Tutorial Letter 101/0/2024

Programming: Data Structures

COS2611

Year module

Department of Computer Science

IMPORTANT INFORMATION:

Please register on myUnisa, activate your myLife e-mail account and make sure that you have regular access to the myUnisa module website, COS2611-2024-Y, as well as your group website

Note: This is a fully online module. It is, therefore, only available on myUnisa.

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Contents

1 INTRODUCTION

Dear Student

Welcome to Programming: Data Structures.

Unisa is a comprehensive open distance e-learning (CODeL) higher education institution. The comprehensiveness of our curricula encapsulates a range of offerings, from strictly vocational to strictly academic certificates, diplomas and degrees. Unisa's "openness" and its distance eLearning character result in many students registering at Unisa who may not have had an opportunity to enrol in higher education. Our CODeL character implies that our programmes are carefully planned and structured to ensure success for students ranging from the under-prepared but with potential to the sufficiently prepared.

Teaching and learning in a CODeL context involves multiple modes of delivery ranging from blended learning to fully online. As a default position, all post-graduate programmes are offered fully online with no printed study materials, while undergraduate programmes are offered in a blended mode of delivery where printed study materials are augmented with online teaching and learning via the learner management system – myUnisa. In some instances, undergraduate programmes are offered fully online as well.

Furthermore, our programmes are aligned with the vision, mission and values of the University. Unisa's commitment to serve humanity and shape futures combined with a clear appreciation of our location on the African continent, Unisa's graduates have distinctive graduate qualities which include:

- independent, resilient, responsible and caring citizens who are able to fulfil and serve in multiple roles in their immediate and future local, national and global communities,
- having a critical understanding of their location on the African continent with its histories, challenges and potential in relation to globally diverse contexts,
- the ability to critically analyse and evaluate the credibility and usefulness of information and data from multiple sources in a globalised world with its ever-increasing information and data flows and competing worldviews,
- applying their discipline-specific knowledge competently, ethically and creatively to solve real-life problems,

- an awareness of their own learning and developmental needs and future potential.

As this module is offered as a fully online module, that is all information is available via the internet, we use myUnisa as our virtual campus. This is an online system that is used to administer, document and deliver educational material to you and support engagement with you.

Look out for information from the lecturer as well as other Unisa platforms to determine how to access the virtual myUnisa module site. Information on the tools that will be available to engage with the lecturer and fellow students to support your learning will also be communicated via various platforms. Visit myUNISA frequently. You will need to use myUNISA to study and complete the learning activities for this module.

This module is presented in English only since this is the predominant language in the field of study.

The website for your module on myUNISA is COS2611-2024.

We wish you every success with your studies!

1.1 Getting started

Owing to the nature of this module, you can read about the module and find your study material online. Go to the website at `https://my.unisa.ac.za` and log in using your student number and password. Click on “myModules”. Select COS2611from the list.

We wish you every success with your studies!

2 OVERVIEW OF COS2611

2.1 Purpose

Students who successfully complete this module will have the knowledge, skills and competencies to apply Data Structures and Algorithm Analysis knowledge and strategies in solving real-world programming problems, according to industry-approved processes within African, South African and global contexts.

2.2 Outcomes

These are the competencies that you need to learn while studying in this module. Each of these specific outcomes will be addressed by the work you will be studying from the prescribed book. You should demonstrate the following competencies :

- Demonstrate an understanding of algorithm analysis and the Big-O notation used in algorithm analysis.
- Demonstrate an understanding of the basic properties of pointers and linked lists.
- Demonstrate an understanding of how to use recursion to solve problems and how to think in terms of recursion.
- Demonstrate an understanding of Abstract Data Types (ADTs) and how they are stored on computers.
- Demonstrate an understanding of search techniques used to retrieve data held in data structures.
- Demonstrate an understanding of sort techniques used to sort data held in data structures.

3 CURRICULUM TRANSFORMATION

Unisa has implemented a transformation charter based on five pillars and eight dimensions. In response to this charter, we have placed curriculum transformation high on the teaching and learning agenda. Curriculum transformation includes the following pillars: student-centred scholarship; the pedagogical renewal of teaching and assessment practices; the scholarship of teaching and learning and the infusion of African epistemologies and philosophies. These pillars and their principles will be integrated at programme and module level as a phased-in approach. You will notice a marked change in the teaching and learning strategy implemented by Unisa, together with how the content is conceptualised in your modules. We encourage you to embrace these changes during your studies at Unisa in a responsive way within the framework of transformation.

