COURSE INFORMATION

School/Faculty:	Computing/Engineering	**Page:**	1 of 6
Program name:	Bachelor of Computer Science (Data Engineering) with Honors		
Course code:	SECP2523	**Academic Session/Semester:**	2025/2026-01
Course name:	Database	**Pre/co requisite (course name and code, if applicable):**	
Credit hours:	3		

Course synopsis	This course introduces students to the concept of the database system and how it can be used in daily human life and profession. The focus of the course is to equip students with knowledge and skills on important steps and techniques used in developing a database, especially in the conceptual and logical database design phase. Among topics covered are database environment, database design, entity relationship diagram, normalisation, and structured query language (SQL). Students will be taught to use a database management system (DBMS). Students are required to work on a project, i.e. to develop a database application system, for a selected organisation. In this project, students are required to work closely with the organisation during the process of analysis, designing and implementing the system and to use the learned techniques, DBMS and development tools in the development process. At the end of the course, students should be able to apply the knowledge of designing and developing a good database system for a real-world problem.
Course coordinator *(if applicable)*	PM Dr Mohd Shahizan Othman

Course lecturer(s)	**Name**	**Office**	**Contact no.**	**E-mail**
	Dr Rozilawati binti Dollah @ Md Zain	N28A-02-29-01	-	rozilawati@utm.my
	PM Dr Mohd Shahizan Othman	N28A-02-10-01		shahizan@utm.my

Mapping of the Course Learning Outcomes (CLO) to the Programme Learning Outcomes (PLO), Teaching & Learning (T&L) methods and Assessment methods:

No.	CLO	PLO (Code)	Taxonomies and Generic skills	T&L methods	Assessment methods
CLO1	Apply the fundamental database principals in DB system lifecycle and methodology.	PLO1 (KW)	C3	Lecture, active learning	Asg, T, GPR
CLO2	Construct Structured Query Language (SQL) statements for database manipulation using a database management system (DBMS).	PLO3 (PS)	C5	Lecture, Lab work	LA, T, PrBL, F

Prepared by:	Certified by:
Name: Rozilawati binti Dollah @ Md Zain	Name: AP Dr Roliana Ibrahim
Signature:	Signature:
Date: 06/10/2025	Date:

CLO3	Design conceptual and logical databases using entity-relationship diagram (ERD) and normalization techniques.	PLO2 (AP)	C3	Lecture, Active learning	Asg, T, PrBL, GPR, F
CLO4	Develop a database application solution for an organization using learned designing techniques, DBMS and development tools.	PLO5 (TH)	TH3	Project-based learning (PrBL)	GPR

This is the basic mapping required for the CI. Any added information is allowed (extra columns for weight or other elements) ***provided*** *this is made consistent for all CI at program/school/faculty level.*
**Up to 5 CLO*
*Refer **Taxonomies of Learning and ***UTM's Graduate Attributes for UG and Generic Skills for PG, where applicable for measurement of outcomes achievement*
****T – Test; Asg – Assignment; LA – Lab Assignment; PrBL – Project-based Learning; GPR – Group Project; F – Final Exam

Details on Innovative T&L practices:

No.	Type	Implementation
1.	Active learning	Conducted through in-class activities
2.	Project-based learning	Students are required to work on a project, i.e. to develop a database application system, for a selected organization. In this project, students are required to work closely with the organization during the process of analysis, designing and implementing the system and to use the learned techniques, DBMS and development tools in the development process.

Weekly Schedule:

WEEK 1 (6/10/25 – 10/10/25)	**1.0 Overview of Database Concepts** - Database Terminologies - Database Management System - Overview Entity Relationship (ER) Model **2.0 The Relational Model and Relational Database** - Terminologies - Integrity Constraints - Views
WEEK 2 (13/10/25 – 17/10/25)	**3.0 DB System Development Life Cycle** - DB Planning - Requirement Collections & Analysis - DB Design Phases - DBMS Selection - Application Design

