# Course Specification

## (Bachelor)

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|---|---|
| **Course Title**: Programming-2 | |
| **Course Code**: COMP 213 | |
| **Program**: B.S in Computer Science<br>B.S in Information Technology & Security<br>B.S in Computer Networks and Engineering | |
| **Department**: Computer science | |
| **College**: College of Computer Science and Information Technology | |
| **Institution**: Jazan University | |
| **Version**: V2 | |
| **Last Revision Date**: 28-08-2024 | |

## Table of Contents

## A. General information about the course:

### 1. Course Identification

| 1. Credit hours: (3 ) |
|---|

| 2. Course type | | | | |
|---|---|---|---|---|
| A. | ☐University | ☐College | ☒ Department | ☐Track | ☐Others |
| B. | ☒ Required | | ☐Elective | | |

**3. Level/year at which this course is offered: (Level 4/Year 2)**

**4. Course general Description:**

This course helps students to develop basic problem-solving skills using the Java programming language. The topics passing arguments to a method, method overloading, use of built methods, single and two dimensional arrays, common array operations, methods with array arguments and return value and search operations on array. The fundamental concepts of recursion technique as an important programming concept to express the other style of iteration by showing the technique used by method via calling itself. Finally, all the concepts mentioned here would be applied using Java programming language by implanting the code using   open source IDE as (NetBeans ).

**5.  Pre-requirements for this course (if any): Programming-1 (112 COMP-3)**

**6. Pre-requirements for this course (if any):None**

**7. Course Main Objective(s):**

- Explain user defined and built in methods, method overloading and understand ambiguous overloading.
- Explain to develop reusable code that is modular, easy to read, easy to debug, and easy to maintain.
- Describe scope of local and global variables in Java.
- Discuss the philosophy of recursion techniques and advantages as well as its drawback.
- Understand constructing and manipulating single and two dimensional arrays and passing methods to arrays.

### 2. Teaching mode (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|---|---|---|---|
| 1 | Traditional classroom | 44 | 80% |
| 2 | E-learning | | |
| 3 | Hybrid<br>• Traditional classroom<br>• E-learning | | |
| 4 | Distance learning | 11 | 20% |

## 3. Contact Hours (based on the academic semester)

| No | Activity | Contact Hours |
|---|---|---|
| 1. | Lectures | 22 |
| 2. | Laboratory/Studio | 22 |
| 3. | Field | |
| 4. | Tutorial | |
| 5. | Others (specify) | 8 |
| Total | | 52 |

## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|---|---|---|---|---|
| 1.0 | Knowledge and understanding | | | |
| 1.1 | **Define** and call method in Java, understanding concepts such as method parameters, return types, and method overloading. | K1 | Lectures/ Presentations/ Media lectures | Assignment – 1 Midterm Final Exam |
| 1.2 | **Describe** the utilization of built-in methods to perform exponentiation, trigonometric methods, calculate | K1 | Lectures /Presentations Media lectures | Assignment – 1 Midterm exam Final Exam |

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|---|---|---|---|---|
| | powers and roots efficiently. | | | |
| **2.0** | **Skills** | | | |
| 2.1 | **Apply** basic concepts of programming such as recursion, methods and arrays for solving simple programming problems. | S1 | Lectures /Presentations Lab demonstration | Final Exam Assignment-2 Lab Assignment Lab Exam |
| 2.2 | **Develop** basic java programs by applying acquired knowledge and concepts effectively. | S2 | Lectures /Presentations Lab demonstration | Midterm Exam Lab Exam Final Exam Assignment-2 |
| 2.3 | **Use** an IDE to create, compile and run a program. | S3 | Lectures /Presentations Lab demonstration | Final Exam Lab Exam Lab Assignment Assignment-2 |
| **3.0** | **Values, autonomy, and responsibility** | | | |
| 3.1 | **Demonstrate** the ability to work in a group to achieve common assignments and activities in the field of computer programming. | V2 | Group Discussion | Assignment – 2 (Group discussion in the lab) |

## C. Course Content

| No | List of Topics | Contact Hours |
|---|---|---|
| 1. | **Chapter One: Introduction to Methods**<br>❖ Defining Methods<br>❖ Method Signature<br>❖ Return Value Type<br>❖ Calling Methods<br>. | **2T + 2P** |
| 2. | **Chapter One: Introduction to Methods Cont'd**<br>❖ Call Stacks<br>❖ Passing Parameters<br>❖ Pass by Value | **2T + 2P** |

