ICT201 COMPUTER ORGANISATION AND ARCHITECTURE T326 BRIEF

All information in the Subject Outline is correct at the time of approval. KOI reserves the right to make changes to the Subject Outline if they become necessary. Any changes require the approval of the KOI Academic Board and will be formally advised to those students who may be affected by email and via Moodle.
Information contained within this Subject Outline applies to students enrolled in the trimester as indicated

1. General Information

1.1 Administrative Details

Associated HE Award(s)	Duration	Level	Subject Coordinator
Bachelor of Information Technology (BIT)	1 trimester	Level 2	Mr Ali Noori ali.noori@koi.edu.au P: +61 (2) 9283 3583 L: 7-11,11 York St. Consultation: via Moodle or by appointment.

1.2 Core / Elective

Core subject in the BIT

1.3. Subject Weighting

Indicated below is the weighting of this subject and the total course points.

Subject Credit Points	Total Course Credit Points
4	BIT (96 Credit Points)

1.4 Student Workload

Indicated below is the expected student workload per week for this subject

No. timetabled hours/week*	No. personal study hours/week**	Total workload hours/week***
4 hours/week (2 hour Lecture + 2 hour Tutorial)	6 hours/week	10 hours/week

* Total time spent per week at lectures and tutorials
** Total time students are expected to spend per week in studying, completing assignments, etc.
*** Combination of timetable hours and personal study.

1.5 Mode of Delivery Classes will be face-to-face or hybrid. Certain classes will be online (e.g., special arrangements).

1.6 Pre-requisites **6 subjects completed**

1.7 General Study and Resource Requirements

- Dedicated computer laboratories are available for student use. Normally, tutorial classes are conducted in the computer laboratories.

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- Students are expected to attend classes with the requisite textbook and must read specific chapters prior to each tutorial. This will allow them to actively take part in discussions. Students should have elementary skills in both word processing and electronic spreadsheet software, such as OFFICE 365 or MS Word and MS Excel.
- Computers and WIFI facilities are extensively available for student use throughout KOI. Students are encouraged to make use of the campus Library for reference materials.
- Students will require access to the internet and email. Where students use their own computers, they should have internet access. KOI will provide access to required software.

Resource requirements specific to this subject: MS Imagine, Office 365

1.8 Academic Advising

Academic advising is available to students throughout teaching periods including the exam weeks. As well as requesting help during scheduled class times, students have the following options:

- Consultation times: A list of consultation hours is provided on the homepage of Moodle where appointments can be booked.
- Subject coordinator: Subject coordinators are available for contact via email. The email address of the subject coordinator is provided at the top of this subject outline.
- Academic staff: Lecturers and Tutors provide their contact details in Moodle for the specific subject. In most cases, this will be via email. Some subjects may also provide a discussion forum where questions can be raised.
- Head of Program: The Head of Program is available to all students in the program if they need advice about their studies and KOI procedures.
- Vice President (Academic): The Vice President (Academic) will assist students to resolve complex issues (but may refer students to the relevant lecturers for detailed academic advice).

2. Academic Details

2.1 Overview of the Subject

This subject provides a broad understanding of Computer Organisation and Architecture. It covers the internal functioning of computer hardware systems and operating systems and the way computer operations are managed. This subject explains algorithms and data structures used in controlling the functioning of a computer through rules and methods that describe the functionality, organisation and implementation of computer systems. Security aspects of operating systems are also covered.

2.2 Graduate Attributes for Undergraduate Courses

Graduates of Bachelor courses from King's Own Institute (KOI) will achieve the graduate attributes expected under the Australian Qualifications Framework (2nd edition, January 2013). Graduates at this level will be able to apply a broad and coherent body of knowledge from their major area of study in a range of contexts for professional practice or scholarship and as a pathway for further learning.

