ICT702 INTRODUCTION TO DATABASE DESIGN 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
Master of Information Systems (MIS) Graduate Diploma of Information Systems (GDIS) Graduate Certificate of Information Systems (GCIS)	1 trimester	Level 8 Graduate Certificate	Name: Dr Mohamad Naji Email: mohamad.naji@koi.edu.au P: 92833583 (Ext.156) L: Level 7-11, 11 York St Consultation: via Moodle or by appointment

1.2 Core / Elective
This subject is a core subject for MIS, GDIS and GCIS.

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	MIS (64 Credit Points); GDIS (32 Credit Points); GCIS (16 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***
3 hours/week plus supplementary online material	7 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 There are no pre-requisites for this subject.

1.7 General Study and Resource Requirements

- Students are expected to attend classes with the required textbook and to read specific chapters prior to the tutorials. Students should read this material before coming to class to improve their ability to participate in the weekly activities.
- Students will require access to the internet and their KOI email and should have basic skills in word

processing software such as MS Word, spreadsheet software such as MS Excel and visual presentation software such as MS PowerPoint.
- 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.

Software resource requirements specific to this subject:
Office 365, MS Imagine, SQL Server 2017

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

Database management, design and development serve as the foundation of the modern business world and information society. Information that is collected from the customers, the sales revenues that are gathered from the business competitors, the profit and loss that are generated and many more forms of data are required to be stored in a secured, efficient and accessible place, this is called a database. A well-designed database will fundamentally change the decision-making process, data communication process and front-end user experience. Therefore, the design of the database is crucial to conquer the concerns of data collection, data storage and data analysis.

This subject provides an overall understanding of database design terminology, database design strategy, database structure and relationships, and level of the data integrity for each database. By completing this subject, students will be able to design a basic relationship database, refine the database structure, integrate the business needs with the database design objectives and implement the database by using a database management system and structured queried language (SQL) Server environments.

2.2 Graduate Attributes for Undergraduate Courses

Graduates of Postgraduate courses from King's Own Institute will achieve the graduate attributes expected from successful completion of a Master's degree under the Australian Qualifications Framework (2nd edition, January 2013). Graduates at this level will be able to apply an advanced 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 master's level degree are summarised below:

	KOI Master's Degree Graduate Attributes	**Detailed Description**

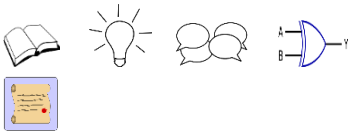
	Knowledge	Current, comprehensive and coherent knowledge, including recent developments and applied research methods
	Critical Thinking	Critical thinking skills to identify and analyse current theories and developments and emerging trends in professional practice
	Communication	Communication and technical skills to analyse and theorise, contribute to professional practice or scholarship and present ideas to a variety of audiences.
	Research and Information Literacy	Cognitive and technical skills to access and evaluate information resources, justify research approaches and interpret theoretical propositions
	Creative Problem Solving Skills	Cognitive, technical and creative skills to investigate, analyse and synthesise complex information, concepts and theories, solve complex problems and apply established theories to situations faced in professional practice.
	Ethical and Cultural Sensitivity	Appreciation and accountability for ethical principles, cultural sensitivity and social responsibility, both personally and professionally
	Leadership and Strategy	Initiative, leadership skills and ability to work professionally and collaboratively to achieve team objectives across a range of team roles. Expertise in strategic thinking, developing and implementing business plans and decision making under uncertainty
	Professional Skills	High level personal autonomy, judgement decision-making and accountability required to begin professional practice.

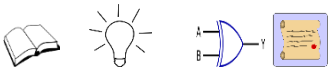
Across the course, these skills are developed progressively at three levels:

- **Level 1 Foundation –** Students learn the skills, theories and techniques of the subject and apply them in 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

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

Subject Learning Outcomes	Contribution to Course Graduate Attributes
a) Define database types, models and design terminology	
b) Perform reviews of existing databases and relational tables	

c) Create a database by using a database management system and generate query results by using SQL based on a given scenario	
d) Analyse the functions of a database and present it to the specific business stakeholders	
e) Evaluate the functionality of a database and make performance enhancements as part of a collaborative team	

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
Week 1 26 October	Introduction to the relational database o Types of databases o Database models o The relational database models o Relational database management systems	Chapter 1	Critically review the concepts and principles of databases and database management systems including relational data model for handling structured data Formative not graded
Week 2 02 November	Introduction to entity relationship model o Understand entity, attribute, cardinality, primary key and foreign key o Understand associate entity and the complex ER diagram terminology	Materials provided on Moodle	Design database using ER Modelling 1 Graded
Week 3 09 November	Introduction to entity relationship model o Draw ER diagram o Create tables and ER diagram on the database management system	Materials provided on Moodle	Design database using ER Modelling 2 Graded
Week 4 16 November	Terminology used in classic database examples o Value-related terms	Chapter 3	Review questions on the main concepts of database terminology Graded

	o Structure-related terms o Relationship-related term		**Assessment 1: due Draft proposal of A4**
Week 5 23 November	Database Design	Chapter 2 & Chapter 11	Design database using ER Modelling and Normalization Techniques Graded
Week 6 30 November	Database Design (2)	Chapter 2 & Chapter 11	Design database using ER Modelling and Normalization Techniques Graded
Week 7 07 December	Table relationships o Types of relationships o Identifying existing relationships o Refining all foreign keys o Establishing relationship characteristics o Relationship-level integrity	Chapter 8 & Chapter 10	Review questions on types of relationships, reducing the unnecessary relationships & Review questions on table relationship and relation-level integrity Graded **Assessment 2: due** In class Quiz
Week 8 14 December	Analysing the current database o Conducting the analysis o Looking at how data is collected o Looking at how information is presented o Conducting interviews o Interview users o Interview management o Interview questions	Chapter 4	Case studies on how data is collected, presented and transit from business needs to database 1 Graded
Week 9 04 January	SQL for database structure creations	Materials provided on Moodle	Use SQL to create, query and manipulate database 1 Graded **Assessment 3: Due Database design (individual assessment)**

