Subject Description Form

Subject Code	EIE3112
Subject Title	Database System
Credit Value	3
Level	3
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	**To introduce:** 1. database design, development, and programming 2. advanced database queries and database security 3. data warehousing and data mining
Intended Subject Learning Outcomes	**Upon completion of the subject, students will be able to:** Category A: Professional/academic knowledge and skills 1. Database design, development, and programming 2. Advanced database queries and database security. 3. Data warehousing and data mining Category B: Attributes for all-roundedness 4. Communicate effectively

Subject Synopsis/ Indicative Syllabus	**Syllabus:**
	1. Database Design and Development
	    1.1 DBMS systems; Client-server architecture; Database architectures and the web
	    1.2 SQL: data manipulation; data definition;
	    1.3 DB Development: DB applications and views;
	    1.4 Advanced SQL: SQL programming language; stored procedures; functions; triggers; cursors; exception handling
	    1.5 ER Modelling: ER diagrams; Transforming ER diagrams to relations
	    1.6 Normalization: Data redundancy and update anomalies; functional dependencies; normalization processes; normal forms
	
	2. Managing Database Environments
	    2.1 Database Security: Database security best practices; SQL injection; Preventing SQL injection
	
	3. Data Warehouse and Data Mining
	    3.1 Architectures of data warehouse; applications of data warehouse; data warehouse tools and technologies
	    3.2 Data warehouse queries; OLTP versus OLAP;
	    3.3. Data-mining processes; Data representation;
	    3.4. Classification, regression, and cluster Analysis
	
	Laboratory Experiments
	Lab 1: Database Implementation and SQL
	Lab 2: Advanced SQL
	Lab 3: Data Mining and Data Analysis

Teaching/Learning Methodology	Lectures: Fundamental principles and key concepts of the subject are delivered to students. Tutorials: Students will be able to clarify concepts and to have a deeper understanding of the lecture material; problems and application examples are given and discussed. Students will be given programming exercises and use database development tools to design database.

	Laboratory Sessions: Students will do some programming exercises to enhance their understanding on database design and development.

Alignment of Assessment and Intended Subject Learning Outcomes						

Specific Assessment Methods/Tasks	% Weighting	Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)			
		1	2	3	4
1. Continuous Assessment (Total: 50%)					
• Assignment	10%	✓	✓	✓	✓
• Test / quizzes	20%	✓	✓		
• Laboratory	20%	✓	✓	✓	✓
2. Examination	50%	✓	✓	✓	
Total	100%				

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Short quizzes: These can measure the students' understanding of the theories and concepts as well as their comprehension of subject materials.

Test & Examination: End-of-chapter-type problems are used to evaluate the students' ability in applying concepts and skills learnt in the classroom; students need to think critically and to learn independently in order to come up with an appropriate design.

Laboratory: Each student is required to produce a report; the accuracy and presentation of the report will be assessed.

Student Study Effort Expected	Class contact (time-tabled):	
	• Lecture/Tutorial	30 Hours
	• Laboratory/Practice Classes	9 Hours
	Other student study effort:	
	• Lecture: preview/review of notes; homework/assignment; preparation for test/quizzes/examination	36 Hours
	• Tutorial/Laboratory/Practice Classes: preview of materials, revision and/or reports writing	30 Hours
	Total student study effort:	**105 Hours**

Reading List and References	1. Thomas Connolly and Carolyn Begg, *Database Systems: A Practical Approach to Design, Implementation, and Management*, 6/E, Pearson, 2015. 2. Mark L. Gillenson, *Fundamentals of database management systems, Wiley*, 2nd ed., Wiley, 2012. 3. I.H. Witten, *Data Mining: Practical Machine Learning Tools and Techniques*, 3rd ed., Morgan Kaufmann, 2011
Last Updated	July 2019
Prepared by	Dr Pauli Lai and Mr Ivan Lau