WEEK 3 (20/10/25 – 24/10/25) **Deepavali (31/10/24)**	**4.0 Relational Algebra** - Unary Operations - Set Operations - Join Operations - Division Operation - Aggregation & Grouping Operations
WEEK 4 (27/10/25 – 31/10/25)	**5.0 SQL: Data Definition Language (DDL)** - CREATE DATABASE, CREATE SCHEMA, SHOW DATABASES, USE DATABASE, DROP DATABASE - CREATE TABLE, ALTER TABLE, DROP TABLE • Data types – CHAR, VARCHAR, DATE, TIME, DATETIME, DECIMAL, INT, BOOLEAN • Integrity constraints – PRIMARY KEY, FOREIGN KEY • Constraints – UNIQUE, CHECK, NULL, NOT NULL • ADD COLUMN, DROP COLUMN - Views – CREATE VIEW, DROP VIEW, with CHECK OPTION **6.0 SQL: Data Manipulation Language (DML)** - Database Updates - INSERT, UPDATE, DELETE - Simple Queries - SELECT, FROM, WHERE - Sorting, Aggregate Functions – ORDER BY, SUM, COUNT - Grouping - GROUP BY, HAVING - Subqueries - ANY, ALL, EXISTS, NOT EXISTS - Multi-table Queries – JOINs - Combining Result Tables – UNION, INTERSECT, EXCEPT **Assessment: LAB ASG 1** **INDUSTRY DAY 1 – Briefing by Industry on Project**
WEEK 5 – 6 (3/11/25 – 14/11/25)	**7.0 Advance SQL** - Stored Procedures Basics - Conditional Statements - Loops - Cursors - Error Handlings - Stored Functions **Assessment: LAB ASG 2**
	8.0 Database Design - Database Design Phases - Conceptual Database Design – Entity Relationship Diagram (ERD), Enhance Entity Relationship Diagram (EERD) - Logical Database Design – Normalization ** **Assessment: ASG 1 – ERD**

WEEK 7 (17/11/25 – 21/11/25)	**WBL 1 – Problem formulation in industry & Project Proposal** **Objective 1:** Identify problem and requirement for a database application through workshop/discussion with industry **Objective 2:** Prepare and submit project proposal for a database application system's requirements identified from industry **Assessment: PROJECT - P1: PROJECT PROPOSAL**
Week 8 (24/11/25 – 28/11/25)	**MID-SEMESTER BREAK**
WEEK 9 (1/12/25 – 5/12/25)	**WBL 2 – Conceptual design of the system's database** **Objective 3:** Prepare and submit a database conceptual design **Assessment: PROJECT - P2: PART 1 - CONCEPTUAL DB DESIGN PRESENTATION & REPORT**
WEEK 10 (8/12/25 – 12/12/25)	**WBL 3 – Logical design of the database** **Objective 4:** To complete the global database logical design (global logical ERD). **Assessment: TEST**
WEEK 11 (15/12/25 – 19/12/25)	**WBL 4 – Prototype development: Develop SQL queries for the proposed system** **Objective 5:** Develop SQL queries for all database transactions proposed **Assessment: Assignment 2 – Normalization** **Assessment: PROJECT P3: PART 1 – SYSTEM LOGICAL ERD**
WEEK 12 (22/12/25 – 26/12/25) **Christmas (25/12/25)**	**WBL 5 – Prototype development: Develop complete application** **Objective 6:** Develop complete application
WEEK 13 (29/12/25 – 2/1/26)	**WBL 6 – Prototype development: Conduct user testing** **Objective 7:** Testing prototype with industry
WEEK 14 (5/1/26 - 9/1/26)	**WBL 7: Submit Project Final Report** **Assessment: PROJECT P3: SYSTEM PRESENTATION & REPORT**
WEEK 15 (12/1/26 – 16/1/26)	**INDUSTRY DAY 2 – SYSTEM HANDOVER TO INDUSTRY** **Assessment: ALTERNATIVE ASSESSMENT (AA)**

Transferable skills (generic skills learned in course of study which can be useful and utilised in other settings):

