



## UNSW Course Outline

# ZPEM2508 Chemical, Biological, Radiological, Nuclear, Explosives - 2024

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## General Course Information

Course Code : ZPEM2508

Year : 2024

Term : Semester 1

Teaching Period : Z1

Is a multi-term course? : No

Faculty : UNSW Canberra

Academic Unit : UC Science

Delivery Mode : In Person

Delivery Format : Standard

Delivery Location : UNSW Canberra at ADFA

Campus : UNSW Canberra

Study Level : Undergraduate

Units of Credit : 6

### Useful Links

[Handbook Class Timetable](#)

## Course Details & Outcomes

### Course Description

Weapons based on chemical, biological, radiological and nuclear agents have become an ever-

present threat. Since the technology to produce such agents may now be available to many countries and possibly also to terrorist organisations, civil and military defence personnel need to be prepared to protect from such threats. This upper level, 6 UoC course introduces students to the scientific basis of chemical, biological, radiological and nuclear weapons (WMDs). Drawing on expertise from several academic staff and guest lecturers, the course has been designed to suit both engineering and science students. Students of this course will apply foundation knowledge in mathematics and science to advance their professional development in a field that is particularly relevant to their careers in Defence.

## Course Aims

The aim of this course is to introduce students to the scientific foundations of CBRN protection as it applies to the technology and impact of weapons of mass destruction.

## Relationship to Other Courses

CBRNE is an elective style course suitable for any student with an interest in the field and a basic understanding of mathematics via ZPEM1301 Maths 1a or equivalent.

# Course Learning Outcomes

Course Learning Outcomes
CLO1 : display an understanding of the science and technology underpinning chemical, biological, radiological, nuclear, and explosives defence.
CLO2 : have capacity to solve quantitative problems associated with chemical, biological, radiological, nuclear, and explosives defence.
CLO3 : master the terminology and descriptions associated with chemical, biological, radiological, nuclear, and explosives defence and be able to effectively communicate them to a career-related audience in oral and written form.

Course Learning Outcomes	Assessment Item
CLO1 : display an understanding of the science and technology underpinning chemical, biological, radiological, nuclear, and explosives defence.	<ul style="list-style-type: none"><li>• Examination</li><li>• Lab</li><li>• Quizzes (in-class)</li></ul>
CLO2 : have capacity to solve quantitative problems associated with chemical, biological, radiological, nuclear, and explosives defence.	<ul style="list-style-type: none"><li>• Examination</li><li>• Lab</li><li>• Quizzes (in-class)</li></ul>
CLO3 : master the terminology and descriptions associated with chemical, biological, radiological, nuclear, and explosives defence and be able to effectively communicate them to a career-related audience in oral and written form.	<ul style="list-style-type: none"><li>• Examination</li><li>• Lab</li><li>• Quizzes (in-class)</li></ul>

## Learning and Teaching Technologies

Moodle - Learning Management System | Echo 360

## Learning and Teaching in this course

Moodle is the Learning Management System used at UNSW Canberra. All courses have a Moodle site which will become available to students at least one week before the start of semester. Please find all help and documentation at the Moodle support page.

*Check the course page on Moodle for course announcements, links to useful web sites, supplementary lecture material, tutorial problem sheets.*

## Additional Course Information

*Students in this course will look at the fundamental science underpinning the Chemical, Biological, Radiological, Nuclear and Explosive materials (CBRNE). This will provide the basic skills to identify,*

deal with and manage incidents involving CBRNE.

The technology and the science behind each of these five components will be studied in a total of 48 lectures and tutorials/workshops plus 10 hours of related laboratory classes.

As members of the ADF, it is likely that you will be involved in operations either in Australia or overseas. An understanding of the nature of CBRNE will help to prepare you for participation in these activities. CBRNE is a 6 Unit of Credit course, normally taken by students at Level 2.

