Title (Units): **COMP2045 Programming and Problem Solving (2,2,1)**

Course Aims: To study the programming basics of Java. Upon completion, students should be able to develop computer programs to solve some problems.

Prerequisite: COMP1005 Essence of Computing or COMP1007 Introduction to Python and Its Applications

Anti-requisite: COMP2026 Problem Solving Using Object Oriented Programming
COMP2056 Object-Oriented Programming and Java

Co-requisite: COMP2046 Problem Solving Using Object Oriented Approach

Course Intended Learning Outcomes (CILOs):
Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
1	Describe the elements and basic syntax of Java
2	Describe the importance of programming styles, implementation and testing in programming
	Professional Skill
3	Design, develop and test computer programs
4	Formulate problems as steps so as to be solved systematically

Calendar Description: This course introduces the basics and syntax of Java programming, including variables, loops, methods, and exception handling. Students will be given a series of examples of how to apply these programming basics to solve practical problems.

Teaching and Learning Activities (TLAs):

CILOs	Type of TLA
1,3,4	Students will learn the basics of Java and how to formulate problems as steps via lectures.
1-4	Laboratories and machine problems are designed for students to apply the programming knowledge to solve practical problems.

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Coding Assessment	29%	1 - 4	Laboratories coding exercises and take-home coding assignments are designed to measure how well the students have learned the fundamentals and major concepts of Java. A number of machine problems will be given to students to train them to design programs.
2	Quizzes and Tests	31%	1, 2, 4	Written and machine-assisted quizzes are designed at different stages of the course to assess students' ability to recall basic Java syntax and to apply them to develop programs.
3	Examination	40%	1,3,4	Final examination questions are designed to see how far students have achieved their intended learning outcomes. Students will be asked to create computer programs according to some specifications

Assessment Rubrics:

	Excellent (A)	Good (B)	Satisfactory (C)	Marginal Pass (D)	Fail (F)
Programming basics	The student are able to demonstrate an excellent competence in programming basics.	The student demonstrates a high competence in programming basics.	The student demonstrates an average level of competence in programming basics.	The student demonstrates only a minimum competence of programming basics.	The student demonstrates a low competence of programming basics.
Design and implement program for problem solving	The student demonstrates a strong ability in designing and implementing programs to solve moderately common problems.	The student demonstrates a considerable ability in designing and implementing programs to solve common problems.	The student demonstrates an average ability in designing and implementing programs to solve common problems.	The student demonstrates some ability in designing and implementing programs to solve common problems.	The student does not demonstrate any ability in designing and implementing programs to solve common problems.
Exception handling	The student correctly writes computer programs with complicated exception handling facilities.	The student correctly writes computer programs with considerable exception handling facilities.	The student correctly writes computer programs with an average amount of exception handling facilities.	The student correctly writes computer programs with some exception handling facilities.	The student cannot write computer programs with any exception handling facilities.

Course Content and CILOs Mapping:

Content		CILO No.
I	Basic Elements of Java	1 - 2
II	Problem Solving with Programming	3 - 4
III	Exception Handling and File I/O	2 - 3

References:

- C. S. Horstmann and G. Cornell, Core Java 2 (Volume I-Fundamentals), Pearson Education, 9th Edition, 2015.
- H. M. Deitel and P. J. Deitel, Java How to Program, Prentice Hall, 11th Edition, 2017.
- D. Liang, Introduction to Java Programming, Prentice Hall, 9th Edition, 2014.

Course Content:

Topic

I. Basic Elements of Java
   A. Programming methodologies (Design, Programming Style, Modularize, Debug)
   B. Lexical elements, data types, operators and expressions
   C. Control structures
   D. Arrays
   E. Methods
   F. Class and Object

II. Problem Solving with Programming
   A. Problems formulation
   B. Method overloading
   C. Testing and Debugging

III. Exception Handling and File I/O

A. Exception Handling
B. File I/O