentals of Chemistry
Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the Assessment Policy and Procedure (Higher Education Coursework).

### Offerings For Term 1 - 2019

- Mixed Mode
- Rockhampton

### Attendance Requirements
All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

### Residential Schools
This unit has a Compulsory Residential School for distance mode students and the details are:
Click here to see your Residential School Timetable.

### Website
This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.

## Class and Assessment Overview

### Recommended Student Time Commitment

Each 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

### Class Timetable

**Regional Campuses**
Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

**Metropolitan Campuses**
Adelaide, Brisbane, Melbourne, Perth, Sydney

### Assessment Overview

1. **Presentation and Written Assessment**
Weighting: 20%
2. **Practical and Written Assessment**
Weighting: 30%
3. **Examination**
Weighting: 50%

### Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the University's Grades and Results Policy for more details of interim results and final grades.

## CQUniversity Policies

**All University policies are available on the CQUniversity Policy site.**
You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the CQUniversity Policy site.

# Previous Student Feedback

## Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

### Feedback from Unit Evaluation

**Feedback**
Students have highlighted the textbook Nanoparticles in Anti-Microbial Materials: Use and Characterisation listed on the Unit Profile as not being useful.

**Recommendation**
Nanoparticles in Anti-Microbial Materials: Use and Characterisation will be removed from the list of textbooks.

### Feedback from Unit Evaluation

**Feedback**
The lab manual was seen to be hard to follow.

**Recommendation**
The experiments in the lab manual will be improved to make them more clear.

### Feedback from Unit Evaluation

**Feedback**
The textbook (Nanotechnology: An Introduction) is not very clear in its explanations.

**Recommendation**
The Ramsden textbook (Nanotechnology: An Introduction) will be replaced with another (to be identified) to meet the needs of the Unit and suit the background of our students (many of who have not done Physics at high school).

### Feedback from Unit Evaluation and Moodle Forum

**Feedback**
The complexity of the research proposal aspect of the second assessment task has been highlighted.

**Recommendation**
The second assessment task on research proposal writing will be simplified to to remove any expectation of projected expenses and research team. This will ensure students are able to understand its requirements better.

### Feedback from Unit Evaluation and anecdotal feedback

**Feedback**
Students have commented that teamwork was not effective in some instances, with group members not sharing the workload equally.

**Recommendation**
A Self and Peer Assessment component will be introduced as part of the group assessment task to better reflect and measure student input in each group.

### Feedback from Course review and discussions with Medical Sciences.

**Feedback**
Students would benefit from completing a second-year unit before enroling in CHEM13082.

**Recommendation**
In the future, appropriate proposals will be developed to swap the delivery of CHEM13082 with CHEM12078. If successful, this change will result in CHEM13082 being offered in Term 2, and CHEM12078 in Term 1. Thus, CHEM12078 can be a relevant second-year unit available to students which will strengthen their chemistry background before enroling in CHEM13082.

## Unit Learning Outcomes

**On successful completion of this unit, you will be able to:**

1. Discuss the basic principles of nanotechnology and nanoscience
2. Evaluate and synthesise information drawn from primary literature in the field of nanotechnology
3. Discuss actual and potential impacts of nanotechnology on society, health and the environment
4. Design possible solutions to significant societal problems in health, engineering, the environment and medicine using the principles of nanoscience and nanotechnology.

## Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level  ◦ Introductory Level  • Intermediate Level  • Graduate Level  ◦ Professional Level  ◦ Advanced Level

### Alignment of Assessment Tasks to Learning Outcomes

| Assessment Tasks | Learning Outcomes | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| 1 - Presentation and Written Assessment - 20% | • | • | • | |
| 2 - Practical and Written Assessment - 30% | | • | | • |
| 3 - Examination - 50% | • | | • | |

### Alignment of Graduate Attributes to Learning Outcomes

| Graduate Attributes | Learning Outcomes | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| 1 - Communication | • | • | • | • |
| 2 - Problem Solving | | • | • | • |
| 3 - Critical Thinking | • | • | • | • |
| 4 - Information Literacy | • | • | | • |
| 5 - Team Work | | | | • |
| 6 - Information Technology Competence | • | • | | • |
| 7 - Cross Cultural Competence | | | • | • |
| 8 - Ethical practice | | | • | • |
| 9 - Social Innovation | | | | |
| 10 - Aboriginal and Torres Strait Islander Cultures | | | | |

## Alignment of Assessment Tasks to Graduate Attributes

| Assessment Tasks | Graduate Attributes | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1 - Presentation and Written Assessment - 20% | • | | | • | | • | | | | |
| 2 - Practical and Written Assessment - 30% | • | • | • | • | • | • | • | • | | |
| 3 - Examination - 50% | • | • | • | | | | | | | |

# Textbooks and Resources

## Textbooks

**There are no required textbooks.**

**Additional Textbook Information**
A list of peer-reviewed papers and book chapters, available for free download will serve as reading materials.

## IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

# Referencing Style

All submissions for this unit must use the referencing style: Vancouver
For further information, see the Assessment Tasks.

