COURSE OUTLINE

Department:	Faculty of Computing	**Knowledge Group:**	KG-PL	
Programme:	Computer Science (BSCS)	**Class:**	BSCS-2K23	
Course code:	CS-212	**Academic Session/Semester:**		Spring 2024
Course name:	Object Oriented Programming	**Pre/co requisite (course name and code, if applicable):**		CS-110 FoCP
Credit hours:	3+1			

Course Synopsis	This course will introduce the Object-Oriented (OO) philosophy to software development, which is a modern and powerful approach. Today, many programming languages support the OO concepts. However, during this course, we'll majorly use the Java programming language. The objective is to make the students understand the benefits of using OO techniques over procedural programming practices, and thereby motivating them to use OO concepts in software development. Further, the students will learn some powerful features of the Java programming language.			
Course Learning Outcomes (CLOs)	1. Understand core OOP concepts such as classes, objects, encapsulation, inheritance, and polymorphism. 2. Evaluate complex programming problems using object-oriented principles analyzing solutions for efficiency and scalability. 3. Build programs using the latest IDEs as per standard practices applicable to the software industry. 4. Develop solutions to real-world problems by applying appropriate object-oriented techniques.			
Course Schedule	Wednesday 14:00-14:50 Friday 10:00-11:50 Lab (Thursday 9:00-12:50)			
Course lecturer	**Name**	**Office**	**Contact no.**	**E-mail**
	Dr Aimal Rextin			Aimal.rextin@seecs.edu.pk

Mapping of the Course Learning Outcomes (CLO) to the Programme Learning Outcomes (PLO), Teaching & Learning (T&L) methods and Assessment methods:

No.	Course Learning Outcomes	PLO (SE)	PLO (CS)	BT Level	Teaching & Learning Methods	Assessment Methods
CLO 1	**Understand** core OOP concepts such as classes, objects, encapsulation, inheritance, and polymorphism.	1 (Engineering Knowledge)	1 (Academic Education)	C-2	Active learning, Cooperative Learning, Blended Learning	Assignment Quiz MSE ESE
CLO 2	**Evaluate** complex programming problems using object-oriented principles analyzing solutions for efficiency and scalability	2 (Problem Analysis)	3 (Problem Analysis)	C-5	Active learning, Cooperative Learning, Blended Learning	Assignment Quiz MSE ESE Labs

CLO 3	**Build** programs using the latest IDEs as per standard practices applicable to the software industry.	5 (Modern Tool Usage)	5 (Modern Tool Usage)	P-3	Active learning, Cooperative Learning, Blended Learning	Labs
CLO 4	**Develop** solutions to real-world problems by applying appropriate object-oriented techniques.	3 (Design/Development of Solutions)	4 (Design/Development of Solutions)	C-6	Active learning, Cooperative Learning, Blended Learning	Assignments Labs

Details on Innovative T&L practices:

No.	Type	Implementation
1.	Active learning	Conducted through in-class or lab activities.
2.	Cooperative learning	Conducted through design project. Students in a team of five will be given a design project that requires software engineering process design solutions. Compliance to the design specifications need to be given in the form of written reports.
3.	Blended learning	Conducted through Learning Management System (LMS) of NUST. All information as well as materials related to teaching and learning activities will be shared with class through this system. Some for formative assessments will be also conducted using this system.

Weekly Schedule:

Week 1	Java Basics • Introduction to Java Programming Language • Compiling & Executing Simple Java Programs • Data types & Operators • Input / Output
Week 2	Flow Control & Composite Datatypes • Decisions • Loops and Iterations • Arrays • Strings & String Manipulations
Week 3	Arrays and strings / functions
Week 4 Week 5 Week 6	Classes and Objects • Basic Concepts • Encapsulation & Data Hiding • Access modifiers • Constructors & Destructors • Setters & Getters • Copy Constructor • Default and No-Argument Constructors • Method (Function) Overloading • Static Class Members • his Reference
Week 7 Week 8	Inheritance In Java • Super classes and sub classes • Protected members