Week 10 11 January	Perform logic information with SQL	Materials provided on Moodle	Use SQL to create, query and manipulate database 2 Graded
Week 11 18 January	Review data integrity o Why you should review data integrity o Review and refine data integrity Assembling the database documentation	Chapter 13	Revie questions on data integrity, case studies on evaluating data integrity Graded
Week 12 25 January	Introduction to Big Data XML and DTD o Semistructured Data o XML o DTD Revision	Materials provided on Moodle	Review questions on the table creations on XML, DTD declarations. Emerging trends eg. blockchain. Formative not graded **Assessment 4: Database implementation and performance improvement (Group assessment)**
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		

2.5 Teaching Methods/Strategies

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

- *Sessions* (3 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. Sessions include class discussion of case studies and research papers, practice sets and problem-solving and syndicate work on group projects. Sessions often include group exercises and so contribute to the development of teamwork skills and cultural understanding. Session participation is an essential component of the subject and contributes to the development of many of the graduate attributes (see section 2.2 above). Session participation contributes towards the assessment in many subjects (see details in Section 3.1 for this subject). Supplementary session 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 assessments (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 are:

- HD High distinction (85-100%): an outstanding level of achievement in relation to the assessment process.
- D Distinction (75-84%): a high level of achievement in relation to the assessment process.
- C 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
Assessment 1: Draft of A4 (one or two pages maximum)	Week 4	20%	a, b
Assessment 2: In class Quiz	Week 7	10%	c
Assessment 3:	Weeks 9	40%	b, c

Assessment Type	When assessed	Weighting	Learning Outcomes Assessed
Database design (individual assessment) Implementation Report – 1500 word			
Assessment 4: Database Implementation and performance improvement (group assessment) Implementation report; Group – 1000 words Individual – 500 words	Week 12	Group report – 20%, Individual demonstration: 10% Total: 30%	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:

Coronel, C., & Morris, S. (2022). *Database systems: Design, implementation, & management* (14th ed.). Boston, MA, USA: Cengage Learning. ISBN: 9780357673102. https://au.cengage.com/c/database-systems-design-implementation-management-14e-coronel-morris/9780357673034/

Recommended Readings:

Ahmad, R., Salahuddin, H., Rehman, A. U., Rehman, A., Shafiq, M. U., Tahir, M. A., & Afzal, M. S. (2024). Enhancing database security through AI-based intrusion detection system. *Journal of Computing & Biomedical Informatics, 7*(02). https://jcbi.org/index.php/Main/article/view/563

Beijing, China, pp. 81–86. https://doi.org/10.1109/BDAI62182.2024.10692676

Khan, M. Z., Zaman, F. U., Adnan, M., Imroz, A., Rauf, M. A., & Phul, Z. (2023). Comparative case study: An evaluation of performance computation between SQL and NoSQL database. *Journal of Software Engineering, 1*(2), 14–23. https://sjhse.smiu.edu.pk/index.php/SJHSE/article/view/42

Khan, W., Kumar, T., Cheng, Z., Raj, K., Roy, A., & Luo, B. (2023). SQL and NoSQL database software architecture performance analysis and assessments: A systematic literature review. *Big Data and Cognitive Computing, 7*, 97. https://api.semanticscholar.org/CorpusID:252280404

Liu, X., Lan, B., Hu, Z., Liu, Y., Zhang, Z., Wang, F., ... & Zhou, W. (2024). Codexgraph: Bridging large language models and code repositories via code graph databases. *arXiv preprint arXiv:2408.03910*. https://doi.org/10.48550/arXiv.2408.03910

Nifra, F. N., & Razeeth, M. S. S. (2022). Building sustainable future through technological transformation. *Proceedings of the 2nd International Conference (ICST2022)*, Faculty of Technology, South Eastern University of Sri Lanka, pp. 53–61. http://ir.lib.seu.ac.lk/handle/123456789/6338

Sicari, S., Rizzardi, A., & Coen-Porisini, A. (2022). Security & privacy issues and challenges in NoSQL databases. *Computer Networks, 206*, 108828. https://doi.org/10.1016/j.comnet.2022.108828

Sen, P. S., & Mukherjee, N. (2023). An ontology-based approach to designing a NoSQL database for semi-structured and unstructured health data. *Cluster Computing, 27*(1), 959–976. https://doi.org/10.1007/s10586-023-03995-y

Tu, H. (2024). Cassandra vs. MongoDB: A systematic review of two NoSQL data stores in their industry uses. In *2024 IEEE 7th International Conference on Big Data and Artificial Intelligence (BDAI)*

Suggested Periodicals:

f) Journal of Database Management: https://www.scimagojr.com/journalsearch.php?q=13581&tip=sid
g) Database System Journal: https://www.dbjournal.ro/

Useful Websites

The following websites are useful sources covering a range of information useful for this subject. However, most are not considered to be sources of Academic Peer Reviewed theory and research. If your assessments require ***academic peer reviewed journal articles*** as sources, you need to access such sources using the Library database, Ebscohost, or Google Scholar. Please ask in the Library if you are unsure how to access Ebscohost. Instructions can also be found in Moodle.