

I. COURSE INFORMATION				
COURSE CODE	COMP1007			
COURSE TITLE	AMAZING APPLICATIONS OF AI	RTIFICIA	L INTELLIGEN	CE
OMAN QUALIFICATION FRAMEWORK (OOF) I EVEL	5			
CREDIT HOURS	2			
CONTACT HOURS	2			
PRE-REQUISITES	-			
Co-REQUISITES	-			
EQUIVALENT COURSES	-			
INCOMPATIBLE COURSES	-			
	University Requirement		⊠ University	/ Elective
	College Requirement		College E	lective
G	Department Requirement		Department	nt Elective
COURSE CATEGORY	☐ Major Requirement		□ Major Elective	
	□ Specialization Requirement		□ Specialization Elective	
	□ Other (specify):			
	College: Science		Department:	Computer Science
COURSE OWNER	Center:		Unit:	
DELIVERY MODE	□ Face to Face	🗆 Blei	nded	⊠ Online
	⊠Lecture		□ Lecture/La	lb
	□ Lecture/Seminar		□ Lecture/Studio	
	□ Lecture/Tutorial		□ Lecture/Lab/Tutorial or Seminar	
	□Tutorial		Laboratory (Practical)	
COURSE I YPE	□ Field or Work Placement		🗆 Studio	
			□ Internship	
	□ Workshop		Project	
			□ Other (specify):	
LANGUAGE OF INSTRUCTION	English			
	This course provides an overvie	w of Ar	tificial Intellige	nce and surveys recent
	amazing applications enabled by	AI. AI I	nas revolutioniz	ed many aspects of life
COURSE DESCRIPTION	in today's world. From conversational agents and smart phones to prediction of			
	epidemics and political orientations from online searches, AI has led to			

	discoveries, improvements, and entire new domains and markets to emerge in the last few decades. In this course, we will present and discuss one amazing application of AI every week and reflect on its benefits and potential harms in social and economic contexts. The applications are selected from a wide range of disciplines, including medicine, finance and commerce, engineering, education, history, politics, and psychology, among others.□Augmented Reality□Flipped Classroom		
	Blended Learning	Problem-Based Learning	
	Discovery-Based Learning Student Led Learning	Trans Deced Learning	
TEACHING AND LEARNING Strategies	 Student-Led Learning Team-Based Learning Other (specify): The course is delivered through interactive lectures and active class discussions supported by offline reading provided to students on a weekly basis. Moodle is used as an online platform to support student learning. 		
Assessment Component And Weight	\Box In-term examination(s) (55%) Test1 30% and Test2 25%	□ Quizzes (5%)	□Other
	\Box Homework assignments (0%)	Project (0%)	(specify):
	\Box Final examination (40 %)	Practical/ Lab (0%)	(%)
TEXTBOOKS AND EDUCATIONAL MATERIAL	 Final examination (40 %) Practical/ Lab (0%) No textbook is required. Reading materials will be provided on a weekly basis. Recommended books: Flynn Colema. A Human Algorithm: How Artificial Intelligence Is Redefining Who We Are, 2019 John D. Kelleher, Brian Mac Namee, Aoife D'Arcy. Fundamentals of Machine Learning for Predictive Data Analytics: Algorithms, Worked Examples, and Case Studies (The MIT Press) Brian Christian, Tom Grif. Algorithms to Live By: The Computer Science of Human Decisions Cathy O'Neil, Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy, 2016 		