# Assessments

## Assessment Structure

Assessment Item	Weight	Relevant Dates
Examination Assessment Format: Individual	40%	Start Date: Not Applicable Due Date: Not Applicable
Lab Assessment Format: Individual	20%	Start Date: Not Applicable Due Date: Not Applicable
Quizzes (in-class) Assessment Format: Individual	40%	Start Date: Not Applicable Due Date: Not Applicable

## Assessment Details

### Examination

#### Assessment Overview

Examination

#### Course Learning Outcomes

- CLO1 : display an understanding of the science and technology underpinning chemical, biological, radiological, nuclear, and explosives defence.
- CLO2 : have capacity to solve quantitative problems associated with chemical, biological, radiological, nuclear, and explosives defence.
- CLO3 : master the terminology and descriptions associated with chemical, biological, radiological, nuclear, and explosives defence and be able to effectively communicate them to a career-related audience in oral and written form.

#### Detailed Assessment Description

Final exam is closed book invigilated mode, of duration 2 hrs to be during the exam period and worth 40%. Coverage is across the entire course.

#### Assessment Length

2 hours

## Submission notes

?

## Assessment information

Examination will cover all section sof the course. An A4 sheet of notes will be allowed for the R and N sections. Formulae and certain tables will also be supplied. Use of a non programmable calculator (FX-82AU or equivalent also allowed.

## Assignment submission Turnitin type

Not Applicable

## **Lab**

### Assessment Overview

4 x 2 hr laboratory programme. Assessment based on submitted lab reports.

### Course Learning Outcomes

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- CLO2 : have capacity to solve quantitative problems associated with chemical, biological, radiological, nuclear, and explosives defence.
- CLO3 : master the terminology and descriptions associated with chemical, biological, radiological, nuclear, and explosives defence and be able to effectively communicate them to a career-related audience in oral and written form.

### Detailed Assessment Description

*8-hour laboratory program, timetabled over four x 2 hr periods, counting 20% towards the final course mark. assessment is based on 4 reports, respectively, worth 5% each.*

### Assessment Length

4 x 2 hours

## Assessment information

*Notes and data are expected to be written up during the laboratory experiment. Students are then generally expected to submit their reports 1 week after the lab class. Students may collaborate in small groups on data collection and analysis but reports must be done as individuals.*

## Assignment submission Turnitin type

This is not a Turnitin assignment

## **Quizzes (in-class)**

### Assessment Overview

5 in class quizzes

### Course Learning Outcomes

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- CLO3 : master the terminology and descriptions associated with chemical, biological, radiological, nuclear, and explosives defence and be able to effectively communicate them to a career-related audience in oral and written form.

### Detailed Assessment Description

Five 40 minute on paper closed book quizzes (one for each component), held throughout the semester, worth 8% each; 40% in total.

Nomianl dates for quizzes:

Quiz R: 15 March 2024

Quiz N: 5 April 2024

Quiz C: 9 May 2024

Quiz B: 24 May 2024

Quiz E: 7 June 2024

### Assessment Length

5 x 50 mins

### Assessment information

Requirements for each lab report vary and will be specified on a case by case basis.

### Assignment submission Turnitin type

This is not a Turnitin assignment

## **General Assessment Information**

*Students who miss assessment tasks (e.g. in-class quizzes and laboratory experiments) must*

*contact the lecturer at the earliest practicable date to discuss the absence. If the student provides written evidence such as a medical certificate or a note from a Divisional Officer explaining why the absence was necessary and the reason for the absence is deemed acceptable by the lecturer, an extension or alternative assessment date will be arranged. Otherwise, a zero mark will be awarded for that task. When absences are foreseeable, students must advise the lecturer prior to the absence. In some circumstances of missed assessment, a formal application for special consideration may also be appropriate.*

*Laboratory logbooks are expected to be written up during the laboratory experiment. They are due at the end of the experiment unless prior arrangements have been made with the lecturer in charge of that experiment.*

**NO ASSISTANCE** is permitted from generative AI in this course: It is prohibited to use any software or service to search for or generate information or answers.

If its use is detected, it will be regarded as serious academic misconduct and subject to the standard penalties, which may include 00FL, suspension and exclusion.

#### Grading Basis

Standard

#### Requirements to pass course

An overall aggregate of 50% is required to pass the course. Note that all marks issued during the session are provisional and may be subject to change. The only official mark is the final course mark, issued by the University after the examination period.

