Department of Software engineering

College of Engineering

Salahaddin University-Erbil

Subject: Object-Oriented Programming (OOP)

Course Book – *(Second Year)*

Omed Saleem Khalind, PhD

Academic Year: 2023/2024 (Fall Semester)

Course Book

1. Course name	**Introduction to Object Oriented Programming**
2. Lecturer in charge	**Dr. Omed Saleem Khalind**
3. Department/ College	**Software Engineering/ College of Engineering**
4. Contact	**e-mail: omed.khalind@sue.edu.krd** **Tel: 07504466177**
5. Time (in hours) per week	**For example Theory: 2** **Practical: 2**
6. Office hours	**Sunday, Monday**
7. Course code	
8. Teacher's academic profile	**I am Omed Saleem Khalind, full-time Lecturer at the department of Software Engineering in Salahaddin University-Erbil. I've got Ph.D. in Software Engineering/ Information Security at University of Portsmouth - UK.** **I have taught different core subjects of Software Engineering, like; Software Engineering, Algorithms and Problem Solving, Compilers, Computer Architecture II and Computer Applications. Now, I am teaching Object-Oriented Programming using Java to second year students of Software Engineering Department, at College of Engineering. I also supervise up to two groups of four students each academic year.**
9. Keywords	**OOP, Class, Objects, Inheritance, Polymorphism, Encapsulation, Interface, Abstract classes.**

10. Course overview:

This course teaches the fundamental ideas behind the object-oriented approach to programming; through the widely-used Java programming language. It focuses mainly on the principals of Object Oriented programming and the techniques used in modern programming.

11. Course objective:

It makes the student to have well understanding of classes, objects, methods, modifiers, and their architecture. It also clarifies the encapsulation, inheritance, and polymorphism which are the main features that object oriented programming can support. Throughout this course students will be able to realize and apply in practice all the theoretical bases with Java programming language in their lab. After that it provides a good base about file input/ output. Then it goes through Exception handling, inner classes, Event handling, and Basic GUI components.

12. Student's obligation

- Regular attendance is required according to the university rules.
- The use of mobile phone during the class is prohibited.
- Only the students who are officially enrolled can attend the class, guests and children are not admitted.

13. Forms of teaching

In teaching any programming language and technique, after studying the principals and theoretical bases, it is important to rely on practicing the concepts, here in this course there is a rich collection of examples students can compile and run them and see the application of each topic. It follows the principal of "teaching by example" to get the best result. You'll need to be confident using a Windows-based PC, and have experience of writing small computer programs. There are two hours per week for theoretical lecture and two hours practical in the lab for each group. The practical part focuses on applying the example codes and assignments.

14. Assessment scheme

The academic course consists of one semester; that has an exam (theoretical and practical), and there is 12 marks for the student's activity per each semester. Also there is a final exam at the end of the semester. So, the student's overall mark gets from the summation of:

Continuous exams (Theory)	20%
Continuous exams (Practical)	20%
Activities & Attendance	10%
Final exam	50%
Total marks	**100%**

15. Student learning outcome:

- Uses objects and classes.
- Declares objects and classes.
- Distinguishes classes and objects.
- Declares and uses variables.
- Declares and uses methods and properties.
- Lists the object-oriented programming concepts.
- Explains and uses encapsulation.
- Explains and uses inheritance.
- Explains and uses polymorphism.
- Names special functions.
- Distinguishes constructors, default constuctors, interfaces, abstract classes and abstract methods.
- Identifies base and derived classes.
- Codes object-oriented programs.
- Inherits a class from another class.
- Writes a complete program using object-oriented programming concepts.
- Explains and handles exceptions.
- Describes exceptions.
- Throws exceptions, Catches exceptions.
- Understands the relational data model: relational data structures, constraints, and languages.
- Uses generic classes and methods.

- Declares generic classes.
- Uses generic classes.
- Declares generic methods.
- Uses generic methods .

16. Course Reading List and References:

- Deitel, P. D. J. H. (2017). *Java How to Program, Early Objects, 11th Edition*, Pearson.
- Deitel, H., & Deitel, P. J. (2019). *Java How to Program, Late Objects, Global Edition*. Harlow, United Kingdom: Pearson Education Canada.
- Java how to program, 9th or 10th Edition, Deitel & Deitel, 2012.
- Schildt, H. (2014). *Java: the complete reference*. D. Coward (9th Ed.). McGraw-Hill Education.
- Java Programming and Object-Oriented Application Development, Richard A. Johnson, 2007.
- http://www.oracle.com/technetwork/java/index.html Java Homepage
- https://docs.oracle.com/javase/tutorial Java Online Tutorial, also available locally.

17. The Topics:	**Lecturer's name**
Week 1: Introduction, about this course, the syllabus, Objectives, Grading, rules Week 2: Object-Oriented Programming basics and concepts Week 3: Introduction to Encapsulation, Inheritance, and Polymorphism Week 4-5: Objects and Classes, Constructors, Garbage Collection, and Finalizers Week 6: Inheritance (details with example) Week 7: Polymorphism (details with example), more on Strings Week 8: Assignment Explanation, Basic GUI Components, Packages Week 9: Exception Handling, Files and Directories Week 10-12: Abstract Classes and Interfaces Week 13-14: Collections	Dr. Omed Saleem Khalind (2 hrs)
18. Practical Topics (If there is any)	
Practicing same topics above in the Labs.	(2 hrs)

19. Examinations:

1. Compositional:

a) State the main access modifiers used in Java and write their differences.

b) What are the differences between class members and instance members? Also, what do member means?

c) State the main differences between the constructor and the finalizer methods of a Java class.

d) Is it possible to invoke a constructor from within another constructor? Explain it with an example.

2. True or false type of exams:

State where each of the following statements that follows is true or false. If false, explain why.

a) We can have a non-abstract method inside interface.

b) We can make a class both final and abstract at the same time.

c) As elements are added to an ArrayList, its capacity grows automatically.

d) We can override the final method in Java.

e) For methods which threaten to throw I/O exceptions, you should advertise this in the method declaration.

f) We can override static method in Java.

3. Multiple choices:

1- Which concept supports static polymorphism?

A. Method overloading B. Method overriding

C. Method signature D. Method access modifier

2- Which Java keyword is used to specify compliance with an interface?

A. extends B. implements

C. public D. static

3- Which Java keywords cannot appear in a class declaration?

A. extends B. private

C. void D. abstract

4- A class's finalizer is called just before the garbage collector destroys the object and it;

A. returns no values B. always has the name finalize

C. takes no parameters D. All of them

5- What do the 'public' and 'private' keywords relate to?

A. Typing B. Garbage Collection

C. Polymorphism D. Access Restriction

20. Extra notes:

None.

21. Peer review پێداچوونەوەی هاوەڵ

This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.

(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).

ئەم کۆرسبووکە دەبێت لەلایەن هاوەڵێکی ئەکادیمیەوە سەیر بکرێت و ناوەرۆکی بابەتەکانی کۆرسەکە پەسەند بکات و جەند ووشەیەک بنووسێت لەسەر شیاوی ناوەرۆکی کۆرسەکە و واژووی لەسەر بکات.
هاوەڵ ئەو کەسەیە کە زانیاری هەبێت لەسەر کۆرسەکە و دەبیت پلەی زانستی لە مامۆستا کەمتر نەبێت.