# Teaching Contacts

**Shaneel Chandra** Unit Coordinator
s.chandra@cqu.edu.au

# Schedule

**Week 1 - 11 Mar 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| An Introduction to Nanotechnology | Nanotechnology: The Science of the invisible | |

**Week 2 - 18 Mar 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| | Past and present futures of nanotechnology | |

**Week 3 - 25 Mar 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| | Particle-by-particle nanotechnology | |

**Week 4 - 01 Apr 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| | Advances in food nanotechnology | |

**Week 5 - 08 Apr 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| | Nanotechnology in targeted drug delivery and therapeutics | |

**Vacation Week - 15 Apr 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|

**Week 6 - 22 Apr 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| | The implications and applications of nanotechnology in dentistry | |

**Week 7 - 29 Apr 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| | Nanoengineered biomaterials for skin regeneration | |

**Week 8 - 06 May 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| | Multifunctional nanocomposite sensors for environmental monitoring Carbon nanomaterials and their application to electrochemical sensors | **Group Poster** Due: Week 8 Wednesday (8 May 2019) 5:00 pm AEST |

**Week 9 - 13 May 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| | Green nanomaterials:On track for a sustainable future | |

**Week 10 - 20 May 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| | Nanoparticle-induced ecotoxicological risks in aquatic environments: Concepts and controversies | |

**Week 11 - 27 May 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| | Nanotechnology: Emerging health issues | Residential School: 28-29 May |

**Week 12 - 03 Jun 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| | | **Residential School Report** Due: Week 12 Wednesday (5 June 2019) 5:00 pm AEST |

**Review/Exam Week - 10 Jun 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|

**Exam Week - 17 Jun 2019**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|

## Assessment Tasks

### 1 Group Poster

**Assessment Type**
Presentation and Written Assessment

**Task Description**
For this task you will sign-up in groups of 4 to work on a poster. Your group should find a range of nanotechnology related research papers to inform the topic. This assessment task requires an in-depth analysis of current research focussing on journal articles. Your group must present key findings and methods in the poster. The poster should be created using PowerPoint (PC) or Keynote (Mac) publishing software. Groups are reminded that posters must be concise and effective in delivering meaningful and key information, your peer groups will be expected to ask questions during the Residential School.
Once the posters have been submitted on Moodle, they will be printed for you. On the second day of the Residential School, you will present these posters as a group to scientists and peers at the University. As this is a group activity, there will also be a self and peer assessment component in the assessment task. The total marks awarded will be 50% of the group mark for the poster + 50% SPA.

**Assessment Due Date**
Week 8 Wednesday (8 May 2019) 5:00 pm AEST
Via Moodle

**Return Date to Students**
Week 12 Friday (7 June 2019)
Marks will be provided via Moodle. Feedback will be given at the time of presentation of posters.

**Weighting**
20%

**Minimum mark or grade**
30%

**Assessment Criteria**
**Assessment criteria**
The poster will be judged according to the following three criteria:
1. Validity and current relevance of the scientific question and findings (20%)
2. Clear communication of the ideas (20%)
3. Ability to communicate ideas verbally to the audience and answer questions (60%)

**Referencing Style**

- Vancouver

**Submission**
Online

**Submission Instructions**
Please ensure a nominated member of the group uploads the poster by the specified due date and time.

**Learning Outcomes Assessed**

- Discuss the basic principles of nanotechnology and nanoscience
- Evaluate and synthesise information drawn from primary literature in the field of nanotechnology
- Discuss actual and potential impacts of nanotechnology on society, health and the environment

**Graduate Attributes**

- Communication
- Information Literacy
- Information Technology Competence

### 2 Residential School Report

**Assessment Type**
Practical and Written Assessment

**Task Description**
Students will work in pairs during the residential school and will be using advanced analytical

instrumentation to perform measurements of their work. At the end of the Residential School, each student will submit an individual summarised report of the experiments undertaken and results.  Word limit: 500 words.

**Assessment Due Date**
Week 12 Wednesday (5 June 2019) 5:00 pm AEST

**Return Date to Students**
Review/Exam Week Wednesday (12 June 2019)
Marks and feedback via Moodle

**Weighting**
30%

**Minimum mark or grade**
30%

**Assessment Criteria**
Demonstrated aims and objectives of each practical exercise: 30%
Critiquing and discussion of results: 50%
Formatting (including proper referencing, adhering to word limits): 20%

**Referencing Style**

- Vancouver

**Submission**
Online

**Submission Instructions**
To be submitted via Moodle

**Learning Outcomes Assessed**

- Evaluate and synthesise information drawn from primary literature in the field of nanotechnology
- Design possible solutions to significant societal problems in health, engineering, the environment and medicine using the principles of nanoscience and nanotechnology.

**Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice

## Examination

**Outline**
Complete an invigilated examination.

**Date**
During the examination period at a CQUniversity examination centre.

**Weighting**
50%

**Length**
180 minutes

**Minimum mark or grade**
40

**Exam Conditions**
Open Book.

**Materials**
Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).
Calculator - all non-communicable calculators, including scientific, programmable and graphics calculators are

authorised

## Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the **Student Academic Integrity Policy and Procedure**. This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

**What is a breach of academic integrity?**
A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

**Why is academic integrity important?**
A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

**Where can I get assistance?**
For academic advice and guidance, the Academic Learning Centre (ALC) can support you in becoming confident in completing assessments with integrity and of high standard.

**What can you do to act with integrity?**

**Be Honest**
If your assessment task is done by someone else, it would be dishonest of you to claim it as your own

**Seek Help**
If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)

**Produce Original Work**
Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem