

SULTAN QABOOS UNIVERSITY COLLEGE OF SCIENCE DEPARTMENT OF COMPUTER SCIENCE BACHELOR OF SCIENCE IN COMPUTER SCIENCE COURSE OUTLINE

I. COURSE INFORMATION				
COURSE CODE	COMP3204			
COURSE TITLE	Advanced Java Programming			
OMAN QUALIFICATION	7	7		
FRAMEWORK (OQF) LEVEL	1	·		
CREDIT HOURS	3			
CONTACT HOURS	4			
PRE-REQUISITES	COMP2202, LANC2058			
CO-REQUISITES				
EQUIVALENT COURSES				
INCOMPATIBLE COURSES				
	□ University Requirement		□ University	Elective
	College Requirement		□ College E	lective
	Department Requirement		Department Elective	
COURSE CATEGORY	□ Major Requirement		□ Major Elective	
	□ Specialization Requirement		🖾 Specializa	tion Elective
	□ Other (specify):			
	College: Science		Department:	Computer Science
COURSE OWNER	Center:		Unit:	
D ELIVERY MODE	\boxtimes Face to Face	🗆 Blei	nded	□ Online
			⊠ Lecture/La	b
	□ Lecture/Seminar		□ Lecture/Studio	
	□ Lecture/Tutorial		□ Lecture/Lab/Tutorial or Seminar	
COUDSE TYDE			□ Laboratory (Practical)	
COURSE I IPE	□ Field or Work Placement			
	□Seminar		□ Internship	
			Project	
	□ Thesis		□ Other (spe	cify):
LANGUAGE OF INSTRUCTION	English		1	
COURSE DESCRIPTION	This course exposes the student to ac	lvanced f	eatures of Java la	nguage such as: advanced
COURSE DESCRIPTION	GUI components, 2D/3D graphics, multimedia programming, multithreading, network			

programming, Java database connectivity, Java structures and collections, servlets and Java beans.						
	□ Augmented Reality			□ Flipped Cl	assroom	
	□ Blended Learning		⊠ Problem-E	Based Learnin	ng	
TEACHING AND LEARNING	□ Discovery	-Based Learning		🛛 Project-Ba	sed Learning	3
SIKALEGIES	□ Student-L	ed Learning		□ Team-Bas	ed Learning	
	□ Work-Bas	sed Learning		\Box Other (specify):		
	⊠In-term ex	amination(s) (20 %))	🗆 Quizzes (1	5%)	□Other
ASSESSMENT COMPONENT	⊠ Homewor	k assignments (10%)	□Project (%)	(specify):
	⊠ Final exa	mination (40%)		⊠ Practical/	Lab (15%)	(%)
TEXTBOOKS AND Educational Material	 <u>Textbook (T1)</u> Cay S. Horstmann, Big Java: Early Objects, 5th Edition, Wiley, 2014. (partly in pdf) <u>Supplemental Materials:</u> (R1) Foundational Java, David Parsons, Springer-Verlag London Limited, Springer, 2012. (Ebook) (R2) An Introduction to Network Programming with Java, Jan Graba, Springer-Verlag, 2013.(Ebook) 		4. (partly in on Limited, oa,			
GRADING METHOD	A-F Scale	2	□ Pass	/Not Pass	\Box Other (specify):
GRADING METHOD DESCRIPT	ION					
	Range	Letter Grade	_	Dese	cription	
	90 - 100	A	Exce	ptional perfor	mance: All	course
	86 - 89.9	A-	consi	stently outstan	ding manner	
	81-85.9	B+	Verv	Good Perform	nance: The	maiority of
	77 – 80.9	B	the c	the course objectives achieved (majority		najority
	73 – 76.9	B-	being	being at least two-thirds) and met in a		et in a
			consi	consistently thorough manner.		
A-F GRADING SCALE:	68 – 72.9	C+	Satis	factory Perfor	mance: At l	east most
	64 – 67.9	C	of co	urse objectives	have been a	chieved
	60 - 63.9	C-	and r	net satisfactoril	y.	
	55 - 59.9	D+	Mini	mally Accepta	ble Perform	nance: The
	50 – 54.9	D	accet	se objectives m stable level	et at a minim	lally
	0 – 49.9	F	Una	ceptable perf	ormance: Th	ne course
		-	objec	ctives not met a	t a minimally	y
			accep	otable level.		
PASS/NOT PASS:						
OTHER:						

II. SEMESTER INFORMATION			
SEMESTER/YEAR	SPRING/??	SECTION(S)	??
DAY AND TIME		VENUE(S)	
COURSE COORDINATOR		COURSE TEAM	
COORDINATOR OFFICE		OFFICE HOURS	
COORDINATOR EXTENSION		COORDINATOR EMAIL	

III. ALIGNMENT OF COURSE LEARNING OUTCOMES (CLO), PROGRAM LEARNING OUTCOMES (PLO), GRADUATE ATTRIBUTES (GA), AND OMAN QUALIFICATION FRAMEWORK (OQF) CHARACTERISTICS

