Subject Description Form

Subject Code	COMP2411
Subject Title	Database Systems
Credit Value	3
Level	2
Pre-requisite / Co-requisite / Exclusion	**Pre-requisite**: COMP1011/COMP1012/ENG2002
Objectives	The objectives of this subject are to: • design, develop, implement, and administrate a database system of considerable complexity; and • possess enough background to evaluate various DBMSs of different data models and make the appropriate selection for an organisation.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: *Professional/academic knowledge and skills* (a) understand database management systems, as well as to apply the associated tools and techniques; (b) understand the principles and practices of database design and analysis; (c) identify the direction of database technology and their implication, and plan database developments; *Attributes for all-roundedness* (d) understand development of database technologies, e.g., web databases; and (e) achieve team outcomes, and develop presentation and technical writing skills.
Subject Synopsis/ Indicative Syllabus	**Topic** **1. Basic Concepts of Database System** Database and its applications; DBMS design objectives and its components; ANSI/SPARC three-level system architecture; data independence. **2. Database Design** Entity-relationship model; functional dependencies; normalisation. **3. Relational Data Model** Relational structure; relational languages: relational algebra, relational calculus, SQL; relational constraints: entity constraints, referential integrity constraints and foreign keys.

4.	**File Structures and Physical Database Design**
	File organisation; indexing and hashing.
5.	**Application Design and Query Processing**
	Relational view definition and management; equivalence of query expressions, estimation of query-processing cost, join strategies; embedded SQL.
6.	**Implementation Issues**
	Buffer management; transaction processing; concurrency control; crash and recovery; security and integrity.

Teaching/ Learning Methodology	This subject emphasises the technical/practical aspects of database design and development. It is intended to equip the student with knowledge and practical experience on the real-life/industrial database application development. The lectures will be used to deliver course material that will be practiced/reinforced during the labs and tutorials.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed				
		a	b	c	d	e
Continuous Assessment	**55%**					
1. Assignments, Tests and Projects		✓	✓	✓	✓	✓
Examination	**45%**	✓	✓	✓		
Total	100%					

Student Study Effort Expected

Class contact:

▪ Lectures	39 Hrs.
▪ Tutorials/Lab	13 Hrs.

Other student study effort:

▪ Assignments, Tests, Projects, Exams	67 Hrs.
Total student study effort	119 Hrs.

Reading List and References

Reference Books:

1. Kroenke, David M. and Auer, David J., *Database Processing: Fundamentals, Design and Implementation*, 14th Edition, Prentice Hall, 2016.

2. Mannino, Michael, *Database Design, Application Development, and Administration*, 3rd (international) Edition, McGraw-Hill, 2007.

	3. Silberschatz, Abraham, Korth, Henry F. and Sudarshan, S., *Database System Concepts*, 6th Edition, McGraw Hill, 2011. 4. Garcia-Molina, Hector, Ullman, Jeffrey D. and Widom, Jennifer, *Database System Implementation*, 3rd Edition, Prentice Hall, 2008. 5. Date, C. J., *An Introduction to Database Systems*, Addison-Wesley Longman, 2004.