King's Own Institute's generic graduate attributes for a bachelor's level degree are summarised below:

	KOI Bachelor Degree Graduate Attributes	**Detailed Description**
	Knowledge	Current, comprehensive and coherent knowledge

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	Critical Thinking	Critical thinking and creative skills to analyse and synthesise information and evaluate new problems
	Communication	Communication skills for effective reading, writing, listening and presenting in varied modes and contexts and for transferring knowledge and skills to a variety of audiences
	Information Literacy	Information and technological skills for accessing, evaluating, managing and using information professionally
	Problem Solving Skills	Skills to apply logical and creative thinking to solve problems and evaluate solutions
	Ethical and Cultural Sensitivity	Appreciation of ethical principles, cultural sensitivity and social responsibility, both personally and professionally
	Teamwork	Leadership and teamwork skills to collaborate, inspire colleagues and manage responsibly with positive results
	Professional Skills	Professional skills to exercise judgement in planning, problem solving and decision making

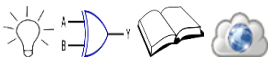
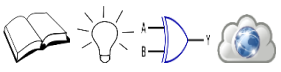
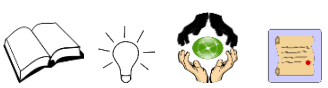
Across the course, these skills are developed progressively at three levels:

- **Level 1 Foundation –** Students learn the basic skills, theories and techniques of the subject and apply them in basic, stand-alone contexts.
- **Level 2 Intermediate –** Students further develop skills, theories and techniques of the subject and apply them in more complex contexts, beginning to integrate the application with other subjects.
- **Level 3 Advanced** – Students have a demonstrated ability to plan, research and apply the skills, theories and techniques of the subject in complex situations, integrating the subject content with a range of other subject disciplines within the context of the course.

2.3 Subject Learning Outcomes

This is a Level 2 subject.

Listed below, are *key* knowledge and skills students are expected to attain by successfully completing this subject:

Subject Learning Outcomes	**Contribution to Graduate Attributes**
a) Describe the major components of computer systems and explain how they control the operation of a computer	
b) Explain the processes for synchronisation, scheduling and handling deadlocks	
c) Explain how operating systems manage memory, storage, file systems and input/output processes	
d) Evaluate security issues and safeguards to protect against threats and recover from disasters.	
e) Apply industry standards and frameworks in security and OS hardening, and demonstrate understanding of the ACS Code of Professional Conduct and Data Privacy Principles.	

2.4 Subject Content and Structure

Below are details of the subject content and how it is structured, including specific topics covered in lectures and tutorials. Reading refers to the text unless otherwise indicated.

Weekly Planner:

Week (beginning)	Topic covered in each week's lecture	Reading(s)	Expected work as listed in Moodle
Week 1 26 October	Computer system overview	Ch. 1	Discuss review questions in the tutorial on computer systems. Formative not graded.
Week 2 02 November	Operating system overview	Ch. 2	Discuss review questions in the tutorial on system calls and activities of an operating system. Graded.
Week 3 09 November	Process description and control, threads	Chs. 3, 4	Discuss review questions in the tutorial. Graded.
Week 4 16 November	Uniprocessor scheduling	Ch. 9	Discuss review questions in the tutorial on scheduling. Graded. **Assessment 2: Formative - Moodle Quiz. In class room**
Week 5 23 November	Concurrency: mutual exclusion and synchronisation	Ch. 5	Discuss review questions in the tutorial on synchronization problems. Graded.
Week 6 30 November	Concurrency: deadlock and starvation	Ch. 6	Discuss review questions in the tutorial on deadlocks. Graded.
Week 7 07 December	Memory management	Ch. 7	Discuss review questions in the tutorial on memory management and algorithms. Graded. **Assessment 3 - Moodle Quiz.** Summative worth 20%. **In classroom**

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Week 8 14 December	Virtual memory	Ch. 8	Discuss review questions in the tutorial on demand paging and virtual memory. Graded.
Week 9 04 January	File management	Ch. 12	Discuss review questions in the tutorial on internal file structure. Graded. **Assessment 4 due: Report.** Summative worth 20%
Week 10 11 January	I/O management and disk scheduling	Ch. 11	Discuss review questions in the tutorial based on input output management and scheduling. Graded. **Assessment 4 Presentations (conducted across Weeks 10–11)** Summative worth 15%
Week 11 18 January	Operating system security and related industry standards and frameworks	Ch. 15	Discuss review questions in the tutorial on cryptography and encryption, OS hardening, networking, security, and cybersecurity industry standards and frameworks. Graded.
Week 12 25 January	ACS Code of Professional Conduct and Data Privacy. Study review week and Final Exam Week	All Chapters	Revision
Week 13 01 February	Study review week and Final Exam Week		
Week 14 08 February	- Final Exam Week - Continuing students - enrolments for T127 open		Please see the exam timetable for the exam date, time and location
Week 15 15 February	- Student Vacation begins - New students - enrolments for T127 open		
Week 16 22 February	• Results Released • Review of Grade Day for T326 – see Sections 2.6 and 3.2 below for relevant information. • Certification of Grades NOTE: More information about the dates will be provided at a later date through Moodle/KOI email.		
T127 01 March 2027			
Week 1 01 March	Week 1 of classes for T127		