Team working
Written communication

School/Faculty:	Computing/Engineering	**Page:**	5 of 6
Program name:	Bachelor of Computer Science (Data Engineering) with Honors		
Course code:	SECP2523	**Academic Session/Semester:**	2025/2026-01
Course name:	Database	**Pre/co requisite (course name and code, if applicable):**	
Credit hours:	3		

Student learning time (SLT) details:

Distribution of student Learning Time (SLT) Course content outline	Guided Learning (Face to Face)				Teaching and Learning Activities: Guided Learning Non-Face to Face	Teaching and Learning Activities: Independent Learning Non-Face to face	TOTAL SLT
CLO	**L**	**T**	**P**	**O**			
CLO1	8					9.5	17.5
CLO2	4		8		5	27	44
CLO3	12				5	23.5	40.5
CLO4			10		5	22.5	37.5
Total SLT	**24**		**18**		**15**	**82.5**	**139.5**

Continuous Assessment (Formative)		PLO	Percentage	Total SLT
1	Assignment 1	PLO1 (KW)	5	**2**
2	Assignment 2	PLO2 (AP)	5	**2**
3	Lab Assignment 1 & 2	PLO3 (PS)	10	**4**
4	Group PrBL - Group Assessment: a) P1: System Requirement b) P2: System DB Design c) P3: System Implementation a. Industry b. Lecturer	 PLO1 (KW) PLO5 (TH) PLO3(PS), PLO5(TH)	 8 8 15 4	 **As in CLO1** **As in CLO3** **As in CLO3 and CLO4**
Final Assessment (Summative)			Percentage	Total SLT
5	Mid-Term Test	PLO1 (KW) PLO2 (AP) PLO3 (PS)	8 9 8	**2.5**
6	Final Exam (Alternative Assessment): PrBL - Individual Assessment	 PLO2 (AP) PLO3 (PS)	 15 5	 **As in CLO3** **As in CLO2**
Grand Total			**100**	**150h**

L: Lecture, T: Tutorial, P: Practical, O: Others

Special requirement to deliver the course (e.g: software, nursery, computer lab, simulation room):

Database Management System software (MySQL)

School/Faculty:	Computing/Engineering	**Page:**	6 of 6
Program name:	Bachelor of Computer Science (Data Engineering) with Honors		
Course code:	SECP2523	**Academic Session/Semester:**	2025/2026-01
Course name:	Database	**Pre/co requisite (course name and code, if applicable):**	
Credit hours:	3		

Learning resources:

Text book: None

Main references:

Connolly,T., C.Begg. Database Systems: A Practical Approach to Design, Implementation, and Management. 6th Edition, Pearson Education International, 2015

Additional references: None

Online: http://elearning.utm.my

Academic honesty and plagiarism:

Assignments are individual tasks and NOT group activities (UNLESS EXPLICITLY INDICATED AS GROUP ACTIVITIES) Copying of work (texts, simulation results etc.) from other students/groups or from other sources is not allowed. Brief quotations are allowed and then only if indicated as such. Existing texts should be reformulated with your own words used to explain what you have read. It is not acceptable to retype existing texts and just acknowledge the source as a reference. Be warned: students who submit copied work will obtain a mark of **zero** for the assignment and disciplinary steps may be taken by the faculty. It is also unacceptable to do somebody else's work, to lend your work to them or to make your work available to them to copy.

Other additional information (Course policy, any specific instruction etc.):

-

Disclaimer:

All teaching and learning materials associated with this course are for personal use only. The materials are intended for educational purposes only. Reproduction of the materials in any form for any purposes other than what it is intended for is prohibited. While every effort has been made to ensure the accuracy of the information supplied herein, Universiti Teknologi Malaysia cannot be held responsible for any errors or omissions.

No	Assessment	PLO1	PLO2	PLO3	PLO5	TOTAL
		CLO1	CLO3	CLO2	CLO4	
1	Assignment 1 & 2	5	5			10
2	Lab Assignment 1 & 2			10		10
3	Mid-Term Test	8	9	8		25
4	Group Project: P1: Project Proposal	8				35
	P2: DB Design				8	
	P3: System Implementation			10	9	
5	Alternative Assignment		15	5		20
TOTAL PLO		**21**	**29**	**33**	**17**	**100**