Unit Descriptor

ITDA1001 Database Fundamentals

Section 1 – General Information

1.1 Administrative Details

Associated Higher Education Awards	Duration	Year Level	Unit Type
Bachelor of Information Technology and Systems (BITS)	12-week Semester or 6-week Term	1	Core

Unit Coordinator	Email	Phone	Office room
Refer to unit facilitator contact information posted on the LMS site of this unit.			
Lecturer	**Email**	**Phone**	**Office room**
Refer to lecturer contact information posted on the LMS site of this unit.			

Unit credit points	Total course credit points
6 credit points	BITS - 144 credit points

1.2 Overview

The unit covers the underlying theory and basic concepts of relational data modelling, query languages and database design. You will develop the knowledge and skills necessary for the effective design and implementation of database systems that satisfy the data management requirements of an enterprise. The unit will also address the various issues and techniques of data management, including retrieval, update, integrity, privacy and security aspects associated with data access, manipulation and administration.

This unit will help you develop a sound theoretical understanding of the issues relevant to database fundamentals. Unification of multiple data sources is central to the 'big data' paradigm likely to dominate design over the coming decades. You will be prepared to critically evaluate and understand database issues as they arise in practice over the coming years. This unit provides the foundation for such understanding.

1.3 Delivery Mode and Attendance Requirement

Delivery Mode: Face to Face On-Campus/Intensive

Attendance Requirement: You are expected to attend scheduled classes. In some units, attendance to some classes is identified as a mandatory component and attendance is compulsory.

1.4 Student Workload

Total timetabled hours per study period	Total personal study hours per study period	Total workload hours per study period
36	108	144

Timetabled hours per week under 12-week semester	Personal study hours per week under 12-week semester	Total workload hours per week under 12-week semester
3	9	12

Timetabled hours per week under 6-week term	Personal study hours per week under 6-week term	Total workload hours per week under 6-week term
6	18	24

1.5 Pre-requisites and Co-requisites

Pre-requisites Nil
Co-requisites Nil
Prohibitions Nil

1.6 Student Feedback

VIT reviews each unit regularly to enhance all aspects of its educational delivery. At the most recent review, the following feedback/recommendations were identified by our staff and students:

Feedback/Recommendation:

-
-

Feedback/Recommendation regarding this unit from the most recent review has resulted in the following improvements been made:

-
-

1.7 Work-integrated learning activity

Not applicable.

Section 2 – Academic Details

2.1 Course Learning Outcomes

Upon completion of this course, graduates will be able to:

1. apply cognitive skills to review, critically analyse and synthesise knowledge within the field of IT.
2. demonstrate a broad understanding of IT with significant depth together with managerial knowledge and teamwork skills for effective participation and leadership in industry.
3. adapt knowledge and skills across broad IT areas and apply these in planning, problem solving, decision making, and communicating ideas and solutions to diverse audiences in a professional IT environment.
4. utilise their learning experiences with a strong industry focus to deal with real world challenges.
5. demonstrate skills applicable for IT industry certification.
6. operate in different professional IT careers within various industry sectors.
7. manage ongoing learning and professional development which will equip them with the knowledge and skills necessary for career path achievement in this competitive IT industry.

Graduates will be able to demonstrate the following understanding and skills:

8. methods, tools and techniques used in the planning, development, implementation and management of information products and systems.
9. computer hardware and software technologies.
10. theories and techniques in the selected field of IT study.
11. legal, ethical and philosophical issues relating to IT.
12. code of professional conduct and ethics.
13. application of best practices and industry standards.

2.2 VIT Graduate Attributes (GA)

1. Graduates will have knowledge of their discipline including a global perspective.
2. Graduates will convey ideas and information effectively to a range of audiences.
3. Graduates will apply logical, critical and creative thinking to solve a range of problems.
4. Graduates will recognise when information is needed, and identify, evaluate, and effectively use information as required.
5. Graduates will be able to recognise, reflect on and respond appropriately to social, cultural and ethical issues.
6. Graduates will be prepared for lifelong learning through reflective practice in pursuit of personal and professional development.
7. Graduates will work independently and collaboratively to achieve individual and common goals.

2.3 Unit Learning Outcomes (ULO)

ULO No.	By the end of the unit, students should be able to:	Related CLO# for BITS
1	Explain the fundamentals of database languages, models and architecture	B
2	Identify data requirements and apply relational modelling concepts and principles to develop Entity Relationship Diagram.	A, C
3	Investigate problem and apply normalization techniques to design a database schema.	A, C
4	Critically analyse, identify data requirements, design, and implement a relational database application by applying relational database management systems concepts like data modelling concept, data definition language, data control language, data manipulation language.	A, B, D
5	Critically analyse data access issues for database administration, integrity, security and privacy in the implementation and use of a database.	A

2.4 Assessment Tasks

Assessment tasks				Learning Outcome Mapping	
Assessment ID	**Assessment Item**	**When due**	**Weighting**	**ULO#**	**CLO# for BITS**
1	Assignment 1 (Individual)	Session 5	15%	1, 2	A, B, C
2	Assignment 2 (Individual)	Session 8	20%	1, 3	A, B, C
3	Assignment 3 (Group)	Session 11	25%	1, 2, 3, 4	A, B, C, D
4	Written Examination	Session 14 Exam Week	40%	1, 2, 3, 5	A, B, C, D

ASSESSMENT ITEM 1:

In this assessment, you will be tasked with creating an entity-relationship diagram that aligns with requirements outlined in a practice-based case study. This is an individual assessment.