	Militiadis D. Lytrasand Paraskevi Papadopoulou.				
	Applying Big Data Analytics in Bioinformatics and				
	Medicine				
		Zakir H	lussain, Sabareesh, K.I	Kranthi Kumar,	
		Sudheer Kumar. <u>A Magnificent Text Book Of</u>			
		Pharmacovigillance 2019			
GRADING METHOD	⊠ A-F Scale	2	□ Pass/Not Pass	\Box Other (specify):	
GRADING METHOD DESCRIPTION	ION				
	Range	Letter Grade	Desc	ription	
	90 - 100	А	Exceptional perform	mance: All course	
	0.6 00.0		objectives achieved and met in a		
	86 - 89.9	A-	consistently outstanding manner.		
	81-85.9	B+	Very Good Perforn	Very Good Performance: The majority of	
	77 - 80.9	В	the course objectives achieved (majority being at least two-thirds) and met in a		
	73 – 76.9	B-			
			consistently thorough manner.		
A-F GRADING SCALE:	68 – 72.9	C+	Satisfactory Perfor	Satisfactory Performance: At least most	
	64 - 67.9	С	of course objectives	have been achieved	
	60 - 63.9	C-	and met satisfactoril	and met satisfactorily.	
	55 – 59.9	D+	Minimally Accepta	ble Performance: The	
	50 540	D	course objectives me	et at a minimally	
	50 – 54.9	D	acceptable level.		
			Unacceptable perfo	rmance: The course	
	0-49.9 F	F	objectives not met at	a minimally	
			acceptable level.		
PASS/NOT PASS:					
OTHER:					

II. SEMESTER INFORMATION				
Semester/Year	Spring25	Section(s)	01/02	
Day and Time	Day, Time: Section 01: SUN 10:00-11:50 Section 02: TUE 10:00-11:50	Venue(s)	DL	
COURSE COORDINATOR	Somaiya Al Shuraiqi	COURSE TEAM		
COORDINATOR OFFICE	-	OFFICE HOURS	By appointment	
COORDINATOR EXTENSION	-	COORDINATOR EMAIL	somaiya@squ.edu.om	

III. ALIGNMENT OF COURSE LEARNING OUTCOMES (CLO), PROGRAM LEARNING OUTCOMES (PLO), GRADUATE ATTRIBUTES				
(G/	(GA), AND OMAN QUALIFICATION FRAMEWORK (OQF) CHARACTERISTICS			
	CLO	PLO / SO	SQU Graduate	OQF
			Attributes	Characteristics
1.	APPLY SPECIALIZATION KNOWLEDGE AND SKILLS:	1,2	А, В	1,2
	GRADUATES ARE EXPECTED TO UTILIZE THEIR ACADEMIC			
	KNOWLEDGE AND SKILLS RELEVANT TO THEIR FIELD OF			
	SPECIALIZATION EFFICIENTLY.			
2.	EFFECTIVE COMMUNICATION AND ICT USAGE:	3	С	3
	GRADUATES SHOULD COMMUNICATE EFFECTIVELY AND BE			
	PROFICIENT IN USING INFORMATION AND COMMUNICATION			
	TECHNOLOGIES.			
3.	CRITICAL ANALYSIS AND PRESENTATION: ABILITY TO	1, 3	A, C	4
	CRITICALLY ANALYZE COMPLEX INFORMATION AND PRESENT			
	IT IN A SIMPLE, CLEAR MANNER IS ESSENTIAL.			
4.	INTERPERSONAL AND CULTURAL ALIGNMENT: GRADUATES	3, 5	С	5
	POSSESS STRONG INTERPERSONAL COMMUNICATION SKILLS			
	AND UNDERSTAND THE CULTURAL NORMS OF THE			
	INTERNATIONAL LABOR MARKET, AIDING THEM IN THEIR			
	PROFESSIONAL AND PERSONAL LIVES.			
5.	INDEPENDENT LEARNING AND LIFELONG ENGAGEMENT:	4	D, F	6
	SQU GRADUATES ARE MOTIVATED FOR INDEPENDENT			
	LEARNING AND ARE ENGAGED IN LIFELONG LEARNING AND			
	RESEARCH.			
6.	WORK ETHICS AND INTELLECTUAL INDEPENDENCE:	4, 5	D, E	5
	GRADUATES UPHOLD STRONG WORK ETHICS, POSSESS			
	POSITIVE VALUES, AND DEMONSTRATE INTELLECTUAL			
	INDEPENDENCE AND AUTONOMY.			
7.	TEAMWORK AND LEADERSHIP POTENTIAL: POSSESSING	4	D	4, 5
	TEAMWORK SKILLS AND DISPLAYING POTENTIAL LEADERSHIP			
	QUALITIES ARE KEY TRAITS OF SQU GRADUATES.			
8.	CITIZENSHIP AND SOCIAL RESPONSIBILITY: GRADUATES	5,6	E	5, 6
	SHOULD EXHIBIT GOOD CITIZENSHIP QUALITIES, BE AWARE			
	OF THEIR NATIONAL IDENTITY, ENGAGE RESPONSIBLY IN			
	COMMUNITY AFFAIRS, AND STAY INFORMED ABOUT			
	CONTEMPORARY ISSUES.			