# Course Schedule

Teaching Week/Module	Activity Type	Content			
Week 1 : 26 February - 1 March	Lecture	4 classes mix of lecture and tutorial style on the Radioactivity topic.			
Week 2 : 4 March - 8 March	Lecture	4 classes mix of lecture and tutorial style on the Radioactivity topic.			
Week 3 : 11 March - 15 March	Blended	Following CBR day, 2 classes mix of lecture and tutorial style on the Nuclear topic plus the first quiz "R".			
Week 4 : 18 March - 22 March	Lecture	4 classes: mix of lecture and tutorial style on the Nuclear topic.			
Week 5 : 25 March - 29 March	Lecture	Mix of lecture and tutorial style classes, 2 on Nuclear and one on chemistry. Week finishes with Good Friday.			
	Laboratory	Radioactivity (shielding) laboratory.			
Week 6 : 1 April - 5 April	Blended	Easter	Chem	Chem	Quiz N
Week 7 : 22 April - 26 April	Lecture	Chem	Military	ANZAC	Chem
	Laboratory	Nuclear activations and radiation properties laboratory.			
Week 8 : 29 April - 3 May	Lecture	Chem	Chem	Chem	Biolog
Week 9 : 6 May - 10 May	Lecture	Biolog	Biolog	Quiz C	Military
Week 10 : 13 May - 17 May	Lecture	Biolog	Biolog	Biolog	Biolog
Week 11 : 20 May - 24 May	Lecture	Biolog	Explos	Explos	Quiz B
	Laboratory	Chemistry lab class			
Week 12 : 27 May - 31 May	Lecture	Explos#	Explos	Explos	Explos
		#Tuesday 28 May, Monday timetable			
Week 13 : 3 June - 7 June	Lecture	Explos	Explos	revision	Quiz E
	Laboratory	Explosives Laboratory			

## Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings. Students are indeed expected to attend all lectures, tutorials, laboratory sessions and assessments unless their absence has been approved by the course coordinator. Students who have missed assessments or a laboratory, or expect to miss such a requirement, must inform the course coordinator by email at the earliest practicable date:

In typical circumstances of missed assessments, a formal application for Special Consideration via the prescribed University procedure is appropriate. Alternative assessment can then be arranged. Otherwise, in the case of absence a mark of zero will be awarded for the assessment.

## General Schedule Information

A readable schedule table will be made available on Moodle.

# Course Resources

## Prescribed Resources

Lecture notes will be made available on Moodle.

A specific calculator without stored memory is prescribed for the course. This is the Casio fx-82AU. Students are encouraged to use this calculator in the quizzes (stored memory calculators will not be permitted) and this is the only calculator permitted in the exam.

## Recommended Resources

*recommended textbooks for the course are:*

*The Chemistry of Explosives, Jacqueline Akhvan. (3<sup>rd</sup> Edition, 2011) ISBN 978-1-84973-330-4.*

*Introduction to weapons of mass destruction, R.Everett Langford: Radiological, Chemical and Biological. (1st Ed, Wiley, 2004) ISBN 0-471-46560-7.*

*In addition, the following books will provide more in-depth descriptions of various sections and are recommended as supplementary reading. They are available in the ADFA library and/or the Co-op bookshop.*

*High Explosives and Propellants, S.Fordham, ISBN 9781483139739.*

*Explosives; History with a bang. G.I. Brown. (The History Press, 1998)*

## Additional Costs

N/A

## Course Evaluation and Development

*One of the key priorities in the 2025 Strategy for UNSW is a drive for academic excellence in education. One of the ways of determining how well UNSW is progressing towards this goal is by listening to our own students. Students will be asked to complete the myExperience survey towards the end of this course.*

*Students can also provide feedback during the semester via: direct contact with the lecturer, the "On-going Student Feedback" link in Moodle, Student-Staff Liaison Committee meetings in schools, informal feedback conducted by staff, and focus groups. Student opinions really do make a*

difference. Refer to the Moodle site for this course to see how the feedback from previous students has contributed to the course development.

