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| ***logobb*** | FAKULTI SAINS KOMPUTER DAN TEKNOLOGI MAKLUMAT |

**Course Title :** Object-oriented Programming

**Course Code :** CCS3101 (Group 1)

**Credit :** 3(2+1)

**Contact Hours :** 1 x 2 hours of lecture per week (Wed 10 am - 12 pm)

1 x 3 hours of practical per week (Fri 8 am – 11 am) – Al-Khawarizmi Lab

**Semester :** Semester 2 2024/2025

**Instructor :** Dr. Khairul Azhar Kasmiran

**E-mail :** [**k\_azhar@upm.edu.my**](mailto:ayu@upm.edu.my)

**Room :** C3-14 (Temporarily at C1-24)

**Telephone** : 012-2948146 / 03-97691657

**Demonstrator** : Muhammad Alif Syahmi Normahadi (011-21201406)

**Objectives:**

Students can:

1. Identify the correct object-oriented programming techniques in solving problems. (C4)
2. Combine existing utilities to build applications for large scale problems. (P4)
3. Solve problems using programming techniques. (CTPS)

**Synopsis:**

Kursus ini meliputi teknik pengaturcaraan berorientasikan objek yang merangkumi pengenalan kepada paradigma berorientasi objek. Paradigma tersebut memberikan fleksibiliti, modulariti dan penggunaan semula semasa membangunkan atur cara.

(*This course covers object-oriented programming techniques including an introduction to the object-oriented paradigm. The paradigm provides flexibility, modularity and reusability when developing programs.*)

| WEEK | TOPIC | TEXT BOOK |
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| 1 | **Topic 1 Introduction**   * Characteristics of object oriented | Chapter 9,  Chapter 10 (10.1-10.3) |
| 2 | **Topic 1 Introduction**   * Abstract concepts   **Topic 2 Object-oriented Modeling**   * The software development process | Chapter 9, Chapter 10 (10.1-10.3)  Chapter 2 (2.16) |
| 3 | **Topic 2 Object-oriented Modeling**   * Discovering relationship among classes   **Topic 3 Inheritance**   * Superclasses and subclasses | Chapter 10 (10.4-10.5)  Chapter 11 (11.1-11.3) |
| 4 | **Topic 3 Inheritance**   * Overriding methods * Overriding and overloading | Chapter 11 (11.4-11.6) |
| 5 | **Topic 4 Polymorphism**   * Polymorphism, dynamic binding, and generic programming | Chapter 11 (11.7-11.12) |
| 6 | **Topic 4 Polymorphism**   * Protected data and methods * Preventing extending and overriding   **TEST 1 (16 April)** | Chapter 11 (11.14-11.15) |
| 7 | **Topic 5 Exceptions**   * Exception and exception types * Understanding exception handling | Chapter 12 (12.1-12.3) |
| 8 | **Topic 5 Exceptions**   * Rethrowing exceptions * The finally clause * Application examples | Chapter 12 (12.4-12.9) |
| 9 | **Topic 6 File Management**   * The File class * File input and output * Application examples | Chapter 12 (12.10‑12.11) |
| 10 | **Topic 7 Abstract Classes and Interfaces**   * UML for abstract classes * Abstract class use | Chapter 13 (13.1-13.4) |
| 11 | **Topic 7 Abstract Classes and Interfaces**   * UML for interfaces * Interface use * Differences between abstract classes and interfaces   **TEST 2 (4 June)** | Chapter 13 (13.5-13.8) |
| 12 | **Topic 8 Binary I/O**   * Binary input/output classes * Object input/output * Random access files | Chapter 17 (17.1-17.7) |
| **13** | **Topic 9 Generics**   * Defining generic classes, interfaces, and methods | Chapter 19 (19.1-19.5) |
| 14 | **Topic 9 Generics**   * Raw types and backward compatibility * Wildcard generic types * Erasure and restrictions on generics | Chapter 19 (19.6-19.8) |

**Programming Assignment Schedule**

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| **Lab Activities** | | **Duration** |
| Lab 1 | Construct a simple object-oriented program | 1 week (W1) |
| Lab 2  (Demo) | Solve programming problems by object-oriented modeling | 2 weeks (W2, W3) |
| Lab 3  (Demo) | Construct simple OOP programs using inheritance | 2 weeks (W4, W5) |
| Lab 4  (Demo) | Construct object-oriented programs using generic programming | 1 week (W6) |
| Lab 5 | Implement exception handling in solving programming problems | 1 week (W7) |
| Lab 6  (Demo Lab 5 + 6) | Solve programming problems using file/text I/O classes | 2 weeks (W8, W9) |
| Lab 7  (Demo) | Construct using abstract classes and interfaces in solving problems | 2 weeks (W10, W11) |
| Lab 8 | Solve programming problems using binary I/O classes | 1 week (W12) |
| Lab 9 | Construct object-oriented programs using generics | 2 weeks (W13, W14) |

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| Course Evaluation | **Knowledge (%)** | **Practical Skill (%)** | **Critical Thinking & Problem Solving Skill (%)** | **Total (%)** |
| Test 1 | 15 |  |  | 15 |
| Test 2 |  |  | 20 | 20 |
| Lab Assignments |  | 35 |  | 35 |
| Final Exam | 15 |  | 15 | 30 |

### Textbook

Liang, Y.D. (2017). *Introduction to Java Programming and Data Structures* (11*th Edition*). Comprehensive Version, Upper Saddle River: Pearson Prentice-Hall.

###### **Reference Books**

1. Deitel, H.M. & Deitel, P.J. (2017). *Java How to Program, Early Objects* (11*th Edition*). Upper Saddle River: Pearson Prentice-Hall.
2. Savitch, W. & Mock, K. (2015). *Absolute Java* (6*th Edition*). Upper Saddle River: Pearson Education.
3. Schildt, H. (2017). *Java: The Complete References* (10*th Edition*). New York: McGraw-Hill/Osborne.

Course material: PutraBlast [(www.learninghub.upm.edu.my](http://(www.learninghub.upm.edu.my))