4 LECTURER(S) AND CONTACT DETAILS

4.1 Lecturer(s)

The contact details for the etutor(s) and secondary lecturers are not provided in this tutorial letter. The contact details will be available on the myUNISA site for this module and in Tutorial Letter 301 (SOCALL).

4.2 Department

You can contact the Department of Computer Science as follows:

Telephone number: 011 670 9200

E-mail: computing@unisa.ac.za

4.3 Lecturer

You can contact the lecturer as follows:

Ms Ronell van der Merwe

Telephone number: 011 471 2929

E-mail: vdmerwer@unisa.ac.za (preferred way of communication)

via MS Teams chat

In the subject field of the email, clearly indicate the module code and the reason for the email. Only emails received from your myLife email account will be acknowledged and answered.

4.4 University

Contact addresses of the various administrative departments appear on the Unisa website: `http://www.unisa.ac.za/sites/corporate/default/Contact-us/Student-enquiries`.

Please include your student number in all correspondence.

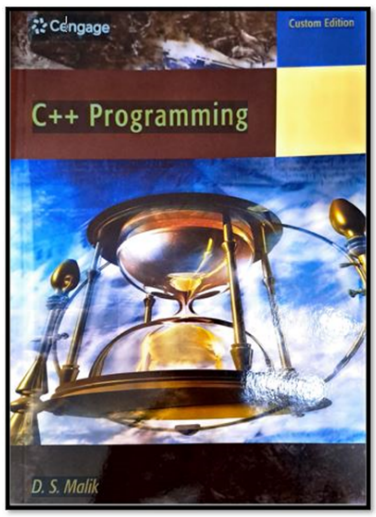
5 RESOURCES

5.1 Prescribed book(s)

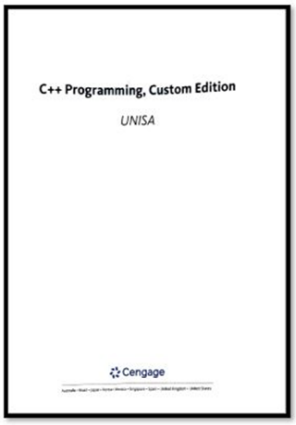
Follow the steps below to access the library and resources and download your prescribed material.

The prescribed textbook for 2024 is:

C++ Programming. Publisher: Cengage. Author: D.S. Malik. Note this is a Custom Edition specifically for UNISA.



ISBN: 978-4737-9209-8



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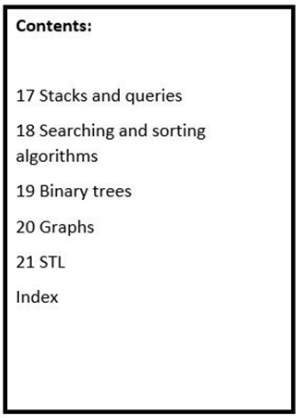


5.2 Recommended book(s)

There are no recommended books for this module.

5.3 Electronic reserves (e-reserves)

There is no prescribed e-reserve for this module.

5.4 Library services and resources

The Unisa Library offers a range of information services and resources:

- For a general Library overview, go to `https://www.unisa.ac.za/sites/corporate/default/Library/About-the-Library`
- For detailed Library information, go to `https://www.unisa.ac.za/sites/corporate/default/Library`
- For research support and services (eg personal librarians and literature search services), go to

  `https://www.unisa.ac.za/sites/corporate/default/Library/Library-services/Research-support`

The library has created numerous Library guides to assist you:
`http://libguides.unisa.ac.za`

Recommended guides:

- Requesting recommended books and access e-reserve material: `https://libguides.unisa.ac.za/request`
- Requesting and finding library material: Postgraduate services:
  `https://libguides.unisa.ac.za/request/postgrad`
- Finding and using library resources and tools (research support):
  `https://libguides.unisa.ac.za/research-support`
- Frequently asked questions about the Library:
  `https://libguides.unisa.ac.za/ask`
- Services to students living with disabilities:
  `https://libguides.unisa.ac.za/disability`
- A-Z databases:
  `https://libguides.unisa.ac.za/az.php`
- Subject-specific guides:
  `https://libguides.unisa.ac.za/?b=s`
- Information on fines & payments:
  `https://libguides.unisa.ac.za/request/fines`

Assistance with **technical problems** accessing the Unisa Library or resources:
`https://libguides.unisa.ac.za/techsupportLib-help/unisa.ac.za`

(insert your student number in the subject line please)

General library enquiries can be directed to

`Library-enquiries@unisa.ac.za`

6 STUDENT SUPPORT SERVICES

The *Study @ Unisa* brochure is available on myUnisa:

`www.unisa.ac.za/brochures/studies`.

