Subject Description Form

Subject Code	EIE4432
Subject Title	Web Systems and Technologies
Credit Value	3
Level	4
Pre-requisite	ENG2003 Information Technology
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. Think critically. 7. Learn independently.
Subject Synopsis/ Indicative Syllabus	**Syllabus:** 1. Introduction to Client/Server Computing The basic principles of client/server computing; Distinguished characteristics of client/server systems and application areas; Comparison of two tier versus three tier client/server solutions; Web programming model; Interactive web. 2. Web Programming Client-Side Web Programming: Benefits and limitation of client-side web programming. Basic concepts and development based on Java applet / JavaScript / dynamic HTML (DHTML). 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. Web application development. Development of a web application using synchronous and asynchronous techniques 3. Web Database Database Design and Implementation: Relation model; Mapping an ER model to relational model; Foundations of relational implementation; Structured query language.

Web Database Applications: Multi-tier architecture; Principle of web database applications: store, manage and retrieve data.

4. Data Analysis
Introduction to data mining; Concepts of data analysis; web data mining; Introduction to big data analysis; Techniques of big data analysis.

Laboratory Experiments:

Practical Works:
1. Client-side web application programming.
2. Server-side web application programming.
3. Database-driven web design.
4. Web database Applications.

Teaching/ Learning Methodology

Teaching and Learning Method	**Intended Subject Learning Outcome**	**Remarks**
Lectures	1, 2, 6	fundamental principles and key concepts of the subject are delivered to students.
Tutorials	1, 2, 6	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, 7	students will develop client-side and server-side web applications.
Mini-project	3, 4, 5, 6, 7	students in groups of 2/3 are required to develop a database-driven web application. Each group is required to perform a detailed study and make a presentation.

Assessment Methods in Alignment with 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**	**7**
1. Continuous Assessment (total 60%)								
• Tests	18%	✓	✓	✓	✓		✓	
• Quiz	18%	✓	✓	✓	✓		✓	
• Laboratory sessions	6%			✓	✓		✓	✓
• Mini-project	18%	✓	✓	✓	✓	✓	✓	✓
2. Examination	40%	✓	✓	✓	✓		✓	
Total	100%							

The continuous assessment consists of tests, laboratory exercises and a mini-project.

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

Specific Assessment Methods/Tasks	Remark
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	15 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

Reference Books:

1. Max Bramer, *Web Programming with PHP and MySQL: A Practical Guide*, Springer, 2015.
2. O'Kane, Mike, *A Web-based Introduction to Programming: Essential Algorithms, Syntax, and Control Structures using PHP, HTML and MySQL*, 3rd ed., Caroline Academic Press, 2014.
3. Nixon, Robin, *PHP: 20 Lessons to Successful Web Development*, McGraw-Hill Education, 2015.

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