IV. COURSE	E LEARNING OUTCOMES (CLOS) AND ASSESSMENT CRITERIA AND N	Methods (for each CLO)		
CLO1: UM	CLO1: UNDERSTAND THE CORE CONCEPTS OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING.			
Assessmen	IT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)	ASSESSMENT METHODS		
A)	DEFINE KEY TERMS AND CONCEPTS RELATED TO ARTIFICIAL	Q1, T1, T2, Final exam		
	INTELLIGENCE AND MACHINE LEARNING.			
В)	EXPLAIN THE FUNDAMENTAL PRINCIPLES OF AI ALGORITHMS	Q1, T1, T2, Final exam		
	AND THEIR APPLICATIONS.			
C)	DESCRIBE DIFFERENT TYPES OF MACHINE LEARNING, SUCH AS	Q1, T1, T2, Final exam		
	SUPERVISED, UNSUPERVISED, AND REINFORCEMENT			
	LEARNING.			
CLO2: IDE	NTIFY DIFFERENT TYPES OF PROBLEMS SOLVED/SOLVABLE USING #	ARTIFICIAL INTELLIGENCE TECHNIQUES.		
Assessmen	IT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)	Assessment Methods		
A)	Identify real-world problems that can be addressed using AI techniques.	Q1, T1, T2, Final exam		
В)	Classify various AI techniques based on problem types	Q1, T1, T2, Final exam		
	(e.g., classification, regression, clustering).			
C)	Provide examples of successful AI applications in different fields	Q1, T1, T2, Final exam		
CLO3: REC	COGNIZE THE ROLE OF DATA IN DATA-DRIVEN DISCOVERIES.			
Assessment Criteria (to achieve this objective, the student must) Assessment Methods				
A)	Identify different types of data used in AI model	Q1, T1, T2, Final exam		
В)	Explain the importance of data quality and preprocessing in AI solutions.	Q1, T1, T2, Final exam		
C)	Describe how data influences the accuracy and performance of AI models.	Q1, T1, T2, Final exam		
CLO4: DISCUSS OPPORTUNITIES AND CHALLENGES BROUGHT BY ARTIFICIAL INTELLIGENCE.				
Assessmen	NT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)	ASSESSMENT METHODS		
A)	Identify various opportunities created by AI in different industries.	Q1, T1, T2, Final exam		
В)	Discuss ethical, social, and legal challenges associated with AI.	Q1, T1, T2, Final exam		
C)	Evaluate the impact of AI on employment and the	Q1, T1, T2, Final exam		
	future of work.			
CLO5: CRI	TICALLY ANALYZE A PROPOSED AI SOLUTION TO A GIVEN PROBLEM	м.		
Assessmen	IT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)	Assessment Methods		
A)	Assess the strengths and weaknesses of an AI solution.	Q1, T1, T2, Final exam		
B)	Suggest improvements to enhance the effectiveness of an AI solution.	Q1, T1, T2, Final exam		
C)	Compare the proposed AI solution with alternative approaches.	Q1, T1, T2, Final exam		

