

School/Faculty:	Faculty of Computing		
Program name:	SECBH/SECRH/SECVH		
Course code:	SECD2523	Academic Session/Semester:	20252026-01
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 database system and how it is used in daily human life and profession. The focus of the course is to equip students with the 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, normalization, and structured query language (SQL). Students will be taught to use a database management system (DBMS). Students are required to design and develop the database component of an information system using the learned techniques, DBMS and a development tool. At the end of the course, students should be able to apply the knowledge of designing and developing a good database system.			
Course coordinator (if applicable)	Dr. Shamini A/P Raja Kumaran			
Course lecturer(s)	Name	Office	Contact no.	E-mail (@utm.my)
	Dr. Haslina binti Hashim			haslinah
	Dr. Sharin Hazlin Huspi			sharin
	Dr. Rozilawati bt Dollah @ Md. Zain			rozilawati
	Dr. Noor Hidayah Zakaria			noorhidayah.z
	Dr. Shamini A/P Raja Kumaran			shamini.rk

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

No.	CLO*	PLO ** (MQF Cluster Code)	***Taxonomies and ****generic skills	T&L methods	*****Assessment methods
CLO1	Apply the fundamental database (DB) principals in DB system lifecycle.	PLO1 (C1)	C3 SC1	Lecture, Active learning	TU, T, F
CLO2	Develop a logical database design using entity-relationship diagram (ERD) and normalization techniques.	PLO2(C2)	C5 SC2	Lecture, Active learning, PoBL	PR, T, F
CLO3	Construct Structured Query Language (SQL) statements for database manipulation using a database management system (DBMS).	PLO3(C3A)	P5 SC3	Lecture, Programming lab, PoBL	LE, PR, T, F
CLO4	Develop the database component for a database application solution using learned designing techniques, DB language, DBMS and development tools.	PLO6(C3D)	A4 A (IT2)	PoBL	TU, PR

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; Q – Quiz; TU-Tutorial; PR – Project; F – Final Exam; LE - Lab Exercise.

C1 = Knowledge & Understanding, **C2** = Cognitive Skills, **C3A** = Interpersonal Skills, **C3B** = Interpersonal Skills, **C3C** = Communication Skills, **C3D** = Digital Skills, **C3E** = Numeracy Skills, **C3F** = Leadership, Autonomy & Responsibility, **C4A** = Personal Skills, **C4B** = Entrepreneurial Skills, **C5** = Ethics & Professionalism

No.	Type	Implementation
1	Active learning	Conducted through in-class activities
2	Project-based learning	Conducted in a group project assignment. Students, in a group of 3 or 4, are required to develop a database application system for a selected company. Students are required to go through the database system development methodology starting from determining the database requirements until developing the database application system. Students shall apply all relevant knowledge acquired throughout the semester on the project. Students are assessed on their ability to deliver a creative database design solution that will be able fulfill the requirements identified.

Skilled in using and applying technology effectively to solve problems.

Week/ Meeting	Course Content Outline and Subtopics	CLO*	Learning and Teaching Activities											TOTAL SLT	
			Face-to-Face (F2F)								Non F2F Independent Learning				
			Physical				Online (Synchronous)				Online (Asynchronous)	Others			
			L	T	P	O	L	T	P	O					
Week 1	Topic 1: Introduction to Database - File Based Approach - Database Approach - Roles in DB Environment - Database Management System - The 3-Level ANSI-SPARC Architecture		2	1							1	2	6		
	Topic 2: The Relational Model and Database Design -Terminologies -Integrity Constraints -Views -Database Design Phases -Conceptual Design – Steps & Deliverables		2	1							1	2	6		
Week 2	Topic 3: Relational Algebra -Unary Operations -Set Operations -Join Operations -Division Operation		2	1							1	2	6		
Week 3	Topic 4: Entity-Relationship (ER) Modeling SQL 1: DDL - Introduction to a DBMS software - SQL: DDL (Data Definition Language) · SQL Data Types · Integrity Enhancement · Data Definition (CREATE, ALTER, DROP) - Views (CREATE , DROP , WITH CHECK OPTION)		2	1							1	2	6		
Week 4			2	1							1	2	6		
Week 5			2	1							1	2	6		
Week 6			2	1							1	2	6		

