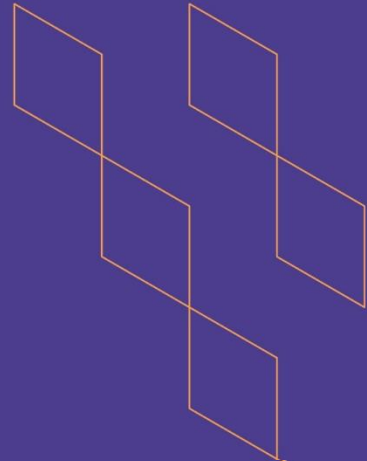




T-104
2022

Course Specification



Course Title: Programming-2
Course Code: 213 COMP-3
Program: Bachelor in Computer Science
Department: Computer Science
College: College of Computer Science and Information Technology
Institution: Jazan University
Version: V2
Last Revision Date: 12 September 2021



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A. General information about the course:

Course Identification	
1. Credit hours:	3
2. Course type	
a.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Track <input type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered:	Level 4/2 nd year
<p>This course provides the fundamental concepts of recursion techniques as an important programming concept to express the other style of iteration by showing the technique used by function or method via calling itself. Moreover, the concepts as mutable and immutable objects are going to be investigated where these vital concepts will introduce the object orientation by explaining the objects in the manner of state and behavior.</p> <p>An introduction to object-oriented paradigm will be introduced by explaining the class design in depth through presenting the UML legends used to graphically express the class design as well as presenting the class methods and constructors through the design along the implementation of the class design. In addition, the concept of lists and collection used in Java as an important technique which allow applying the operation over collection of data with different types as primitive or objects types of the data stored will be investigated through the arrays of objects, arrays of arrays, and engaging searching algorithms. Furthermore, the concepts and types of exceptions used over the list will be illustrating deeply.</p> <p>Finally, all the concepts mentioned here would be applied using Java programming language by implanting the code using open source IDE as (NetBeans and BluEJ).</p>	
5. Pre-requirements for this course (if any): Programming-1 (112 COMP-3)	
6. Co- requirements for this course (if any): None	
7. Course Main Objective(s)	
<ul style="list-style-type: none"> • Explain the mutable objects in java. • Explain the immutable object and its differences from the mutable objects. • Explaining the design of the class graphically using UML class diagram legend. • Presenting setter and getter methods and their role inside the class. • The types of Constructors, their roles, and their implantation are going to be 	



presented.

- Objects as data types and parameters are going for more investigation.
- Exploring the arrays of objects in java and applying searching algorithms on them.
- Explain the concepts of arrays of arrays and objects of arrays and the exception handling invoked on them.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	44	80%
2.	E-learning		
3.	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		
4.	Distance learning (Self Learning)	11	20%

2. 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	Recognize recursion, immutable, mutable objects, class design, and	K1	<ul style="list-style-type: none"> • Lectures/Presentations • Media lectures 	<ul style="list-style-type: none"> • Assignment – 1 • Internal



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	collections			exam <ul style="list-style-type: none"> Final Theory Exam Lab Assignment
...				
2.0	Skills			
2.1	Apply recursions style, class designs by using UML, constructors, methods, and list types along operations over list as searching and the exceptions over lists.	S1	Lectures /Presentations Lab demonstration	Final Theory Exam Quiz Assignment-2 Lab Assignment Lab Exam
2.2	Analyze understanding recursion as another technique of iteration and understanding the concept of object oriented through the class design and dealing with collections.	S2	Lectures /Presentations Lab demonstration	Assignment – 1 Internal Exam Lab Assignment Quiz Final Theory Exam
2.3	Use abstraction and modularization principles to solve a problem.	S3	Lectures /Presentations Lab demonstration	Internal Exam Lab Exam Quiz Final Theory Exam Assignment-1
2.4	Use object-orientation design principles to accommodate any future changes to a software system.	S2	Lectures /Presentations Lab demonstration	Lab exam Final Theory Exam 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)
3.2				



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Chapter One: Recursion <ul style="list-style-type: none"> ❖ Recursion definition and parts. ❖ Recursion implementation. ❖ Designing the recursive method. ❖ Recursion version of factorial. ❖ Recursion version of Fibonacci series. ❖ Recursion disadvantages. 	2T + 2P
2.	Chapter Two: Immutable Objects <ul style="list-style-type: none"> ❖ primitive vs object ❖ String: immutable object. ❖ Wrapper Classes ❖ BigInteger arithmetic ❖ Design process [incremental Design] 	2T + 2P
3.	Chapter Three: Mutable Objects <ul style="list-style-type: none"> ❖ Introduction to mutable object. ❖ Object as parameter and returned value. ❖ Rectangle object: mutable. 	2T + 2P
4.	Chapter Three: Mutable Objects (continue) <ul style="list-style-type: none"> ❖ Introduction to class diagram. ❖ UML notation. <ul style="list-style-type: none"> ○ Garbage collection ○ Immutable vs Mutable 	2T + 2P
5.	Chapter Four: Designing classes <ul style="list-style-type: none"> ❖ Introduction to design class. ❖ Designing motivation. ❖ Time class design. ❖ Attribute data types & Attribute scope ❖ Constructor definition and its types. ❖ Getter methods, Setter methods, & toString() method. ❖ Combining all the above into well designed class 	2T + 2P





6.	Chapter Five: Arrays of Objects <ul style="list-style-type: none"> ❖ Creating arrays of objects ❖ Card Objects. ❖ Class variables. ❖ The compareTo() method. 	2T + 2P
7.	Chapter Five: Arrays of Objects (continue) <ul style="list-style-type: none"> ❖ Arrays of cards. ❖ Sequential search. ❖ Binary search. Recursion version of Binary Search	2T + 2P
8.	Chapter Six: Objects of arrays <ul style="list-style-type: none"> ❖ Array of user-defined class. ❖ Selection sort. ❖ Static context using UML class diagram. ❖ ArrayList 	2T + 2P
9	Chapter Seven: Arrays of arrays <ul style="list-style-type: none"> ❖ Introduction ❖ Creating two-dimensional Array ❖ Iteration over 2-dim array ❖ Exception Handling ❖ Types of exception handling, <ul style="list-style-type: none"> ○ ArrayIndexOutOfBoundsException ○ NegativeArraySizeException 	2T + 2P
10	Lab Exam + Revision	2T + 2P
Total		22T+22P

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Exam	6th-7th week	15%
2.	Assignment I	3rd week	10%
3.	Assignment II (Case Study/ Group assignment)	6th-7th 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. 2 nd edition, Allen B. Downey. 2019, ISBN-13: 978-1492072508
Supportive References	JAVA: The Complete Reference, Herbert Schildt, McGraw-Hill, 10 th edition 2017, ISBN: 978-1-259-58933-1 John Schiller, “Mobile i).
Electronic Materials	<ul style="list-style-type: none"> • www.netbeans.org • www.bluej.org • www.oracle.com › Java › Java SE • www.coursera.org • www.udacity.com • www.uml.org
Other Learning Materials	Online tutorial

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	<ul style="list-style-type: none"> • Classroom equipped with projector, whiteboard, and sufficient seating arrangements. • Lab with software installed and individual computer terminal for each student.
Technology equipment (projector, smart board, software)	Whiteboards and projectors for classroom and lab Following software for lab work: <ul style="list-style-type: none"> • Java SE 1.8 or later • NetBeans 8.0 • BlueJ 4.2 for windows.
Other equipment (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		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	DEPARTMENT COUNCIL
REFERENCE NO.	
DATE	15/10/2022

