2023
TP-153

Course Specification
(Bachelor)

Course Title:	Advanced Programming Methods
Course Code:	CSC 1203
Program:	Bachelor in Computer Science
Department:	Computer Science
College:	Computers and Information Technology
Institution:	University of Tabuk
Version:	1.0
Last Revision Date:	27 July 2022

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (4 Hours)					
2. Course type					
A.	☐ University	☒ College	☐ Department	☐ Track	☐ Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (Semester 4 / Year 2)					
4. Course general Description:					
This course introduces advanced programming topics including GUI Programming using JavaFX comprise GUI basics, container panes, drawing shapes, event-driven programming, animations, and GUI controls, and playing audio and video. Furthermore this course cover multithreading programming to make programs more responsive and interactive and introduces parallel programming. In addition to basic knowledge in networking and RMI.					
5. Pre-requirements for this course (if any):					
Object Oriented Programming (CSC 1201)					
6. Co-requisites for this course (if any):					
7. Course Main Objective(s):					
● To be able to create Graphical User Interfaces programs.					

- Understand the architecture of GUI Programming using JavaFX.
- Design and implement systems that are easily extensible and maintainable with JavaFX.
- Understand multithreading concepts.
- Develop Java applications with threads, and Network programs.
- Develop java applications with RMI

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	100%
2	E-learning		
3	Hybrid ● Traditional classroom ● E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	30
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		75

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

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Recognize the principles of GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles.	K1, K2, K3, K4	**Lectures**	**Lab Assignments Midterms Final Exam**
1.2	Describe the concepts of GUI to software design	K1, K2, K3, K4	**Lectures**	**Lab Assignments Midterms Final Exam**
1.3	Recognize the concepts of Multithreading and network programming	K1, K2, K3, K4	**Lectures**	**Lab Exam Assignments Midterms Final Exam**
1.4	Understand the principles of RMI	K1, K2, K3, K4	**Lectures**	**Lab Exam Assignments Midterms Final Exam**
2.0	**Skills**			
2.1	Apply the Application Programming Interface (API) classes and methods to create GUI classes with event handling.	S4	**Lectures Lab**	**Lab Exam Assignments Midterms Final Exam Project**
2.2	Analyze concurrent execution of Java applications in multi-threading environment	S2	**Lectures Lab**	**Lab Exam Assignments Midterms Final Exam Project**
2.3	Apply communication using URL with suitable HTTP GET and POST requests	S3	**Lectures Lab**	**Lab Exam Assignments Midterms Final Exam Project**

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
2.4	Design, implement, and evaluate a computer-based system to meet desired needs.	S4	**Lectures** **Lab**	**Lab Exam** **Assignments** **Midterms** **Final Exam** **Project**
3.0	**Values, autonomy, and responsibility**			
3.1	Communicate and work (effectively, ethically, and professionally) (individually and in groups/teamwork) to accomplish all the assigned duties and projects.	V2	Lab	Project
...				

C. Course Content

No	List of Topics	Contact Hours
1.	**GUI Basics: e.g. JavaFX UI Controls, Property Binding, Common Properties and Methods for Nodes.** **Lab: writing simple JavaFX programs and using common properties (i.e style)**	**5**
2.	**GUI Basics: Color class, Font class, Image and ImageView classes** **Lab: creating colors and fonts images and image views using their respective classes**	**5**
3.	**GUI Basics: Layout Panes, Shapes.** **Lab: creating user interfaces using panes UI controls (Pane, StackPane, FlowPane, GridPane, BorderPane), and shapes**	**5**
4.	**Event-Driven Programming and Animations: Event and Event Sources, Registering Handlers and Handling Events** **Lab: writing the code to handle events and defining handler classes, register handler objects**	**5**
5.	**Event-Driven Programming and Animations: Inner Classes, Anonymous Inner Class Handlers, Simplifying Event Handling Using Lambda Expressions** **Lab: defining handler classes using anonymous inner classes and simplify event handling using lambda expressions**	**5**
6.	**Event-Driven Programming and Animations: Mouse Events, Key Events, Listeners for Observable Objects and Animation**	**5**

	Lab: writing programs to deal with MouseEvents and KeyEvents and creating listeners	
7.	UI Controls and Multimedia: e.g. JavaFX Label, Button, CheckBox, RadioButton, TextField, TextArea Lab: creating graphical user interfaces using the above mentioned user-interface controls	5
8.	UI Controls and Multimedia: e.g. JavaFX ComboBox, ListView, ScrollBar, Slider and Video and Audio. Lab: developing simple forms using using the above mentioned user-interface controls	5
9.	Multithreading and Parallel Programming: Introduction, Thread Concepts, Creating Tasks and Threads, The Thread Class Lab: developing task classes by implementing the Runnable interface and creating threads to run tasks using the Thread class	5
10.	Multithreading and Parallel Programming: Thread Pools, Thread Synchronization, Synchronization Using Locks, Cooperation among Threads, Blocking Queues, Semaphores, Avoiding Deadlocks Lab: using synchronized methods or blocks and to synchronize and lock threads using different techniques	5
11.	Multithreading and Parallel Programming: Thread States, Synchronized Collections, and Parallel Programming Lab: creating synchronized collections using the collection-based static methods	5
12.	Networking: Client/Server Computing, The InetAddress Class Lab: creating servers and clients using server and client sockets	5
13.	Networking: Serving Multiple Clients, Sending and Receiving Objects Lab: developing servers for multiple clients and how to send and receive objects on a network	5
14.	Remote Method Invocation (Part 1): Understanding stub and skeleton, Create and run distributed application Lab: how to initialize distributed application using stub and skeleton	5
15.	Remote Method Invocation (Part 2): Understanding server and client applications Lab: Building simple RMI application	5
Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Lab Assignment	2- 15	20%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
2.	Group Project	14 or 15	10%
3.	Mid-Exam 1	6 or 7	15%
4.	Mid-Exam 2	11 or 12	15%
5.	Final Exam	16 or 17	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	**Intro to Java Programming, Comprehensive Version, Y. Daniel Liang, Pearson, 12rd edition, 2019, ISBN 978-0136520153**
Supportive References	**1) Java How to Program, Early Objects, Paul Deitel and Harvey Deitel, Pearson, 11rd edition, 2017, ISBN 978-0134743356** **2) Java How to Program, Late Objects, Paul Deitel and Harvey Deitel, Pearson, 11rd edition, 2017, ISBN 978-0134791401**
Electronic Materials	**https://www.w3schools.com/java/default.asp**
Other Learning Materials	**Java 9 for Programmers, Paul Deitel and Harvey Deitel, Pearson, 4rd edition, 2017, ASIN: B071S84XCK**

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	**Classroom (25 seats)**
Technology equipment (projector, smart board, software)	**White board, Data show projector**
Other equipment (depending on the nature of the specialty)	N/A

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Teaching	Faculty, Program Leaders, and	Both Direct and Indirect

Assessment Areas/Issues	Assessor	Assessment Methods
	Advisory Board	
	Students	Indirect
Effectiveness of Students Assessment	Faculty, Program Leaders, Advisory Board, and Independent Opinion	Both Direct and Indirect
Quality of Learning Resources	Faculty, Students, and Advisory Board	Indirect
The Extent to which CLOs have been Achieved	Faculty, Program Leaders, Advisory Board, and Independent Opinion	Direct (as in section B) and Indirect/Surveys
	Students	Indirect
Other	-	-

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	