



UNSW Course Outline

ZPEM8104 Counter IED and Forensic Investigation of Explosives - 2024

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General Course Information

Course Code : ZPEM8104

Year : 2024

Term : Semester 2

Teaching Period : Z2

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 : Postgraduate

Units of Credit : 6

Useful Links

[Handbook Class Timetable](#)

Course Details & Outcomes

Course Description

The course presents the fundamentals of improvised explosive devices (IEDs) and develops an

understanding of how chemical analysis techniques are applied in forensic explosives investigations from field through to laboratory. It covers types of improvised explosives and devices, introduces students to the scientific principles and sampling methods for different types of chemical analysis relevant to IED detection, and provides an awareness of the strengths and limitations of each method. Enrolment in this course is only open to students nominated by the Department of Defence.

Course Aims

This will be an elective course within the EO Masters program. The aim of the course is to provide students with a scientific and fundamental understanding of IEDs and CIED systems, and how chemical analysis techniques are applied in this area, from the field through to the laboratory, with an emphasis on supporting capabilities and technology. It will allow students to be knowledgeable at a general level about the topic, and to interact in an informed manner with those with more specialist knowledge.

Relationship to Other Courses

This is an elective course in the Master of Explosive Ordnance and the Graduate Certificate in Explosive Ordnance, and it is preferably taken after the completion of ZPEM8101. The first part of this course introduces some key basic concepts that underpin later subject material in this course and are also relevant to other courses in the program.

3.5

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Demonstrate an understanding of chemical compositions and structure and stability of EO in common IEDs.
CLO2 : Demonstrate an understanding of methods for collecting sample of bulk and /or trace explosive samples for subsequent forensic analysis
CLO3 : Demonstrate an understanding of the general principles of analytical chemistry and instrumentation applied to the sensing and identification of chemical explosives.
CLO4 : Develop an awareness of the advantages and limitations of various analytical methods in different operational situations.

Course Learning Outcomes	Assessment Item
CLO1 : Demonstrate an understanding of chemical compositions and structure and stability of EO in common IEDs.	<ul style="list-style-type: none">• Class test• Assignment• Practical work/analysis
CLO2 : Demonstrate an understanding of methods for collecting sample of bulk and /or trace explosive samples for subsequent forensic analysis	<ul style="list-style-type: none">• Class test• Assignment• Practical work/analysis
CLO3 : Demonstrate an understanding of the general principles of analytical chemistry and instrumentation applied to the sensing and identification of chemical explosives.	<ul style="list-style-type: none">• Class test• Assignment• Practical work/analysis
CLO4 : Develop an awareness of the advantages and limitations of various analytical methods in different operational situations.	<ul style="list-style-type: none">• Class test• Assignment• Practical work/analysis

Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams | Blackboard Collaborate | Echo 360 | Zoom

Learning and Teaching in this course

Lectures on the topics are supplemented either by tutorials, workshops, or Q&A discussions, reinforcing the concepts and methods under discussion and understanding key concepts employed in this course. The latter part of the course is a practical work/analysis module that allows students to gain hands-on experience in aspects of analytical chemistry and instrumentation as applied in forensic investigation of explosives.

Some experts in this field are invited to provide new perspectives and outlooks on various topics.

Additional Course Information

This course assumes background knowledge in synthesizing and manufacturing energetic materials, basic analytical chemistry, and EO-related courses.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Class test Assessment Format: Individual	20%	Start Date: Not Applicable Due Date: Not Applicable
Assignment Assessment Format: Individual	40%	Start Date: Not Applicable Due Date: Not Applicable
Practical work/analysis Assessment Format: Individual	40%	Start Date: 22/10/2024 08:00 AM Due Date: 26/10/2024 11:59 PM

Assessment Details

Class test

Assessment Overview

Tests are a fundamental part of the educational process, serving multiple functions that contribute to the overall development and success of the students. They assess knowledge, enhance learning, and provide motivation.

Course Learning Outcomes

- CL01 : Demonstrate an understanding of chemical compositions and structure and stability of EO in common IEDs.
- CL02 : Demonstrate an understanding of methods for collecting sample of bulk and /or trace explosive samples for subsequent forensic analysis
- CL03 : Demonstrate an understanding of the general principles of analytical chemistry and instrumentation applied to the sensing and identification of chemical explosives.
- CL04 : Develop an awareness of the advantages and limitations of various analytical methods in different operational situations.

Detailed Assessment Description

An assessment brief will be provided in Moodle. The class test will cover key concepts and topics discussed in the lectures and readings up to the date of the test. The test is designed to evaluate your understanding and application of these concepts through a variety of question types, which may include multiple-choice, short answer, and essay questions.

The specific format, duration, and scope of the test will be outlined in the assessment brief.

Please ensure you review all relevant materials and participate in class discussions to prepare effectively. Attendance and participation in preparatory sessions are highly recommended.

Additional details, including the test date and time, will be posted on Moodle.

Submission notes

None

Assessment information

see Assessment Brief

Assignment submission Turnitin type

Not Applicable

Assignment

Assessment Overview

Assignments are vital components of the educational process, reinforcing learning, developing critical skills, and providing feedback. They enhance engagement, motivation, and personalisation in the learning experience.

