UNSW Course Outline

# ZEIT2103 Data Structures and Representation - 2024

Published on the 08 Feb 2024

## General Course Information

**Course Code :** ZEIT2103
**Year :** 2024
**Term :** Semester 1
**Teaching Period :** Z1
**Is a multi-term course? :** No
**Faculty :** UNSW Canberra
**Academic Unit :** School of Systems and Computing
**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

Data Structures and Representation is an intermediate course in computer programming, that aims to further explore computer program control and data structures, using Java as the teaching language. The main focus is on the appropriate selection and application of data

structures to specific problems. Structures explored include lists, hash tables, trees, heaps, and graphs. We also explore the use of persistent data structures in text and XML files, and in SQL databases. And we further develop fundamental notions of object-oriented program design, and of software engineering ideas and techniques.

## Course Aims

The course aims to build on Introduction to Programming and further explore computer program control and data structures, using Java as the teaching language.

# Course Learning Outcomes

| Course Learning Outcomes |
|---|
| CLO1 : be able to demonstrate principles of object-oriented analysis; |
| CLO2 : be able to model, design, implement, verify, validate and document OO approaches to problem-solving using the Java programming language |
| CLO3 : evaluate the variety of key data structures employed in modern computing |
| CLO4 : identify the usage of data structures in databases, files and SQL |
| CLO5 : distinguish between a range of fundamental sorting, searching, graph and tree algorithms; |
| CLO6 : apply team management tools to accomplish small-scale projects and reflect on the approach taken |
| CLO7 : be able to identify the knowledge of information and communications technology (ICT) code of ethics to apply them as an ICT professional |

| Course Learning Outcomes | Assessment Item |
|---|---|
| CLO1 : be able to demonstrate principles of object-oriented analysis; | • Programming Assignments<br>• Tutorial Test |
| CLO2 : be able to model, design, implement, verify, validate and document OO approaches to problem-solving using the Java programming language | • Exam<br>• Programming Assignments |
| CLO3 : evaluate the variety of key data structures employed in modern computing | • Tutorial Test<br>• Exam<br>• Programming Assignments |
| CLO4 : identify the usage of data structures in databases, files and SQL | • Tutorial Test<br>• Exam<br>• Programming Assignments |
| CLO5 : distinguish between a range of fundamental sorting, searching, graph and tree algorithms; | • Tutorial Test<br>• Programming Assignments |
| CLO6 : apply team management tools to accomplish small-scale projects and reflect on the approach taken | • Programming Assignments |
| CLO7 : be able to identify the knowledge of information and communications technology (ICT) code of ethics to apply them as an ICT professional | • Quiz (ICT Ethics) |

# Learning and Teaching Technologies

Moodle - Learning Management System | Echo 360

# Learning and Teaching in this course

This course comprises a one two-hour lecture per week in which new content in the course

syllabus is presented; a one-hour tutorial used to reinforce concepts and to answer questions; and a two-hour lab in which you demonstrate your mastery of the course content and student learning outcomes through the successful completion of the specified programming tasks. They are currently scheduled as follows:

# Assessments

## Assessment Structure

| Assessment Item | Weight | Relevant Dates |
|---|---|---|
| Quiz (ICT Ethics)<br>Assessment Format: Individual | 1% | Start Date: 28/02/2024 12:00 AM<br>Due Date: 08/03/2024 11:59 PM |
| Programming Assignments<br>Assessment Format: Individual | 51% | Start Date: Not Applicable<br>Due Date: Not Applicable |
| Tutorial Test<br>Assessment Format: Individual | 15% | Start Date: 02/05/2024 10:00 AM<br>Due Date: 02/05/2024 01:00 PM |
| Exam<br>Assessment Format: Individual | 33% | Start Date: Not Applicable<br>Due Date: Not Applicable |

## Assessment Details

### Quiz (ICT Ethics)

**Assessment Overview**

*It covers ICT Ethics*

**Course Learning Outcomes**

- CLO7 : be able to identify the knowledge of information and communications technology (ICT) code of ethics to apply them as an ICT professional

**Assignment submission Turnitin type**

Not Applicable

### Programming Assignments

**Assessment Overview**

Programming assignments

**Course Learning Outcomes**

- CLO1 : be able to demonstrate principles of object-oriented analysis;
- CLO2 : be able to model, design, implement, verify, validate and document OO approaches to problem-solving using the Java programming language
- CLO3 : evaluate the variety of key data structures employed in modern computing

- CLO4 : identify the usage of data structures in databases, files and SQL
- CLO5 : distinguish between a range of fundamental sorting, searching, graph and tree algorithms;
- CLO6 : apply team management tools to accomplish small-scale projects and reflect on the approach taken

**Detailed Assessment Description**

| | Weight | Start date | End date |
|---|---|---|---|
| Assignment 1 | 17% | 11/03 | 29/03 |
| Assignment 2 | 14% | 01/04 | 03/05 |
| Assignment 3 | 20% | 06/05 | 24/05 |

**Assignment submission Turnitin type**

Not Applicable

## Tutorial Test

**Assessment Overview**

Class test

**Course Learning Outcomes**

- CLO1 : be able to demonstrate principles of object-oriented analysis;
- CLO3 : evaluate the variety of key data structures employed in modern computing
- CLO4 : identify the usage of data structures in databases, files and SQL
- CLO5 : distinguish between a range of fundamental sorting, searching, graph and tree algorithms;

**Detailed Assessment Description**

open-book class test

## Exam

**Assessment Overview**

Final exam

**Course Learning Outcomes**

- CLO2 : be able to model, design, implement, verify, validate and document OO approaches to problem-solving using the Java programming language
- CLO3 : evaluate the variety of key data structures employed in modern computing
- CLO4 : identify the usage of data structures in databases, files and SQL

**Detailed Assessment Description**

open-book final exam

# General Assessment Information

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.

