Subject Description Form

Subject Code	EIE432 (for 42077)
Subject Title	Web Systems and Technologies
Credit Value	3
Level	4
Pre-requisite	Information Technology (ENG224)
Co-requisite/ Exclusion	Nil
Objectives	This subject will provide students with the principles and practical programming skills of developing Internet and Web applications. It enables students to master the development skill for both client-side and server-side programming, especially for database applications. Students will have opportunity to put into practice the concepts through programming exercises based on various components of client/server web programming.
Intended Subject Learning Outcomes	**Upon completion of the subject, students will be able to:** Category A: Professional/academic knowledge and skills 1. Understand the enabling technologies for building Internet and Web database applications. 2. Understand the different components for developing client/server applications. 3. Apply the techniques and features of the client/server development languages to construct a database application based on Internet. 4. Develop the web database applications through programming exercises. Category B: Attributes for all-roundedness 5. Present ideas and findings effectively. 6. Learn independently.
Contribution of the Subject to the Attainment of the Programme Outcomes	**Programme Outcomes:** Category A: Professional/academic knowledge and skills • Programme Outcome 1: This subject contributes to the programme outcome through the teaching of the theories and concepts of web technologies and through providing the students with an opportunity to apply their knowledge. • Programme Outcome 3: This subject contributes to the programme outcome through teaching the different ways of building Internet and web applications. • Programme Outcome 4: This subject contributes to the programme outcome by providing the opportunity for students to solve practical problems pertaining to the fields of Internet and Web applications. Category B: Attributes for all-roundedness • Programme Outcome 11: This subject contributes to the programme outcome by providing students with the foundations for life-long learning and continual professional development in the areas of Web applications.
Subject Synopsis/ Indicative Syllabus	**Syllabus:** 1. Introduction to Client/Server Computing 1.1 The basic principles of client/server computing; Distinguished characteristics of client/server systems and application areas; Comparison of 2 tier versus three tier client/server solutions; Web programming model; Interactive web.

2. Web Programming
   2.1 Client Side Web Programming: Benefits and limitation of client-side web programming; Byte code versus scripting. Basic concepts and development based on Java applet, Java script & dynamic HTML (DHTML).
   2.2 Server Side Web Programming: Approaches to server-side programming. Benefits and limitations of server-side web programming. Development framework for server-side programming based on PHP/servlet/JSP.
   2.3 Web application development. Development of a web application using client-side programming, server-side side programming and AJAX techniques

3. Web Database
   3.1 Introduction to Database: File and database processing systems; Definition of database; DBMS examples.
   3.2 Data Modelling: Entity relationship model; Elements of the E.R. model.
   3.3 Database Design and Implementation: Relation model; Mapping an ER model to table model; Mapping entities and attributes; Normalization; Foundations of relational implementation; Defining relational data; Relational data manipulation; Relational algebra; Structured query language; Restricting and sorting data; Displaying data from multiple tables.
   3.4 Web Database Applications: Multi-tier architecture; Principle of web database applications: store, manage and retrieve data.

Laboratory Experiments:

Practical Works:
1. Client-side web application programming.
2. Server-side web application programming.
3. Database driven web design.
4. Evaluation of commercially available database management systems.
5. Creating and managing a database.
6. Web database Applications.

Teaching/ Learning Methodology	Teaching and Learning Method	Intended Subject Learning Outcome	Remarks
	Lectures	1, 2	fundamental principles and key concepts of the subject are delivered to students.
	Tutorials	1, 2	supplementary to lectures; 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.
	Laboratory sessions	3, 4, 6	students will develop client-side and server-side web applications.
	Mini-project	3, 4, 5, 6	students in groups of 2 are required to develop a database driven web application. Each group is required to perform a detailed study and make a presentation.

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**	**5**	**6**
	1. Continuous Assessment (total 40%)							
	• Short quizzes	10%	✓	✓				
	• Tests	20%	✓	✓	✓	✓		✓
	• Laboratory sessions	10%			✓	✓	✓	✓
	2. Examination	60%	✓	✓	✓	✓		✓
	Total	100%						

The continuous assessment consists of a number of short quizzes, assignments, laboratory reports and two tests.

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

Specific Assessment Methods/Tasks	**Remark**
Short quizzes	mainly objective tests (e.g., multiple-choice questions, true-false, and matching items) conducted to measure the students' ability to remember facts and figures as well as their comprehension of subject materials.
Tests and examination	end-of chapter type problems used to evaluate students' ability in applying concepts and skills learnt in the classroom; students need to think critically and creatively in order to come with an alternate solution for an existing problem.
Laboratory sessions, mini-project	oral examination based on the laboratory exercises will be conducted to evaluate student's technical knowledge and communication skills.

Student Study Effort Expected	**Class contact (time-tabled):**	
	• Lecture	24 Hours
	• Tutorial/Laboratory/Practice Classes	18 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	27 Hours
	Total student study effort:	**105 Hours**
Reading List and References	**Textbooks:** 1. M. Hall, *Core Web Programming*, Prentice, 2003. 2. D.M. Kroenke, *Database Processing Fundamentals, Design and Implementation*, 8/e., Prentice-Hall, 2001. **Reference Books:** 1. F.J. Cooper et al., *Implementing Internet Security*, New Riders, 1995. 2. Peter Rossbach and Hendrik Schreiber, *Java Server and Servlets*, Addison-Wesley, 2000. 3. Jason Hunter and William Crawford, *Java Servlet Programming*, 2nd ed., O'Reilly, 2001. 4. Susan Boardman, Melanie Caffrey, Solomon Morse and Benjamin Rosenzweig, *Oracle Web Application Programming for PL/SQL Developers*, Prentice-Hall, 2003. 5. Michael V. Mannino, *Database, Design, Applications Development, & Administration*, 2nd ed., McGraw-Hill, 2004.	