Course Learning Outcomes

- CL01 : Demonstrate an understanding of chemical compositions and structure and stability of EO in common IEDs.
- CL02 : Demonstrate an understanding of methods for collecting sample of bulk and /or trace explosive samples for subsequent forensic analysis
- CL03 : Demonstrate an understanding of the general principles of analytical chemistry and instrumentation applied to the sensing and identification of chemical explosives.
- CL04 : Develop an awareness of the advantages and limitations of various analytical methods in different operational situations.

Detailed Assessment Description

An assessment brief will be provided in Moodle. This assignment will require you to engage deeply with the course material and apply your knowledge to a specific topic or problem relevant to the course. The assignment may involve research, analysis, and synthesis of information, as well as critical thinking and original insights.

The assignment should be well-organized, clearly written, and adhere to the guidelines provided in the assessment brief. This includes meeting the required word count, formatting, and submission deadlines.

Additional details, including the specific topic, structure, and assessment criteria, will be provided in the assessment brief on Moodle. Ensure you review the brief thoroughly and plan your work accordingly. Assistance and resources will be available through Moodle and during designated office hours.

Note: For **References:** Properly cite all sources used in your research according to JACS citation style. <https://doi.org/10.1021/acsguide.40303>

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

Practical work/analysis

Assessment Overview

By bridging the gap between theoretical knowledge and real-world application, this exercise ensures that students are well-prepared to tackle the challenges associated with the chemical identification of explosive materials.

Course Learning Outcomes

- CL01 : Demonstrate an understanding of chemical compositions and structure and stability of EO in common IEDs.
- CL02 : Demonstrate an understanding of methods for collecting sample of bulk and /or trace explosive samples for subsequent forensic analysis
- CL03 : Demonstrate an understanding of the general principles of analytical chemistry and instrumentation applied to the sensing and identification of chemical explosives.
- CL04 : Develop an awareness of the advantages and limitations of various analytical methods in different operational situations.

Detailed Assessment Description

An assessment brief will be provided in Moodle. This practical work/analysis component is a crucial part of the course, designed to provide hands-on experience and deepen your understanding of the theoretical concepts covered in lectures.

Overview:

- **Collaboration:** Students will work in pairs to conduct the practical work. This collaborative approach encourages teamwork and allows for shared learning experiences.
- **Objective:** The practical work aims to develop your skills in experimental techniques, data collection, and analysis, and to apply theoretical knowledge in a practical setting.

Laboratory Report:

- **Individual Submission:** Despite working in pairs, each student must submit an individual Laboratory Report at the end of the exercise. This ensures that every student can demonstrate understanding and analysis of the practical work.
- **Template Provided:** A Laboratory Report template will be provided to standardize submissions and help guide your report writing.

Additional Information:

- The specific dates and times for the practical sessions will be announced on Moodle.
- Detailed instructions, safety guidelines, and assessment criteria will be included in the assessment brief on Moodle.
- It is essential to attend all practical sessions and actively participate in the exercises.

Note: For References: Properly cite all sources used in your research according to JACS citation style. <https://doi.org/10.1021/acsguide.40303>

This assessment is designed to be a significant part of your learning experience, contributing 40% to your final grade. Ensure you review the assessment brief thoroughly and plan your work accordingly.

Assessment Length

3-day activities

Submission notes

None

Assessment information

see Assessment Brief

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

General Assessment Information

For this assessment task, you may use standard editing and referencing software, but not generative AI. You are permitted to use the full capabilities of the standard software to answer the question (e.g., Microsoft Office suite, Grammarly, etc.).

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

Referencing

In this course, students are required to reference following the **JACS referencing style**.

Information about referencing styles is available at: <https://doi.org/10.1021/acsguide.40303>

Study at UNSW Canberra

<https://www.unsw.adfa.edu.au/study>

Study at UNSW Canberra has lots of useful information regarding:

- Where to get help
- Administrative matters
- Getting your passwords set up
- How to log on to Moodle
- Accessing the Library and other areas.

Grading Basis

Standard

Requirements to pass course

Students must obtain 50% on Practical work/analysis to pass the course. Tests, reports, workshops and assignments must be submitted in electronic format, via Moodle.

Course Schedule

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

General Schedule Information

While all lectures and assessments are delivered online, this course also includes an in-person practical work/analysis component that takes place on campus. For 2024, this is *tentatively scheduled for Week 13 (October 21 - October 25)*, with final dates to be confirmed on Moodle. Attendance for this exercise is compulsory.

This course consists of seven modules, including *Practical Work/Analysis*. The modules are spread throughout the 13-week semester. Schedules for each module will be posted.

Course Resources

Prescribed Resources

There are no compulsory textbooks to be purchased for this course.

Recommended Resources

A list of useful texts, including links to the e-books in the Academy library, is provided on the Moodle site. Other resources, such as journal articles, may be posted on Moodle or provided as citations for students to access through the library.

Additional Costs

None

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*

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

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Morphy Dumlaog		Room 216 Bldg 22	(02) 5114 5325	9 am - 5 pm	No	Yes