CLO6: BE	CLO6: BE FAMILIAR WITH A RANGE OF AI APPLICATIONS IN DIFFERENT SCIENTIFIC AND SOCIAL DOMAINS			
Assessmen	ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST) ASSESSMENT METHODS			
A)	Identify various AI applications across scientific,	Q1, T1, T2, Final exam		
	medical, infancial, and social fields.			
В)	Describe the impact of AI applications in specific	Q1, T1, T2, Final exam		
	domains, such as healthcare or finance.			
C)	Compare the effectiveness of AI applications in	Q1, T1, T2, Final exam		
	different domains.			
CLO7: EFF	ECTIVELY DESCRIBE AND COMMUNICATE THE DIFFERENT ASPECTS	OF A DOMAIN-SPECIFIC AI APPLICATION		
Assessmen	IT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)	Assessment Methods		
A)	Analyze a specific AI application, detailing its	Q1, T1, T2, Final exam		
	components and functionality.			
В)	Present findings on a domain-specific AI application	Q1, T1, T2, Final exam		
	using clear and structured communication.			
C)	Evaluate the potential improvements and limitations of	Q1, T1, T2, Final exam		
	a domain-specific AI application.			
CLO8: BE	AWARE OF SOCIAL AND ETHICAL CONCERNS RELATED TO DATA, A	, AND MACHINE LEARNING		
Assessmen	IT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)	Assessment Methods		
A)	Identify key ethical issues related to AI, such as bias,	Q1, T1, T2, Final exam		
	privacy, and transparency.			
В)	Discuss the societal impact of AI, including potential	Q1, T1, T2, Final exam		
	risks and benefits.			
C)	Propose strategies to address ethical and social	Q1, T1, T2, Final exam		
	concerns in AI development.			

V. COURSE CONTENT AND SCHEDULE

WEEK	LECTU RES#	TOPICS/ SUBJECTS	READINGS/ CHAPTERS	Remarks (e.g., assessments)
1	1	Introduction: What is AI? What is Machine	Recommended	Q1, T1,
		Learning? Why is it big now?	book 1, Ch1,2	Final
2	2	Reading Human Mind and Intentions: Mind	Mind Reading	Q1,
		Reading Project, Intention detection from subtle head movements and facial gestures	Project	T1,Final
3	3	Language understanding and Large Language Models: chatGPT and following variants: the potential and shortcomings of AI in "understanding"	What are LLMs? How to converse with ChatGPT?	Q1,T1,Final
4	4	Health discoveries at scale: Predicting epidemics and drug reactions/interactions	Scientists Mine Web Search Data	T1,Final

		from online searches Postmarket Drug	to Identify	
		Surveillance Without Trial Costs: Discovery	Epidemics and	
		of Adverse Drug Reactions Through Large-	Adverse Events	
		Scale Analysis of Web Search Oueries		
5	5	Self-driving/smart vehicles (cars and drones)		T1 Final
5	5	Student AL-enabled Idea discussion		11,1111
6	6	Identifying unknown historical documents	Automatic	T2 Final
Ū	0	from style associations:	Compositor	exam
		a Automatic Compositor Attribution in the	Attribution in the	0.0011
		First Folio of Shakespeare	First Folio of	
		This Tono of bhakespeare.	Shakespeare	
7	7	Personalized Shopping and Stock-market	Predicting Ad	T2. Final
,	,	prediction: Predicting Ad Liking and	Liking and	exam
		Purchase Intent	Purchase Intent	
8	8	Predicting depression and preventing	Predicting	T2, Final
Ū	Ũ	suicide from social media posts	depression from	exam
			social media	
			posts	
			Freeze	
9	9	Learning analytics: automatically learning	AI Applications	T2, Final
		how students learn? Insights from student	in Education and	exam
		performance data and eye tracking data.	Higher Education	
			-	
10		Detecting political orientations and	Social media	T2, Final
	10	gender/racial biases from social media	data mining	exam
		interactions		
11		Digital Pathology: accurate prediction of	earlier and more	T2, Final
	11	diseases by machine algorithms	<u>accurate</u>	exam
			prediction of	
			cancer by	
			<u>machine</u>	
			algorithms	
12		AI-enabled human kindness: Context-	<u>"Kind and</u>	Final
	12	Sensitive App Utilizing Content to Promote	Grateful": A	
		Gratitude	Context-	
			<u>Sensitive</u>	
			Smartphone App	
			<u>Utilizing</u>	
13		Philosophical and Ethical Issues Part1	ensuring machine	Final
	13	A. Verifiability of Behavior: ensuring	<u>learning</u>	
		machine learning algorithms are well-	algorithms are	