	CLO	PLO / SO	SQU Graduate Attributes	OQF Characteristics
1.	Develop Java applications utilizing Collections, Generics, and advanced data structures to enhance code reusability and efficiency.	6	A	1,2
2.	Design and implement concurrent applications by employing multithreading techniques.	2,6	Α	1,2
3.	Construct Java networking applications using sockets, datagrams, and related APIs for communication and data exchange.	2,6	Α	1,2
4.	Develop robust web applications using Java web programming tools and integrate database functionalities through Java classes and interfaces.	2,6	Α	1,2
5.	Create user-friendly interfaces and graphical applications using advanced GUI components, graphics, and current Java IDEs.	6	Α	1,2

IV. COURSE LEARNING OUTCOMES (CLOS) AND ASSESSMENT CRITERIA AND METHODS (FOR EACH CLO)

CLO1: Develop Java applications utilizing Collections, Generics, and advanced data structures to enhance code reusability and efficiency.

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ASSESSM	ENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE	ASSESSMENT METHODS
STUDENT	MUST)	
A)	Correct application of Java Collections and Generics to solve problems.	Homework, Midterm and/or Final
B)	Efficient use of prebuilt data structures (e.g., Lists, Maps, Sets).	Homework and/or Project and/or Final
C)	Demonstration of reusable and maintainable code practices.	Homework and/or Project
CLO2: D	esign and implement concurrent applications by employing mult	ithreading techniques.
ASSESSM	ENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE	ASSESSMENT METHODS
STUDENT	MUST)	
A)	Effective use of threads to achieve concurrency.	Homework and/or Project, Lab test, Final
B)	Implementation of thread synchronization to avoid race conditions.	Homework and/or Project, Lab test, Final
C)	Ability to debug and optimize multithreaded applications	Homework and/or Project, Lab test

CLO3: C	onstruct Java networking applications using sockets, datagram	is, and related APIs for communication and data	
exchange.			
ASSESSM	ENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE	ASSESSMENT METHODS	
STUDENT	MUST)		
A)	Correct implementation of client-server architecture using		
	sockets.		
B)	Demonstration of reliable data transfer using datagrams and	Homework and/or Project, Midterm, Lab test,	
	protocols.	and/or Final	
C)	Handling exceptions and ensuring robust network		
	communication		
CLO4: D	evelop robust web applications using Java web programming to	ools and integrate database functionalities through	
Java classe	s and interfaces.		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE ASSESSMENT METHODS			
STUDENT	MUST)		
A)	Correct usage of Java web frameworks and technologies (e.g.,		
	Servlets, JSP, JDBC).		
B)	Integration of database operations like CRUD (Create, Read,	Midterm, Project and/or Final	
	Update, Delete) using Java.		
C)	Security considerations and user-friendly design in web		
	applications		
CLO5: Cr	eate user-friendly interfaces and graphical applications using adv	anced GUI components, graphics, and current Java	
IDEs.			
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE ASSESSMENT METHODS			
STUDENT MUST)			
A)	Correct use of advanced GUI components like JTable, JTree,	Homework and/or Project Midterm Lab test	
	and dialogs.	and/or Final	
B)	Implementation of custom graphics and event handling.		
C)	Effective use of Java IDEs (e.g., IntelliJ, Eclipse) for	Homework and/or Project	
	debugging and optimization	Tome work and, or Troject	

V COUDCE CONTENT AND SCHEDULE
V. U.OI IRSE U.ONTENT AND SCHEDULE

WEEK	LECTURES #	TOPICS/ SUBJECTS	READINGS/ CHAPTERS	REMARKS
1	1	Introduction: Course outline and review of Java programming and OOP concepts.		
2	1	Objects that contain objects, Associations and Collections, The core Collection interfaces, Legacy Classes, Type safe Collections with Generics, A Concrete Collection Class: Set, List, Map, Wrapping and Autoboxing	T1: Ch 14	
3	1	Iterators, ListIterator, Static methods of collection class, Generics and Inheritance.	T1: Ch14, 17	
4	1	Covers functional programing paradigm introduced in Java SE8. Functional interfaces(e.g. Function, Predicate, Supplier, Consumer), Lambda expressions, streams, stream operations.	Ch 19, + Lect. notes	

15 VI ADD	1 ITIONAL INF	General revision	-	
14	1	Java Beans and Java Server Faces (JSF)	Lect. notes	
13		Web applications: Covering servlets, Java Server Pages (JSP)	Lect. notes	
12	1	Reflection: Explore intrinsic class details at runtime (handout)	Lect. notes	
11	1	JDBC (continued)	R1	
10		Java Database Connectivity (JDBC) relational databases, SQL, connecting to and querying a database, stored procedures. (Ch 22)	R1	
9		Client/server interactions with datagrams, multithreaded servers, NIO.	R2	
8	1	Networking: Reading a file on a Web server, establishing a simple client and server, client and server interactions with stream socket connections	R2	
7	1	Thread synchronization, Runnable interface. (Ch 20)	T1:Ch 20	
6	1	Multithreading: The life cycle of a thread, creating and executing threads	T1:Ch 20	
5		Advanced GUI components, 2D/3D graphics Programing.	T1: Ch18	

VII. STUDENTS RESPONSIBILITIES

It is the student's responsibility to know and comply with all University Academic Regulations relevant to participation in this course. These regulations specifically include attendance requirements and student academic code of conduct.