Week 7	Topic 5: Enhanced ER Modeling - Generalization, Specialization - Superclass, subclass		2	1							1	2	6
Week 8	Semester Break												
Week 9	Topic 5: Enhanced ER Modeling - Generalization, Specialization - Superclass, subclass SQL 3: DML 2 Simple Queries (SELECT, FROM, WHERE) -Sorting, Aggregate (ORDER BY) -Grouping (GROUP BY)		2	1							1	2	6
Week 10	Topic 6a: Logical Database Design - ERD to Relations		2	1							1	1	5
Week 11	Topic 6b: Logical Database Design - Normalization - Update Anomalies		2	1							2	2	7
Week 12	SQL 4: DML 3 - Joining Data from Multiple Tables - UNION, INTERSECT, EXCEPT - JOINS (Equi-Join, Outer Join, Left Join)		2	1							2	1	6
Week 13	Topic 7: Transaction Management -Transaction Support -Key Characteristics of Transaction (ACID) -Concurrency Control in Transaction Management -Concurrency Control Method -Concurrency Control -Database Recovery		2	1							2	2	7
Week 14	Topic 8: Introduction to Data Warehouse - Main Concept of Data Warehouse - OLAP and OLTP - Architecture of Data Warehouse - Tools & Technologies (ETL) - Data Mart		2	1							2	3	8
Week 15	Topic 9: Introduction to NOSQL Database		2	1							2	3	8
SUB-TOTAL SLT :												89	

Continous Assessment		%	Face-to-Face (F2F)		NF2F Independent Learning for Assessment		TOTAL SLT
			Physical	Online (Synchronous)	Online (Asynchronous)	Others	
1	Tutorial	10	3			3	6
2	Lab exercises	10	5				5
3	Mid Term Exam (T1-T4) - 19/11 Tue 8-10.30 pm @ N24	20	3				3
4	Project	30	14				14
SUB-TOTAL SLT :							28

Summative Assessment		%	Face-to-Face (F2F)		NF2F Independent Learning for Assessment		TOTAL SLT
			Physical	Online (Synchronous)	Online (Asynchronous)	Others	
1	Final Exam (T5-T9)	30	3				3

		SUB-TOTAL SLT :	3
		SLT for Assessment:	31
		GRAND TOTAL SLT:	120
A	% SLT for F2F Physical Component	58.33	
B	% SLT for Online & Independent Learning Component :	41.67	
C	%SLT for Online Component:	15.83	
D	% SLT for All Practical Component:	0.00	
D1	% SLT for F2F Physical Practical Component:	0.00	
D2	% SLT for F2F Online Practical Component:	0.00	
Please tick (/) if this course is Industrial Training/ Clinical Placement/ Practicum using 50% of Effective Learning Time (ELT)			

Identify special requirement or resources to deliver the course (e.g.,software,nursery, computer lab, simulation room etc)
Computer lab that is equipped with Database Management System (DBMS) software, ERD software designer tool, application program software

References (include required and further readings, and should be the most current)
<p>Main references Connolly, T., & Begg, C. (2015). Database systems: A practical approach to design, implementation, and management (6th ed.). Pearson Education International.</p> <p>Additional references Penn, M. (2025). Database Systems: A Practical Approach. Willford Press. Coronel, C., & Morris, S. (2019). Database systems: Design, implementation, and management (13th ed.). Course Technology–Cengage Learning. Hernandez, M. J. (2013). Database design for mere mortals: A hands-on guide to relational database design (3rd ed.). Addison-Wesley.</p> <p>Online http://elearning.utm.my</p>

Other additional information (if applicable)
Academic honesty and plagiarism:
<p>Assignments are individual tasks and NOT group activities (UNLESS EXPLICITLY INDICATED AS GROUP ACTIVITIES)</p> <p>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.</p>

Other additional information (if applicable)

Disclaimer:
<p>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.</p> <p>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.</p>

ELT = (Theory + Industrial Guidance + Assessment) x 50%

Total of credit for LI/Practical = ELT/40 Notional Hours

Note: For ODL Programme : Courses with mandatory practical requirement imposed by programme standards or any related standards can be exempted from complying to the minimum 80% ODL delivery rule in the SLT.

Prepared by: Name: DR. NOOR HIDAYAH ZAKARIA Signature:  Date: 3/10/2025	Certified by: Name: DR. SHARIN HAZLIN HUSPI Signature:  Date: 3/10/2025
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