

EE3206: OBJECT-ORIENTED PROGRAMMING AND APPLICATIONS

Effective Term

Semester A 2026/27

Part I Course Overview

Course Title

Object-Oriented Programming and Applications

Subject Code

EE - Electrical Engineering

Course Number

3206

Academic Unit

Electrical Engineering (EE)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

EE2331 Data Structures and Algorithms
or equivalent

Precursors

Nil

Equivalent Courses

EE2311 Object-oriented Programming and Design

Exclusive Courses

Nil

Part II Course Details

Abstract

The aim of this course is to provide students with an understanding of the object-oriented design and programming techniques. Java, a prime object-oriented programming language, is used to illustrate this programming paradigm.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Apply object-oriented programming paradigm in software design		x	x	
2	Implement software solutions using modern object-oriented programming language following standard coding conventions used in the software community.		x	x	
3	Apply the built-in data structures and collections framework of the chosen language to solve more complex computation problems.		x	x	x
4	Design modular and reusable components within an object-oriented framework using the functional programming approach.		x		
5	Apply system-level concurrent programming techniques to implement event-driven and multi-thread software that can take advantage of multi-cores CPU available in today's computer systems.		x	x	x
6	Demonstrate project-based learning by collaborating in teams to design, implement, and present an object-oriented application using AI-assisted development tools to enhance productivity and learning outcomes.		x	x	x

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Teaching activities are primarily based on lectures followed by examples to show students the basic skills.	1, 3, 4, 5	3 hrs Lect/wk

2	Assignments	Assignments are designed to help students to acquire the essential programming skills, and get familiar with the software development tools through hands-on coding practices.	1, 2, 3, 4, 5	2 to 3 hrs/wk
3	Group project	The group project requires students to work collaboratively in teams to plan, analyze requirements, design, and implement software using object-oriented skills.	1, 2, 6	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Tests	1, 3, 4, 5	20	-	No
2	#Assignments (3 to 4)	1, 2, 3, 4, 5	15	-	Yes
3	Group project	1, 2, 6	15	-	Yes

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2.5

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

Additional Information for ATs

To pass the course, students are required to achieve at least 30% in course work and 30% in the examination.

Assessment Rubrics (AR)**Assessment Task**

Examination

Criterion

Achievements in CILOs

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Coursework

Criterion

Achievements in CILOs

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Object-oriented principles and design

Objects and classes; information hiding; encapsulation; data abstraction; inheritance and polymorphism; unified modeling language (UML) and diagrams.

Overview of the Object-Oriented Programming Language (Java as the illustrative language)

Basic syntax; Classes, interfaces, and methods; Fundamental data types and wrapper classes; Mutable and immutable objects; String and related classes; Class design; Generic classes and methods; Basic I/O processing; Exception handling; Java coding conventions and guidelines.

Software design using Object-Oriented Programming Language (Java as the illustrative language)

Sorting and searching; Classes and Interfaces that support commonly used data structures such as list, stack, queue, tree, map, and hash table. Applications of the Data Collection Framework in conventional imperative programming paradigm. Functional/declarative programming paradigm for data processing applications; Lambda expression; Stream API; Stream data pipeline.

Multi-thread software design; Thread life cycle; Thread safety and management; Thread-safe class design; Data sharing, synchronization and mutual exclusion; Re-entrance lock and condition objects; Parallel processing.

Reading List

Compulsory Readings

Title	
1	Dr. Rajkumar Buyya, Object Oriented Programming with Java: Essentials and Applications, latest edition

Additional Readings

Title	
1	Michael Blaha, Object-Oriented Modeling and Design with UML, latest edition
2	https://docs.oracle.com/en/java/javase/21/docs/api/index.html http://docs.oracle.com/javase/tutorial/