This brochure contains important information and guidelines for successful studies through Unisa. If you need assistance with the myModules system, you are welcome to use the following contact details:

- Toll-free landline: 0800 00 1870 (Select option 07 for myModules)
- E-mail: `mymodule22@unisa.ac.za` or `myUnisaHelp@unisa.ac.za`

You can access and view short videos on topics such as how to view your calendar, how to access module content, how to view announcements for modules, how to submit assessment and how to participate in forum activities via the following link:

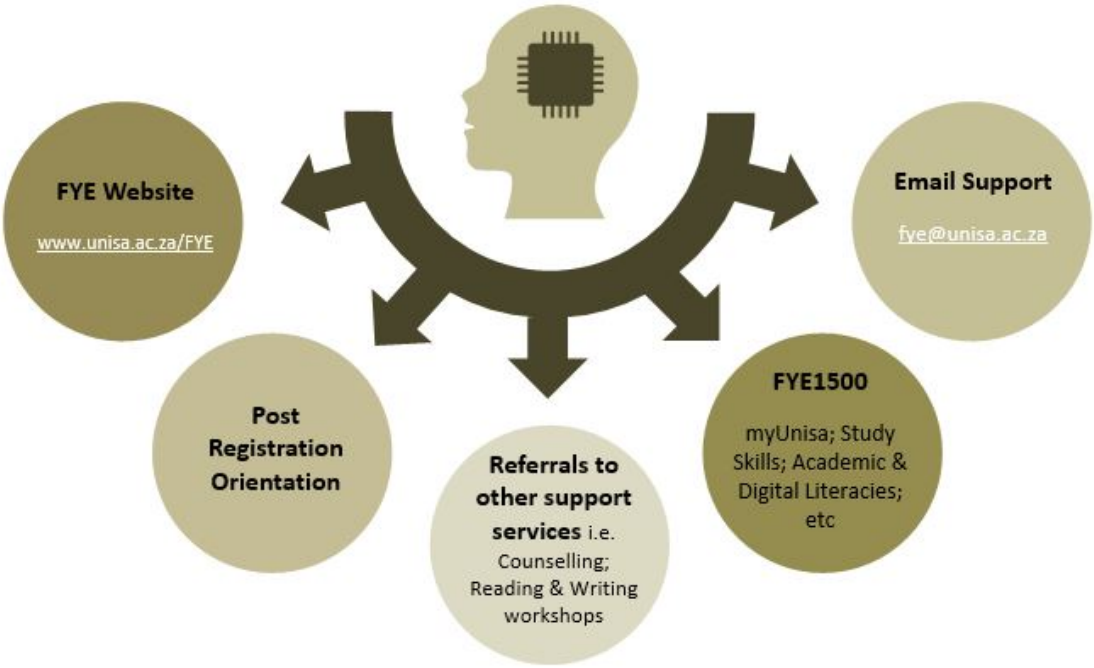
`https://dtls-qa.unisa.ac.za/course/view.php?id=32130`

Registered Unisa students get a free myLife e-mail account. Important information, notices and updates are sent exclusively to this account. Please note that it can take up to 24 hours for your account to be activated after you have claimed it. Please do this immediately after registering at Unisa, by following this link: `myLifeHelp@unisa.ac.za`

Your myLife account is the only e-mail account recognised by Unisa for official correspondence with the University, and will remain the official primary e-mail address on record at Unisa. You remain responsible for managing this e-mail account.

6.1 First-Year Experience Programme

Many students find the transition from school education to tertiary education stressful. This is also true in the case of students enrolling at Unisa for the first time. Unisa is a dedicated open distance and e-learning institution, and it is very different from face-to-face/contact institutions. It is a mega university, and all our programmes are offered through either blended learning or fully online learning. It is for this reason that we thought it necessary to offer first-time students additional/extended support to help them seamlessly navigate the Unisa teaching and learning journey with little difficulty and few barriers. We therefore offer a specialised student support programme to students enrolling at Unisa for the first time- this is Unisa's First-Year Experience (FYE) Programme, designed to provide you with prompt and helpful information about services that the institution offers and how you can access information. The following FYE services are currently offered:



To ensure that you do not miss out on important academic and support communication from the SRU, please check your myLife inbox regularly.