	• Method (Function) Overriding • Constructors in subclasses
Week 9	**Mid-Semester Break**
Week 10	Polymorphism
Week 11	• Abstract Classes & Methods • Polymorphic Behaviour • Final Methods and Classes
Week 12	Interfaces and Abstract Classes
Week 13	Exception Handling
Week 14	Graphical User Interfaces
Week 15	File Manipulation
Week 16	Project Presentations
Week 17	Revisions
Week 18	**End Semester Break**

Lab Experiments:

Lab 1	Java Basics [Data types and Operators]
Lab 2	Flow Control [Loops and Decisions]
Lab 3	Composite data types [Arrays & Strings]
Lab 4	Classes and Objects
Lab 5	Constructors
Lab 6	Inheritance
Lab 7	Function Overloading
Lab 8	Function Overriding
Week 9	**Mid-Semester Break**
Lab 9	Polymorphism
Lab 10	Interfaces and Abstract Classes
Lab 11	Exception Handling
Lab 12	GUI
Lab 13	Event Handling
Lab 14	I/O and File Handling
Lab 15	Open-Ended Lab
Lab 16	Advanced Topics
Week 18	**End Semester Break**

Assessment Methods:

Assessment		**Percentage**
Theory: 75%		
1	Quizzes (10-15%)	15%
2	Assignments (5-10%)	10%
3	Mid-Term Exam (25-35%)	30%
4	End-Semester Exam (40-50%)	45%

Labs:25%		
1	Labs	70%
2	Project / Final Lab	30%
Total:		100

Learning resources:

Textbook:

1. Java – How to Program (Early Objects), Paul Deitel and Harvey Deitel, 10th Edition, ISBN 978-1- 292-01819-5, Pearson Education, 2015
2. Bruce Eckel, Thinking in Java, Fourth Edition, ISBN-13: 978-0131872486, 25th March 2006. (available online)

Reference Book:

1. Computing Concepts with Java Essentials, Cay Horstmann, 3rd Edition, ISBN 0-471-24371-x, 2003, John Wiley & Sons.
2. Object Oriented Programming in C++, Robert Lafore, 4th Edition, ISBN-10: 0672323087 | ISBN-13: 978-0672323089, 2001

Grading Policy:

Quiz Policy:

The quizzes will be unannounced / announced and normally last for ten minutes. The question framed is to test the concepts involved in last few lectures. Number of quizzes that will be used for evaluation is at the instructor's discretion.

Project Policy:

Students will be required to develop a project during the course which should be completed towards the end of the semester. They will be graded based on project deliverables and presentation at the end. Students will work in a group/team for projects. A group of 3 students is recommended. At most 4 students are allowed.

Assignment Policy:

In order to develop comprehensive understanding of the subject, assignments will be given. Late assignments will not be accepted / graded. All assignments will count towards the total (No 'best-of' policy). The students are advised to do the assignment themselves. Copying of assignments is highly discouraged and violations will be dealt with severely by referring any occurrences to the disciplinary committee. The questions in the assignment are meant to be challenging to give students confidence and extensive knowledge about the subject matter and enable them to prepare for the exams.

Class participation:

The students are encouraged to participate in class by actively taking part in asking questions from the instructor, sharing his/her thoughts about the topic under discussion, replying to instructor questions, contribute in project presentation and demo. The class participation will be recorded by the instructor and 2% of project marks are assigned to student class participation.

Plagiarism:

SEECS maintains a zero-tolerance policy towards plagiarism. While collaboration in this course is highly encouraged, you must ensure that you do not claim other people's work/ ideas as your own. Plagiarism occurs when the words, ideas, assertions, theories, figures, images, programming codes of others are presented as your own work. You must cite and acknowledge all sources of information in your assignments. Failing to comply with the SEECS plagiarism policy will lead to strict penalties including zero marks in assignments and referral to the academic coordination office for disciplinary action