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2.5 Teaching Methods/Strategies

Briefly described below are the teaching methods/strategies used in this subject:

- *Lectures* (2 hours/week) are conducted in seminar style and address the subject content, provide motivation and context and draw on the students' experience and preparatory reading.
- *Tutorials* (2 hours/week) include class discussion of case studies and research papers, practice sets and problem-solving and syndicate work on group projects. Tutorials often include group exercises and so contribute to the development of teamwork skills and cultural understanding. Tutorial participation is an essential component of the subject and contributes to the development of many of the graduate attributes (see section 2.2 above). Tutorial participation contributes towards the assessment in many subjects (see details in Section 3.1 for this subject). Supplementary tutorial material such as case studies, recommended readings, review questions etc. will be made available each week in Moodle.
- *Online* teaching resources include class materials, readings, model answers to assignments and exercises and discussion boards. All online materials for this subject as provided by KOI will be found in the Moodle page for this subject. Students should access Moodle regularly as material may be updated at any time during the trimester
- *Other contact* - academic staff may also contact students either via Moodle messaging, or via email to the email address provided to KOI on enrolment.

2.6 Student Assessment

Assessment is designed to encourage effective student learning and enable students to develop and demonstrate the skills and knowledge identified in the subject learning outcomes. Assessment tasks during the first half of the study period are usually intended to maximise the developmental function of assessment (formative assessment). These assessment tasks include weekly tutorial exercises (as indicated in the weekly planner) and low stakes graded assessment (as shown in the graded assessment table). The major assessment tasks where students demonstrate their knowledge and skills (summative assessment) generally occur later in the study period. These are the major graded assessment items shown in the graded assessment table.

Final grades are awarded by the Board of Examiners in accordance with KOI's Assessment and Assessment Appeals Policy. The definitions and guidelines for the awarding of final grades within the BIT degree are:

- HD High distinction (85-100%) an outstanding level of achievement in relation to the assessment process.
- DI Distinction (75-84%) a high level of achievement in relation to the assessment process.
- CR Credit (65-74%) a better than satisfactory level of achievement in relation to the assessment process.
- P Pass (50-64%) a satisfactory level of achievement in relation to the assessment process.
- F Fail (0-49%) an unsatisfactory level of achievement in relation to the assessment process.
- FW This grade will be assigned when a student did not submit any of the compulsory assessment items.

Provided below is a schedule of formal assessment tasks and major examinations for the subject.

Assessment Type	When Assessed	Weighting	Learning Outcomes Assessed

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Assessment 1: Weekly Tutorial Exercises (10 Weeks)	Weeks 2 – 11	10%	a, b, c, d, e
Assessment 2: Quiz Formative	Week 4	0%	a
Assessment 3: Quiz (1 hour)	Week 7	15%	a, b
Assessment 4: Analysis of an operating system scenario and report, presentation (2,000 words)	Report: Week 9 Presentation: Weeks 10-11	15% 10% Total: 25%	b, c
Assessment 5: Final examination On-campus: 2 hours + 10 mins reading time	Final Exam Period	50%	a, b, c, d, e

Requirements to Pass the Subject:

To gain a pass or better in this subject, students must gain a *minimum of 50%* of the total available subject marks.

2.7 Prescribed and Recommended Readings

Provided below, in formal reference format, is a list of the prescribed and recommended readings.

Prescribed Text:

Stallings, W., 2021, *Computer Organization and Architecture*, Global Edition, 11th ed., Pearson Education Limited, Harlow. ISBN: 9781292420103. Available from: ProQuest Ebook Central.