7 STUDY PLAN

Below is the study plan for COS2611. See Assessment in Section 9 for details pertaining to the assessments.

Outcome	Outcome detail	Chapters
Algorithm analysis	Demonstrate an understanding of algorithm analysis and the Big-Oh notation used in algorithm analysis.	Linked lists and ADTs
Pointers	Demonstrate an understanding of the basic properties of pointers and linked lists.	17
Recursion	Demonstrate an understanding of how to use recursion to solve problems and how to think in terms of recursion.	18
ADT	Demonstrate an understanding of Abstract Data Types (ADTs) and how they are stored on computers	17-21
Search	Demonstrate an understanding of search techniques used to retrieve data held in data structures	18,19,20
Sort	Demonstrate an understanding of sort techniques used to sort data held in data structures	18,19,20

8 HOW TO STUDY ONLINE

8.1 What does it mean to study fully online?

Studying fully online modules differs completely from studying some of your other modules at Unisa.

- All your study material and learning activities for online modules are designed to be delivered online on myUnisa.
- All your assignments must be submitted online. This means that you will do all your activities and submit all your assignments on myUnisa. In other words, you may NOT post your assignments to Unisa using the South African Post Office.
- All communication between you and the University happens online. Lecturers will communicate with you via e-mail and SMS, and will use the Announcements, Discussion

Forum, and Questions and Answers options. You can also use all these platforms to ask questions and contact your lecturers.

9 ASSESSMENT

9.1 Assessment criteria

To successfully complete this module, you will be required to submit 4 formative assessments (assessments) and 1 summative assessment (exam). The exam consists of two sections - Section A a practical project that you will submit and Section B - Quiz.

All information about when and where and how to submit your assessments will be made available to you via the myModules site for this module (COS2611).

The formative assessments (assessments) will contribute to 20% of your final mark. The summative assessment (exam) will contribute to 80% of your final mark.

9.2 Assessment plan

Because this is an online module, the assessments are not provided in this tutorial letter. Instead, the assessments are provided online as they become due. You will see them when you go online.

- To complete this module, you will be required to submit assessments.
- All information about when and where to submit your assessments will be made available to you via the myModules site for your module.
- Due dates for assessments, as well as the actual assessments are available on the myModules site for this module.
- To gain admission to the examination, you will be required to submit 1 assessment/s.
- The assessment weighting for the module is 20%.
- You will receive examination information via the myModules sites. Please watch out for announcements on how examinations for the modules for which you are registered will be conducted.

- The examination will count 80% towards the final module mark

The table below explains the weighting of the assessments. Watch out for announcements on the myModule site and your myLife email account.

Assessment number	**Method of assessment**	**Outcome(s)**	**Weight contribution of assessment**	**Final Mark**
1	Quiz	1	25%	20%
2	Quiz	2	25%	
3	Quiz	3	25%	
4	Quiz	4 and 5	25%	
Exam Section 1	Practical Project	1,2,3,4,5	40% (contributes to the Exam)	80%
Exam Section 2	ExamQuiz	1,2,3,4,5	60%	

Final mark composition

Year mark = $(A1 + A2 + A3 + A4)/4) * .3$

Exam mark = $PracticalProject * .4 + ExamQuiz * .6$

Final mark = $Yearmark * .3 + Exammark * .7$

9.3 Assessment due dates

- There are no assessment due dates included in this tutorial letter.
- Assessment due dates will be made available to you on the myUnisa landing page for this module. We envisage that the due dates will be available to you upon registration.
- Please start working on your assessments as soon as you register for the module.
- Log on to the myUnisa site for this module to obtain more information on the due dates for the submission of the assessments.

A large volume of work has to be covered during this year; thus, the earlier you start the better. Do not waste time to get hold of the required resources and to plan your academic activities for this module.

Various webinars will be hosted during the year, which will help you to complete your assessments. It is in your best interest that you attend the webinars. However, should you not be able to attend, you are welcome to listen to the recordings.