ACADEMIC	The University expects the students to approach their academic endeavors with
INTEGRITY	the highest academic integrity. Please refer to the Undergraduate Academic
	Regulations.
ADD AND DROP	Students who wish to drop or add the course should review the Undergraduate
	Academic Regulations.
ATTENDANCE	Sultan Qaboos University has a clear requirement for students to attend courses,
	detailed in the Undergraduate Academic Regulations.
ASSESSMENT AND	To ensure the provision of a sound and fair assessment and grading, please review
GRADING	the Undergraduate Academic Regulations.
GRADE APPEAL	Students who wish to appeal their grades should review the Undergraduate
	Academic Regulations.
CLASSROOM	Students are expected to dress professionally during class time as required by the
POLICIES	University. Use of phones or any other electronic devices in the classroom during

	class time is strictly prohibited. Unauthorized use may lead to faculty member
	confiscation of the device for the remainder of the class. Behavior that
	persistently or grossly interferes with classroom activities is considered
	disruptive behavior and may be subject to disciplinary action. A student
	responsible for disruptive behavior may be required to leave the class.
LATE AND MAKE-UP	Students are required to meet the course objectives by submitting coursework no
WORK	later than the assigned due date. Students may be allowed to submit late work if
	approved by the course coordinator. Assignments submitted after the due date
	may be penalized.
MISSED	All quizzes, tests, clinical evaluations, and exams must be completed by the date
EVALUATIONS	they are assigned. If a quiz, test, or exam is missed due to a documented
	emergency situation (e.g., medical emergency, death in the immediate family), it
	is the student's responsibility to contact the instructor.
OTHER	

Course Outline Appendix

A. PROGRAM LEARNING OUTCOMES / STUDENT OUTCOMES

- 1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- 2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- 3. Communicate effectively in a variety of professional contexts.
- 4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- 5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- 6. Apply computer science theory and software development fundamentals to produce computing-based solutions.

GRADUATE ATTRIBUTES	GRADUATE COMPETENCIES FOR UNDERGRADUATE	
	STUDIES	
A. Cognitive Capabilities: The graduate has sufficient general and specialized theoretical knowledge that enables him/her to deal well	1. Demonstrates familiarity and works with advanced specialized knowledge in the area of specialization.	
with his/her specialty and other related fields.	2. Demonstrates a general understanding of the relationship of advanced specialized knowledge with knowledge in other relevant professional fields and aspects.	
	3. Demonstrates a comprehensive understanding of the theories, principles, and methods used in his/her specialty, and how to create and apply new knowledge.	
	4. Demonstrates general knowledge of the legal environment and necessary relevant regulatory frameworks.	
	5. Shows awareness of contemporary literature and research.	
B. Skill and Professional Capability: The graduate has sufficient skill and practical experience that enables him/her to perform all	1. Applies concepts, theories, and investigative methods to synthesize and interpret information to evaluate conclusions.	

B. SQU Graduate Attributes and Competencies for Undergraduate Studies

tasks related to the specialization and other related fields.	2. Applies appropriate research methods and techniques and employs digital knowledge
	3. Evaluates and critiques information independently
	 Uses cognitive and technical skills to analyze complex issues and develop appropriate solutions.
	5. Initiates new ideas or processes in the professional, educational or research context.
C. Effective Communication: The graduate has the ability to communicate effectively with	1. Explains, presents, and adapts information to suit the recipients.
others to achieve the desired results	2. Employs appropriate information and communication technology to collect and analyze information.
D. Autonomy and Leadership: The graduate has the ability to lead, make decisions and take	1. Performs advanced professional activities independently.
responsibility for decisions.	2. Demonstrates leadership skills.
	3. Takes professional responsibility.
	4. Assumes full accountability for the tasks and their output.
E. Responsibility and Commitment: The	1. Manages time and other resources assigned to
graduate appreciates the importance of	accomplishing tasks effectively and responsibly.
available resources and deals with them effectively and is committed to the ethics of	2. Demonstrates effective practices when working in teams.
the profession and society.	3. Demonstrates advanced levels of understanding of values and ethics relevant to the specialization, profession and local and international society and promotes them among others.
	4. Works within the professional, institutional, and specialization guiding frameworks and strategic plans.
	5. Interacts with community affairs positively and preserves national identity.
F. Development and Innovation: The	1. Demonstrates the ability to independently manage
graduate has a passion for development and	learning tasks, with an awareness of how to
innovation in the field of specialization.	develop and apply new knowledge.
	2. Utilizes specialized knowledge and skills for entrepreneurship.
	3. Utilizes creative and innovative skills in the field of specialization.

C. OQF Characteristics

- 1. Knowledge
- 2. Skills
- 3. Communication, Numeracy, and Information and Communication Technology Skills.
- 4. Autonomy and Responsibility
- 5. Employability and Values
- 6. Learning to learn