This course has seven assessment items: three programming labs, two tutorial tests, 1 quiz and the final exam. Two exercises are not graded. These all are just to confirm your understanding of and ability to apply the theory presented in the course lessons.

Exercises, which include some pre-work, are to be completed within a lab session. Programming assignments are allocated three lab sessions each. Students are expected to spend the allocated lab time and an additional 4-5 hours (approx) working on them. Please seek help from the course staff outside of scheduled lab times if needed. Detailed requirements for each assignment and the exact submission date will be provided on the course website prior to the scheduled time for working on them.

Programming Assignments are due in by electronic submission on Moodle by 11:55 pm, generally on Friday/Saturday of the scheduled week.

**Grading Basis**

Standard

# Course Schedule

| Teaching Week/Module | Activity Type | Content |
|---|---|---|
| Week 1 : 26 February - 1 March | Lecture | Intro to data structures, Java revision |
| | Laboratory | Exercise 1 |
| | Tutorial | Java review |
| Week 2 : 4 March - 8 March | Lecture | Collections |
| | Laboratory | Exercise 2 |
| | Tutorial | Collections |
| Week 3 : 11 March - 15 March | Lecture | Complexity, Sort, Search |
| | Laboratory | Assignment 1 |
| | Tutorial | Complexity, Sort, Search |
| Week 4 : 18 March - 22 March | Lecture | Files, intro to Databases |
| | Laboratory | Assignment 1 |
| | Tutorial | Files, intro to Databases |
| Week 5 : 25 March - 29 March | Lecture | SQL, JDBC |
| | Laboratory | Assignment 1 |
| | Tutorial | SQL, JDBC |
| Week 6 : 1 April - 5 April | Lecture | Queues, Stacks, Lists |
| | Laboratory | Assignment 2 |
| | Tutorial | Queues, Stacks, Lists |
| Week 7 : 22 April - 26 April | Lecture | LOST |
| | Laboratory | Assignment 2 |
| | Tutorial | LOST |
| Week 8 : 29 April - 3 May | Lecture | Hashing |
| | Laboratory | Assignment 2 |
| | Tutorial | TEST |
| Week 9 : 6 May - 10 May | Lecture | Graphs |
| | Laboratory | Assignment 3 |
| | Tutorial | Hashing |
| Week 10 : 13 May - 17 May | Lecture | Trees |
| | Laboratory | Assignment 3 |
| | Tutorial | Graphs |
| Week 11 : 20 May - 24 May | Lecture | Priority Queues |
| | Laboratory | Assignment 3 |
| | Tutorial | Trees & Priority Queues |

## Attendance Requirements

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

# Course Resources

## Prescribed Resources

There is no compulsory text for this course.

## Recommended Resources

John Lewis and Joseph Chase, “JAVA Software Structures – Designing and Using Data Structures”, 4th Edition, Pearson, 2014.

You will also find your Lewis & Loftus “Java Software Solutions” Introduction to Programming text of use.

**Moodle Site**

*The primary source for course materials (lecture notes, assignments, solutions, and the latest news, among others) is the Moodle site for this course. Moodle is accessible at https://moodle.telt.unsw.edu.au/*

## 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 | Saber Elsayed | | B15, R115 | 02 5114 5144 | by appointment | No | Yes |
| Demonstrator | Jo Plested | | Room 225, Building 16 | | by appointment | No | No |
| Lecturer | Wendy Chen | | B15, Room 203. | 2 5114 5432 | 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 Equitible 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 Plagarism

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)

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.

## School-specific Information

**The Leaning Management System**

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 (including Blackboard Collaborate) at the Moodle Support page.

UNSW Moodle supports the following web browsers:
• Google Chrome 50+
• Safari 10+
Internet Explorer is not recommended. Addons and Toolbars can affect any browser's performance.

Operating systems recommended are:
• Windows 10,
• Mac OSX Sierra,
• iPad IOS10

Further details:
Moodle System Requirements
Moodle Log In

If you need further assistance with Moodle:

For enrolment and login issues please contact:
IT Service Centre
Email: itservicecentre@unsw.edu.au
Phone: (02) 9385-1333
International: +61 2 9385 1333

For all other Moodle issues please contact:
External TELT Support
Email: externalteltsupport@unsw.edu.au
Phone: (02) 9385-3331
International: +61 2 938 53331
Opening hours:
Monday – Friday 7:30am – 9:30 pm
Saturday & Sunday 8:30 am – 4:30pm

**Study at UNSW Canberra**
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.

UNSW Canberra Student Hub

For News and Notices, Student Services and Support, Campus Comminity, Quick Links, Important Dates and Upcoming Events

## School Contact Information

**Deputy Head of School (Education):** Dr Erandi Hene Kankanamge
E: e.henekankanamge@adfa.edu.au
T: 02 5114 5157

**Syscom Admin Support**: syscom@unsw.edu.au
T: 02 5114 5284
Syscom Admin Office: Building 15, Level 1, Room 101 (open 10am to 3pm, Mon to Fri)