Continue to the myUNISA site for COS2611. Go to the Get Started page, download and install the software, download the textbook and videos and start working towards assessment 1.

9.4 Submission of assessments

- Unisa, as a comprehensive open distance e-learning institution (CODeL), is moving towards becoming an online institution. You will therefore see that all your study material, assessments and engagements with your lecturer and fellow students will take place online. We use myUnisa as our virtual campus.
- The myUnisa virtual campus will offer students access to the myModules site, where learning material will be available online and where assessments should be completed. This is an online system that is used to administer, document, and deliver educational material to students and support engagement between academics and students.
- The myUnisa platform can be accessed via `https://my.unisa.ac.za`. Click on the myModules 2024 button to access the online sites for the module COS2611.
- The university undertakes to communicate clearly and as frequently as is necessary to ensure that you obtain the greatest benefit from the use of the myModules learning management system. Please access the announcements on your myModules site regularly, as this is where your lecturer will post important information to be shared with you.
- When you access your myModules site for the module COS2611, you will see a welcome message posted by your lecturer. Below the welcome message you will see the assessment shells for the assessments that you need to complete. Some assessments may be multiple choice, some tests, others written assessments, some forum discussions, and so on. All assessments must be completed on the assessment shells available on the respective module platforms.

- To complete quiz assessments, please log on to the module site where you need to complete the assessment. Click on the relevant assessment shell (Assessment 1, Assessment 2, etc.). There will be a date on which the assessment will open for you. When the assessment is open, access the quiz online and complete it within the time available to you. Quiz assessment questions are not included in this tutorial letter (Tutorial Letter 101) and are only made available online. You must therefore access the quiz online and complete it online where the quiz has been created.
- It is not advisable to use a cell phone to complete the quiz. Please use a desktop computer, tablet or laptop when completing the quiz. Students who use a cell phone find it difficult to navigate the **Online Assessment** tool on the small screen and often struggle to navigate between questions and successfully complete the quizzes. In addition, cell phones are more vulnerable to dropped internet connections than other devices. **If at all possible, please do not use a cell phone for this assessment type**.
- For written assessments, please note the due date by which the assessment must be submitted. Ensure that you follow the guidelines given by your lecturer to complete the assessment. Click on the submission button on the relevant assessment shell on myModules. You will then be able to upload your written assessment on the myModules site of the modules that you are registered for. Before you finalise the upload, double check that you have selected the correct file for upload. Remember, no marks can be allocated for incorrectly submitted assessments.

9.4.1 Types of assessments and descriptions

Assessments are defined as either optional, mandatory, compulsory, or elective.

- Elective assessments
  - If not submitted, the student gets no mark for this item.
  - The best of the required submissions will count.
- Mandatory assessments
  - If not submitted, the student gets no mark for this item.
- Compulsory assessments
  - If not submitted, the result on the student's academic record will be absent.

- Optional assessments
  - You are encouraged as a student to do optional assessments so that they may benefit your learning.

I. Elective assessments

(a) the student is given a choice of which assessments within an identified group to submit, only the best result(-s), the number of which is specified in advance, will contribute towards the year mark.

(b) elective assessments must also be grouped into an elective group.

(c) for the student to select which assessment to submit, the elective assessments must be grouped together. For such an elective group, relevant information must be provided to the student, such as how many of the assessments must be submitted and how many of the assessment marks should be combined into the year mark.

(d) The selection criteria define how marks received for assessments in an elective group are to be combined into the year mark. Three different criteria may be used for calculating the year mark:

- The best mark should be used, or
- If the student submits fewer than the required number of assessments per group or no assessment in a group, a mark of 0% will be used.
- 0% is awarded to all non-submitted or unmarked assessments. A best mark is then calculated from all items.

II. Mandatory assessments

(a) contributes to the year mark.

(b) if a student fails to submit a mandatory assessment, no mark is awarded and the year mark is calculated accordingly. The student will therefore forfeit the marks attached to this assessment when the final mark for the module is calculated.

III. Compulsory Assessment

(a) when not submitted, the student will fail a Continuous Assessment module but will be shown as absent from the examination in the case of other modules.

IV. Optional assessments

(a) You are encouraged as a student to do optional assessments so that they may benefit your learning.

9.5 Formative assessment

As indicated in section 9.2, you need to complete 4 assessment for this module. There are no assessments included in this tutorial letter. Assignments and due dates will be made available to you on myModules for this module. We envisage that the due dates will be available to you upon registration.

