

Subject Description Form

Subject Code	EIE4432 (for BEng in EIE and BSc in IMT)
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	<p>Upon completion of the subject, students will be able to:</p> <p><u>Category A: Professional/academic knowledge and skills</u></p> <ol style="list-style-type: none"> 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. <p><u>Category B: Attributes for all-roundedness</u></p> <ol style="list-style-type: none"> 5. Present ideas and findings effectively. 6. Think critically. 7. Learn independently.
Subject Synopsis/ Indicative Syllabus	<p>Syllabus:</p> <ol style="list-style-type: none"> 1. <u>Introduction to Client/Server Computing</u> 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. <u>Client-Side Web Programming</u> Benefits and limitations of client-side web programming. Basic concepts and development based on HTML, CSS, JavaScript, jQuery, AJAX, JSON. 3. <u>Server-Side Web Programming</u> Approaches to server-side programming. Benefits and limitations of server-side web programming. Development framework for server-side programming based on Node.js, RESTful API. Web application development: Development of a web application; Comparison of synchronous and asynchronous techniques. 4. <u>Web Database Applications</u> Web Database Applications: Multi-tier architecture; Principle of web database applications: store, manage and retrieve data.

	Laboratory Experiments: Practical Works: <ul style="list-style-type: none"> • Client-side web application programming. • Server-side web application programming. • Database-driven web design. • 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.
	Project	1, 2, 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 100%)																
	• Quiz(zes)/Test(s)	40%	✓	✓	✓	✓		✓									
	• Laboratory sessions	15%			✓	✓		✓	✓								
	• Project	45%	✓	✓	✓	✓	✓	✓	✓								
Total	100%																
<p>The continuous assessment consists of quiz(zes), test(s), laboratory exercises, and project.</p> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <table border="1"> <thead> <tr> <th>Specific Assessment Methods/Tasks</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>Tests, quizzes</td> <td>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 up with an alternate solution for an existing problem.</td> </tr> <tr> <td>Laboratory sessions, Project</td> <td>the laboratory exercises and the project are to evaluate students' technical knowledge and communication skills.</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>										Specific Assessment Methods/Tasks	Remark	Tests, quizzes	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 up with an alternate solution for an existing problem.	Laboratory sessions, Project	the laboratory exercises and the project are to evaluate students' technical knowledge and communication skills.		
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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							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	<p>Reference Books:</p> <ol style="list-style-type: none"> 1. V. Subramanian, <i>Pro MERN stack : full stack web app development with Mongo, Express, React, and Node</i>, Second edition. New York, NY: Apress, 2019. 2. C. Northwood, <i>The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer</i>. Berkeley, CA: Apress L. P, 2018. 3. Rungta, Krishna. <i>Learn NodeJS in 1 Day: Complete Node JS Guide with</i> 																

	<p><i>Examples</i>. Independently published, 2016.</p> <ol style="list-style-type: none">4. V. Bojinov and V. Bojinov, <i>RESTful web API design with Node.js 10 : learn to create robust RESTful web services with Node.js, MongoDB, and Express.js</i>, Third edition. Birmingham: Packt Publishing Ltd., 2018.5. S. Powers, <i>JavaScript cookbook : programming the web</i>, Third edition. Sebastopol, California: O'Reilly Media, Incorporated, 2021.
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