	· · · · ·	
	behaved	well-behaved
	B. Accountability and ownership	
	Philosophical and Ethical Issues Part2	How machine
	A. Automation, AI, and the Job Market:	learning is
	what can and what cannot be automated?	impacting
	B. The role of AI in changing the job market	industries
	landscape	
	C. Predicting the future	
	$(data \rightarrow prediction \rightarrow events feedback loop):$	
	how do predictions made about the future	
	change the present and thereupon change	
	the future? Potential paradoxes	
	D. Responsibilities of individuals and	
	decision makers	
14	Where do we go from here? thoughts and	
14	discussion	
15		

VI. ADDITIONAL INFORMATION (e.g., RUBRICS, etc.)

ASSESSMENT PLAN:

COMP1007 ASSESSMENT:

Assessment Items	NUMBER	WEIGHT	Notes
Quiz 1	1	5%	WEEK 5
TEST 1	1	25%	WEEK 7
TEST 2	1	30%	WEEK 10
FINAL	1	40%	WEEK 15

DEPARTMENT'S POLICY FOR DEALING WITH CHEATING:

It is essential that each student solves all programming assignments, lab tests and exams individually unless instructed otherwise, e.g., for group projects. Copying, plagiarism, collusion, switching, and falsification are violations of the university academic regulations. Students involved in such acts will be severely penalized. The department has adopted a firm policy on this issue. A zero mark will be assigned the first time a student is caught involved in copying and his/her name will be added to a watch list maintained by the Head of Department. Further repeated involvements in copying will cause the student to get an F grade in that course. This is in line with the university academic regulations.

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 INTEGRITY	The University expects the students to approach their academic endeavors with
	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
GRADING	review the Undergraduate Academic Regulations.
GRADE APPEAL	Students who wish to appeal their grades should review the Undergraduate
	Academic Regulations.
CLASSROOM POLICIES	Students are expected to dress professionally during class time as required by
	the 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
WORK	no 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 EVALUATIONS	All quizzes, tests, clinical evaluations, and exams must be completed by the date
	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

1. **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 with his/her specialty and other related fields.	1. Demonstrates familiarity and works with advanced specialized knowledge in the area of specialization.
	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 tasks related to the specialization and other related fields.	1. Applies concepts, theories, and investigative methods to synthesize and interpret information to evaluate conclusions.
	2. Applies appropriate research methods and techniques and employs digital knowledge
	3. Evaluates and critiques information independently
	4. 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.

2. SQU GRADUATE ATTRIBUTES AND COMPETENCIES FOR UNDERGRADUATE STUDIES

C. Effective Communication: The graduate	1.	Explains, presents, and adapts information to suit the
has the ability to communicate effectively with		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	1.	Performs advanced professional activities independently.
has the ability to lead, make decisions and take	2.	Demonstrates leadership skills.
responsibility for decisions.	3.	Takes professional responsibility.
	4.	Assumes full accountability for the tasks and their output.
	1.	Manages time and other resources assigned to
		accomplishing tasks effectively and responsibly.
	2.	Demonstrates effective practices when working in teams.
E. Responsibility and Commitment: The	3.	Demonstrates advanced levels of understanding of values
graduate appreciates the importance of available		and ethics relevant to the specialization, profession and
resources and deals with them effectively and is		local and international society and promotes them among
committed to the ethics of the profession and		others.
society.	4.	Works within the professional, institutional, and
		specialization guiding frameworks and strategic plans.
	5.	Interacts with community affairs positively and preserves
		national identity.
	1.	Demonstrates the ability to independently manage
		learning tasks, with an awareness of how to develop and
F. Development and Innovation: The graduate		apply new knowledge.
has a passion for development and innovation in	2.	Utilizes specialized knowledge and skills for
the field of specialization.		entrepreneurship.
	3.	Utilizes creative and innovative skills in the field of
		specialization.

3. 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