| | | |
|---|---|---|
| | Overloading Methods | |
| 3. | **Chapter Two: Built in Methods**<br>❖ Scope of Local Variables<br>❖ Benefits of Methods<br>❖ The Math Class<br>❖ Trigonometric Methods<br>❖ Exponent Methods<br>❖ Rounding Method | **2T + 2P** |
| 4. | **Chapter Two: Built in Methods Cont'd**<br>❖ The String Type<br>❖ Simple Methods for String Objects<br>❖ Converting Strings<br>❖ String Concatenation<br>❖ Reading a Character from the Console<br>❖ Comparing Strings<br>Conversion between Strings and Numbers | **2T + 2P** |
| 5. | **Chapter Three: Recursion**<br>❖ Recursion definition and parts.<br>❖ Recursion implementation.<br>❖ Designing the recursive method.<br>❖ Recursion version of factorial.<br>　○ Recursion version of Fibonacci series.<br>　○ Recursion disadvantages. | **2T + 2P** |
| 6. | **Chapter Four: Arrays**<br>❖ Introducing Arrays<br>❖ Declaring Array Variables<br>❖ Creating Arrays<br>❖ The Length of an Array<br>❖ Indexed Variables | **2T + 2P** |
| 7. | **Chapter Four: Arrays  Cont'd**<br>❖ Array Initializers<br>❖ Declaring, creating, initializing Using the Shorthand Notation<br>❖ Trace Program with Arrays<br>❖ Processing Arrays<br>❖ Shifting Elements<br>❖ Enhanced for Loop (for-each loop)<br>❖ Copying Arrays | **3T + 2P** |
| 8. | **Chapter Four: Arrays  Cont'd**<br>❖ Passing Arrays to Methods<br>❖ Pass By Value<br>❖ Call Stack<br>❖ Heap<br>❖ Returning an Array from a Method | **3T + 2P** |

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|---|---|---|
| 9. | **Chapter Five: Multidimensional Arrays**<br>❖ Declare/Create Two-dimensional Arrays<br>❖ Declaring Variables of 2D Arrays and Creating 2D Arrays<br>❖ Two-dimensional Array Illustration<br>❖ Declaring, Creating, and Initializing Using Shorthand Notations<br>❖ Lengths of Two-dimensional Arrays<br>❖ Ragged Arrays<br>❖ Processing Two-Dimensional Arrays<br>❖ Summing 2D Array<br>❖ Passing Two-Dimensional Arrays to Methods<br>❖ Multidimensional Arrays | **4T + 2P** |
| 10. | **Chapter Five: Multidimensional Arrays**<br><br>❖ Processing Two-Dimensional Arrays<br>❖ Summing 2D Array<br>❖ Passing Two-Dimensional Arrays to Methods<br>❖ Multidimensional Arrays | **2T + 2P** |
| 11. | **Chapter Six: File Handling**<br>❖ Key Topics of File Handling<br>❖ File Class<br>❖ **FileReader** and **FileWriter** classes<br>❖ **PrintWriter**<br>❖ **FileInputStream and FileOutputStream** | **2T + 2P** |
| 12. | Lab Exam + Revision | 2T + 2P |
| **Total** | | **26 T+26P** |

## D. Students Assessment Activities

| No | Assessment Activities * | Assessment timing (in week no) | Percentage of Total Assessment Score |
|---|---|---|---|
| **1.** | Midterm Exam | 7th week | 15% |
| **2.** | Assignment I | 4th week | 10% |
| **3.** | Assignment II | 9th week | 15% |
| **4.** | Lab Exam + Lab Assignment | As per schedule | 20% |
| **5.** | Final Theory Exam | As per schedule | 40% |

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

## E. Learning Resources and Facilities

### 1. References and Learning Resources

| | |
|---|---|
| **Essential References** | Think java: how to think like computer scientist. 2nd edition, Allen B. Downey. 2019, ISBN-13: 978-1492072508<br>Intro To Java Programming 10th edition, Y Daniel Liang. 2018, ISBN-13: 978-353065782 |
| **Supportive References** | JAVA: The Complete Reference, Herbert Scheldt, McGraw-Hill, 10th edition 2017, ISBN: 978-1-259-58933-1John Schiller, "Mobile |
| **Electronic Materials** | • www.netbeans.org<br>• www.bluej.org<br>• www.oracle.com › Java › Java SE<br>• www.coursera.org<br>• www.udacity.com<br>• www.uml.org |
| **Other Learning Materials** | |

### 2. Required Facilities and equipment

| Items | Resources |
|---|---|
| **facilities**<br>(Classrooms, laboratories, exhibition rooms, simulation rooms, etc.) | • Classroom equipped with projector, whiteboard, and sufficient seating arrangements.<br>• Lab with software installed and individual computer terminal for each student. |
| **Technology equipment**<br>(projector, smart board, software) | Whiteboards and projectors for classroom a<br>Following software for lab work:<br>• Java SE 1.8 or later<br>• NetBeans 8.0<br>• BlueJ 4.2 for windows. |
| **Other equipment**<br>(depending on the nature of the specialty) | None |

### F. Assessment of Course Quality

| Assessment Areas/Issues | Assessor | Assessment Methods |
|---|---|---|
| Effectiveness of teaching | Students | Indirect (Course evaluation survey form) |
| Effectiveness of Students assessment | CRC / QAU / HoD | Direct (Course reports / result analysis) |

| Assessment Areas/Issues | Assessor | Assessment Methods |
|---|---|---|
| Quality of learning resources | Track leaders / CRC | Indirect (Review, meetings and star rating with suggestions for further modification and improvements) |
| The extent to which CLOs have been achieved | CRC / QAU | Direct (CLO assessment template further verified at course coordinator, Track leader and QAU level) |
| Other | Students | Indirect (Course evaluation survey form) |

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval

| COUNCIL /COMMITTEE | DEPARTMENT COUNCIL |
|---|---|
| REFERENCE NO. | |
| DATE | |