Recommended Readings:

Silberschatz, A., Galvin, P.B., and Gagne, G., 2019, *Operating System Concepts*, 10th edn, Global Edition, John Wiley & Sons, Hoboken, NJ. ISBN: 9781119455868.

Tomsho, G., 2020, *Guide to Operating Systems*, 6th edn, Student Edition, Cengage Learning, Boston, MA. ISBN: 9780357433836.

Null, L., 2024, *The Essentials of Computer Organization and Architecture*, 6th edn, Jones & Bartlett Learning, Burlington, MA. ISBN: 9781284259438.

Australian Computer Society (ACS), 2023, *The ACS Code of Professional Ethics*, ACS, viewed 18 December 2024, https://www.acs.org.au/content/dam/acs/ACS-Professional-Ethics-Mar-2023.pdf

Australian Computer Society (ACS), 2014, *The ACS Code of Professional Conduct*, ACS, viewed 31 August 2024, https://www.acs.org.au/content/dam/acs/ACS-Professional-Conduct-v2.1.pdf

Stallings, W 2017, *Operating Systems: Internals and Design Principles*, 9th edn, Global Edition, Pearson Education Limited, Harlow. ISBN: 9781292214306.

Journals:

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Qi, C., and Li, C., 2022, A solution design for solving road deadlock in autonomous driving, *13th International Conference on Information and Communication Technology Convergence (ICTC)*, Jeju Island, Korea, pp. 455–457. DOI: 10.1109/ICTC55196.2022.9952591

Zhang, H., and Wang, X., 2021, Evaluating the speedup of multicore architecture on the topological characteristics of on-chip memory, *International Conference on Computer Engineering and Artificial Intelligence (ICCEAI)*, Shanghai, China, pp. 502–506. DOI: 10.1109/ICCEAI52939.2021.00098

Li, Y., 2019, Optimal selection of tests for fault detection and isolation in multi-operating mode system, *Journal of Systems Engineering and Electronics*, vol. 30, no. 2, pp. 425–434. DOI: 10.21629/JSEE.2019.02.20

Elsayed, M.S., Liu, G., Mostafa, A.M., Alnuaim, A.A., and Kafrawy, P.E., 2021, Fault-recovery and robust deadlock control of reconfigurable multi-unit resource allocation systems using siphons, *IEEE Access*, vol. 9, pp. 67942–67956. DOI: 10.1109/ACCESS.2021.3073639

Yang, M., Huang, and Chen, J 2019, Resource-oriented partitioning for multiprocessor systems with shared resources, *IEEE Transactions on Computers*, vol. 68, no. 6, pp. 882–898. DOI: 10.1109/TC.2018.2889985

Nour, S., Habashy, S.A., and Salem, S.A., 2021, Energy optimization by using last level cache partitioning for multicore platforms, *16th International Conference on Computer Engineering and Systems (ICCES)*, Cairo, Egypt, pp. 1–6. DOI: 10.1109/ICCES54031.2021.9686175

Ruchkin, V., Soldatov, G., Koryachko, A., Kostrov, B., and Ruchkina, E., 2020, Conceptual model of hardware & software co-design for multicore systems on chip, *9th Mediterranean Conference on Embedded Computing (MECO)*, Budva, Montenegro, pp. 1–4. DOI: 10.1109/MECO49872.2020.9134207

Al-Fedaghi, S., 2021, Conceptual Modeling for Computer Organization and Architecture. *Journal of Computer Science*, *17*(2), 123-134. DOI: 10.3844/jcssp.2021.123.134

Journal References:

- International Journal of Security and Networks
- International Journal of Security and Its Applications
- ACM Transactions on Computer Systems
- Computer Science: Research and Development

Conference/ Journal Articles:

Students are encouraged to read peer reviewed journal articles and conference papers. Google Scholar provides a simple way to broadly search for scholarly literature. From one place, you can search across many disciplines and sources: articles, theses, books, abstracts and court opinions, from academic publishers, professional societies, online repositories, universities and other web sites.

Useful Websites:

The following industry websites are useful introductory sources covering a range of information useful for this subject.

https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/

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