**Important note:** Students are reminded that any feedback provided should be constructive and professional and that they are bound by the Student Code of Conduct Policy

## Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Wayne Huthison		G22 B26 ADFA campus	+61 2 5114 5040	Normal hours from early most days, appointments encouraged.	No	Yes
Lecturer	Adrian Garrido Sanchis		Room 218, Building 22 ADFA Campus	+61 5114 5031	By appointment	No	No

## Other Useful Information

### Academic Information

### Course Evaluation and Development

One of the key priorities in the 2025 Strategy for UNSW is a drive for academic excellence in education. One of the ways of determining how well UNSW is progressing towards this goal is by listening to our own students. Students will be asked to complete the myExperience survey towards the end of each course.

Students can also provide feedback during the semester via: direct contact with the lecturer, the “On-going Student Feedback” link in Moodle, Student-Staff Liaison Committee meetings in schools, informal feedback conducted by staff, and focus groups (where applicable). Student opinions really do make a difference. Refer to the Moodle site for your course to see how the feedback from previous students has contributed to the course development.

**Important note:** Students are reminded that any feedback provided should be constructive and professional and that they are bound by the Student Code of Conduct.

<https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf>

### Equitable Learning Services (ELS)

Students living with neurodivergent, physical and/or mental health conditions or caring for someone with these conditions may be eligible for support through the Equitable Learning Services team. Equitable Learning Services is a free and confidential service that provides practical support to ensure your mental or physical health conditions do not adversely affect your studies.

Our team of dedicated **Equitable Learning Facilitators** (ELFs) are here to assist you through this process. We offer a number of services to make your education at UNSW easier and more equitable.

Further information about ELS for currently enrolled students can be found at: <https://www.student.unsw.edu.au/equitable-learning>

## Academic Honesty and Plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. All students are expected to adhere to UNSW's Student Code of Conduct.

Find relevant information at: [Student Code of Conduct \(unsw.edu.au\)](https://student.unsw.edu.au/student-code-of-conduct)

Plagiarism undermines academic integrity and is not tolerated at UNSW. It is defined as using the words or ideas of others and passing them off as your own, and can take many forms, from deliberate cheating to accidental copying from a source without acknowledgement.

For more information, please refer to the following:

<https://student.unsw.edu.au/plagiarism>

## Submission of Assessment Tasks

### Special Consideration

Special Consideration is the process for assessing and addressing the impact on students of short-term events, that are beyond the control of the student, and that affect performance in a specific assessment task or tasks.

Applications for Special Consideration will be accepted in the following circumstances only:

- Where academic work has been hampered to a substantial degree by illness or other cause;

- The circumstances are unexpected and beyond the student's control;
- The circumstances could not have reasonably been anticipated, avoided or guarded against by the student; and either:
  - (i) they occurred during a critical study period and was 3 consecutive days or more duration, or a total of 5 days within the critical study period; or
  - (ii) they prevented the ability to complete, attend or submit an assessment task for a specific date (e.g. final exam, in class test/quiz, in class presentation)

Applications for Special Consideration must be made as soon as practicable after the problem occurs and at the latest within three working days of the assessment or the period covered by the supporting documentation.

By sitting or submitting the assessment task the student is declaring that they are fit to do so and cannot later apply for Special Consideration (UNSW 'fit to sit or submit' requirement).

Sitting, accessing or submitting an assessment task on the scheduled assessment date, after applying for special consideration, renders the special consideration application void.

Find more information about special consideration at: <https://www.student.unsw.edu.au/special/consideration/guide>

Or apply for special consideration through your [MyUNSW portal](#).

### **Late Submission of assessment tasks (other than examinations)**

UNSW has a standard late submission penalty of:

- 5% per day,
- capped at five days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and
- no permitted variation.

Students are expected to manage their time to meet deadlines and to request extensions as early as possible before the deadline.

### **Electronic submission of assessment**

Except where the nature of an assessment task precludes its electronic submission, all assessments must be submitted to an electronic repository, approved by UNSW or the Faculty,

for archiving and subsequent marking and analysis.

### **Release of final mark**

All marks obtained for assessment items during the session are provisional. The final mark as published by the university following the assessment review group meeting is the only official mark.