ASSESSMENT ITEM 2:

Assignment 2 is an individual assessment task that requires you to create a database design by applying normalization techniques.

ASSESSMENT ITEM 3:

Assignment 3 is a group assessment task that requires your group to critically analyse database requirements, design and implement a database, and use SQL to retrieve / manipulate the data from the database to solve the given complex requirements / problems.

ASSESSMENT ITEM 4:

You will complete a written examination at the end of the study period.

2.5 Prescribed and recommended readings

Prescribed Text:

Silberschatz, A., Korth, H.F., Sudarshan, S. (2019) Database System Concepts. (7th Ed). McGraw-Hill.

Ramez, E., Navathe, S.B. (2016). *Fundamentals of database systems*. (7th Ed). Pearson.

Recommended Readings:

Chavan, H. (2022). *Introduction to DBMS*. BPB Publications.

Jiawei H. (2022). *Data Mining: Concepts and Techniques*. Morgan Kaufmann.

Murach, J. (2020). *SQL Server 2019 for developers*. Mike Murach & Associate, Inc.

Ward, B. (2021). *Azure SQL Revealed – A Guide to the Cloud for SQL Server Professionals*. APRESS.

Curé, O., & Blin, G., (2014). *RDF Database Systems: Triples Storage and SPAROL Query Processing*. Elsevier Science & Technology. [Online]. Available at: https://www.proquest.com/ebookcentral/docview/2135772627/5524EADA6BF24472PQ/1/thumbnail?accountid=175624

Schönig, H. (2018). *Mastering PostgreSQL 11: Expert Techniques to Build Scalable, Reliable, and Fault-Tolerant Database Applications*. (2nd Ed). Packt Publishing, Limited. [Online]. Available at: https://www.proquest.com/ebookcentral/docview/2188185642/5E8922E25B5D44DFPQ/1/thumbnail?accountid=175624

Vidhya, V., Jeyaram, G., & Ishwarya, K.R. (2016). *Database Management Systems*. Alpha Science International. [Online]. Available at: https://www.proquest.com/ebookcentral/docview/2134711992/7D4AE9BE8CBC4E69PQ/1/thumbnail?accountid=175624

Australian Privacy Principles (APP) [online] Available at: https://www.oaic.gov.au/privacy/australian-privacy-principles

Customer Data Right (CDR) [online] Available at: https://www.cdr.gov.au/

General Data Protection Regulation (GDPR) [online] Available at: https://gdpr.eu/

2.6 Any specialist facilities and/or resources required:

Microsoft SQL Server Management Studio 2019 or higher version. Note that the current version is 2022.

2.7 Study Schedule

Session Number	Module Topic	Activities and submissions due
Session 1	• Core Database Concepts ○ Introduction to databases	
Session 2	• Database Languages and Architecture ○ Overview of database concepts	

Session 3	• Database Design
	  ○ Overview of database models
	  ○ Relational Database Modelling Concept	

Session 4	• Normalisation
	  ○ Database anomalies and functional dependency
	  ○ Brief description of relation/ table
	  ○ Normalization forms	

Session 5	• Database Queries
	  ○ Data retrieval - Select statement
	  ○ Data updates - Update and Delete statements
	  ○ SQL functions	

Session 6	• Database Queries
	  ○ Advanced queries using aggregation-group by and having clauses
	  ○ Queries involving multiple tables, Join and Subqueries
		Assignment 1 due

Session 7	• Data Definition Language
	  ○ Creation and Altering Tables
	  ○ Foreign keys and constraints	

Session 8	• Stored Procedures	Assignment 2 due
Session 9	• SQL Views	

Session Number	Module Topic	Activities and submissions due

Session 10	• Database administration, Data control language and Data privacy
	  ○ Security requirements for databases and the data stored in them
	  ○ SQL for security and control
	  ○ Object permission and security ethics
	  ○ Administering user rights
	  ○ Discussion on Australian Privacy Principles (APP), General Data Protection Regulation (GDPR) and Customer Data Rights (CDR)	

Session 11	• Non-RDBMS data management
	  ○ Introduction to large datasets and cloud persistence
	  ○ Introduction to NoSQL database.
		Assignment 3 due

Session 12	• Review and Revision	
Study Week		
Exam Week		Written Exam