9.6 Summative assessment (examination)

Examination information and details on the format of the examination will be made available to you online via the myUnisa site. Look out for information that will be shared with you by your lecturer and e-tutors (where relevant) and for communication from the university.

9.6.1 Invigilation/proctoring

Since 2020 Unisa conducts all its assessments online. Given stringent requirements from professional bodies and increased solicitations of Unisa's students by third parties to unlawfully professional bodies and increased solicitations of Unisa's students by third parties to unlawfully assist them with the completion of assessments and examinations, the University is obliged to assure its assessment integrity through the utilisation of various proctoring tools: Turnitin, Moodle Proctoring, the Invigilator App and IRIS. These tools will authenticate the student's identity and flag suspicious behaviour to assure the credibility of students' responses during assessments. The description below is for your benefit as you may encounter any or all of these in your registered modules:

Turnitin is a plagiarism software that facilitates checks for originality in students' submissions against internal and external sources. Turnitin assists in identifying academic fraud and ghost writing. Students are expected to submit typed responses for utilisation of the Turnitin software.

The **Moodle Proctoring tool** is a facial recognition software that authenticates students identity during their Quiz assessments. This tool requires access to a student's **mobile or laptop**

camera. Students must ensure their camera is activated in their browser settings prior to their assessments.

The Invigilator "**mobile application-based service does verification**" of the identity of an assessment participant. The Invigilator Mobile Application detects student 'dishonesty-by-proxy' and ensures that the assessment participant is a registered student. This invigilation tool requires students to download the app from their Play Store (Google, Huawei and Apple) on their mobile devices (camera enabled) prior to their assessment.

IRIS Invigilation software verifies the identity of a student during assessment and provides for both manual and automated facial verification. It has the ability to record and review a student's assessment session. It flags suspicious behaviour by the students for review by an academic administrator. IRIS software requires installation on students' laptop devices that are enabled with a webcam.

Students who are identified and flagged for suspicious dishonest behaviour arising from the invigilation and proctoring reports are referred to the disciplinary office for formal proceedings.

Please note:
Refer to the module assessment information on the myModules site to determine which proctoring or invigilation tool will be utilised for the formative and summative assessments.

10 ACADEMIC DISHONESTY

10.1 Plagiarism

Plagiarism is the act of taking the words, ideas and thoughts of others and presenting them as your own. It is a form of theft. Plagiarism includes the following forms of academic dishonesty:

- Copying and pasting from any source without acknowledging the source.
- Not including references or deliberately inserting incorrect bibliographic information.
- Paraphrasing without acknowledging the original source of the information.

10.2 Cheating

Cheating includes, but is not limited to, the following:

- Completing assessments on behalf of another student, copying the work of another student during an assessment, or allowing another student to copy your work.
- Using social media (e.g. WhatsApp, Telegram) or other platforms to disseminate assessment information.
- Submitting corrupt or irrelevant files, this forms part of examination guidelines.
- Buying completed answers from so-called "tutors" or internet sites (contract cheating).

For more information about plagiarism, follow the link below:

`https://www.unisa.ac.za/sites/myunisa/default/Study-@-Unisa/Student-values-and-rules`

11 STUDENTS LIVING WITH DISABILITIES

The Advocacy and Resource Centre for Students with Disabilities (ARCSWiD) provides an opportunity for staff to interact with first-time and returning students with disabilities.

If you are a student with a disability and would like additional support or need additional time for assessments, you are invited to contact the ARCSWiD department. For more information visit the website:
`https://www.unisa.ac.za/sites/corporate/default/Apply-for-admission/Students-with-disabilities`
E-mail: `Arcswid@unisa.ac.za`

Remember to add this module code COS2611, in your email to the ARCSWiD department.

12 IN CLOSING

As you embark on this exciting academic journey, remember that each step you take brings you closer to your goals. Embrace every challenge as an opportunity to grow, every setback as a chance to learn, and every success as a testament to your hard work and dedication. Believe in yourself, stay focused, and never hesitate to seek help when needed. You are

capable of achieving greatness, and this year holds boundless possibilities for you. Embrace the power of knowledge, embrace the adventure that awaits, and let your passion for learning guide you towards a remarkable and fulfilling academic year. Best of luck, and may your journey be filled with endless discovery and accomplishments!

Lecturer(s) for COS2611

Department of Computer Science