

Subject Description Form

Subject Code	EIE3320 (for Scheme in IAIE)
Subject Title	Object-Oriented Design and Programming
Credit Value	3
Level	3
Pre-requisite	<u>For BSc in AIIE and BSc in IS:</u> COMP2011 Data Structure
Co-requisite/ Exclusion	Nil
Objectives	This subject will provide students with the principles of object-oriented software design and programming from the perspective of Java implementation and UML. Students are expected to learn the concepts of and practical approaches to object-oriented analysis, design and programming using UML and Java.
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 principles of object oriented design. 2. Apply Java in object oriented software development. 3. Apply UML in object oriented software modeling. 4. Apply object oriented approach to developing computer software. <p><u>Category B: Attributes for all-roundedness</u></p> <ol style="list-style-type: none"> 5. Learn independently and be able to search for the information required in solving problems. 6. Present ideas and findings effectively. 7. Think critically. 8. Work in a team and collaborate effectively with others.
Subject Synopsis/ Indicative Syllabus	<p>Syllabus:</p> <ol style="list-style-type: none"> 1. <u>Introduction to Software Engineering</u> Software products; software processes; software process models; 2. <u>Java Programming Basic</u> Java technologies; Java platform; Java language basic: variables, operators, expressions, statements, blocks, control flow, methods, arrays. 3. <u>Object-Oriented Programming with Java</u> Objects and classes; class definition; fields, constructors and methods; object interaction; grouping objects; array and collections; designing classes; inheritance and polymorphism; managing inheritance: creating subclasses and super-classes, hiding member variables, overriding methods. Interfaces and packages. 4. <u>Web Programming with Java</u> <i>JavaScript</i>: Client-side Web programming; JavaScript and HTML; Object, events, and event handlers in JavaScript. <i>Java Servlets</i>: architecture of servlets, client interaction, life cycle of servlets, saving client states; servlet communications, session tracking, and using server resources. 5. <u>Unified Modelling Language (UML)</u> Purposes of modelling. Structural Modelling: classes, relationships, class Diagrams, interfaces, packages, and object diagrams. Behavioural modelling interactions and use case diagrams. Architectural modelling: components, deployment, and collaborations. Mapping UML diagrams to Java Code.

	<p>Laboratory Experiment:</p> <p>Students will be requested to use integrated development environment (IDE) to write and debug Java programs during tutorial and lab sessions.</p>																																																																																										
<p>Teaching/ Learning Methodology</p>	<table border="1"> <thead> <tr> <th data-bbox="477 315 735 456">Teaching and Learning Method</th> <th data-bbox="743 315 914 456">Intended Subject Learning Outcome</th> <th colspan="8" data-bbox="922 315 1402 456">Remarks</th> </tr> </thead> <tbody> <tr> <td data-bbox="477 468 735 568">Lectures</td> <td data-bbox="743 468 914 568">1, 2, 3</td> <td colspan="8" data-bbox="922 468 1402 568">fundamental principles and key concepts of the subject are delivered to students</td> </tr> <tr> <td data-bbox="477 580 735 734">Quizzes/Tests</td> <td data-bbox="743 580 914 734">1, 2, 3</td> <td colspan="8" data-bbox="922 580 1402 734">students' knowledge on understanding of certain topics can be easily estimated, and the corresponding teaching time will be adjusted accordingly</td> </tr> <tr> <td data-bbox="477 745 735 846">Assignments</td> <td data-bbox="743 745 914 846">2,4,5,7</td> <td colspan="8" data-bbox="922 745 1402 846">Programming exercises are used to reinforce the knowledge taught in lectures.</td> </tr> <tr> <td data-bbox="477 857 735 936">Laboratory sessions</td> <td data-bbox="743 857 914 936">2,3,4,5,6,7,8</td> <td colspan="8" data-bbox="922 857 1402 936">Students will need to design, develop, test, and document Java programs.</td> </tr> </tbody> </table>									Teaching and Learning Method	Intended Subject Learning Outcome	Remarks								Lectures	1, 2, 3	fundamental principles and key concepts of the subject are delivered to students								Quizzes/Tests	1, 2, 3	students' knowledge on understanding of certain topics can be easily estimated, and the corresponding teaching time will be adjusted accordingly								Assignments	2,4,5,7	Programming exercises are used to reinforce the knowledge taught in lectures.								Laboratory sessions	2,3,4,5,6,7,8	Students will need to design, develop, test, and document Java programs.																																							
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	<p>Assignments</p> <p>Students will be asked to write Java programs and test the programs. Students will need to think critically and creatively in order to come up with a good solution for an existing problem.</p>	
	<p>Lab reports</p> <p>Each group of students are required to produce a written report for the Laboratory sessions. Students will be assessed based on the quality of their programs and the clarity of their reports.</p> <p>Students will be asked to work as a team to develop a Java application. Each of them will be responsible for part of the software. They will also need to use UML diagram to illustrate the structure of their programs. Students will need to think critically and creatively in order to come up with a good solution for an existing problem.</p>	
	<p>Practical Tests</p> <p>Students will be given programming problems and asked to write Java programs to solve the problems.</p>	
Student Study Effort Expected	Class contact (time-tabled):	
	<ul style="list-style-type: none"> Lecture 	26 Hours
	<ul style="list-style-type: none"> Tutorial/Laboratory/Practice Classes 	13 hours
	Other student study effort:	
	<ul style="list-style-type: none"> Lecture: preview/review of notes; homework/assignment; preparation for test/quizzes/examination 	36 Hours
	<ul style="list-style-type: none"> 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"> G. Booch, I. Jacobson and J. Rumbaugh, <i>The Unified Modeling Language User Guide</i>, 2nd ed., Addison-Wesley, 2005. D.J. Barnes and M. Kolling, <i>Objects First with Java: A Practical Introduction using BlueJ</i>, 5th ed., Prentice-Hall, 2012. Nell Dale, Daniel T. Joyce, and Chip Weems. <i>Object-Oriented Data Structures Using Java (4th. ed.)</i>. Jones and Bartlett Publishers, Inc., USA. 2018. H.M. Deitel and P.J. Deitel, <i>Java: How To Program (Early Objects)</i>, 10th ed., Prentice-Hall, 2014. J. Lewis and W. Loftus, <i>Java Software Solutions</i>, 8th Edition, Pearson, 2015. J. Rumbaugh, I. Jacobson and G. Booch, <i>The Unified Modeling Language Reference Manual</i>, 2nd ed., Addison-Wesley, 2004. 	
Last Updated	April 2023	
Prepared by	Mr Richard Pang	