Program Specification

(Postgraduate Programs)

Program Name:	**Master of Science in Computer Engineering**
Program Code (per the Saudi Standard Classification of Educational Levels and Specializations):	**071405**
Qualification Level:	7
Department:	**Computer and Network Engineering**
College:	**Computing**
Institution:	**Umm Al-Qura University**
Program Specification:	**New** ☐ **Updated** ☒
Last Review Date:	**14/5/2026**

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A. Program Identification and General Information:

1. Program's Main Location:		
Umm Al-Qura University, Makkah, Saudi Atabia		
2. Branches Offering the Program (if any):		
None		
3. System of Study:		
☒ Coursework & Project	☐ Coursework	
4. Mode of Study:		
☒ On Campus	☐ Distance Education	☐ Other ……(specify)
5. Partnerships with other parties (if any) and the nature of each:		
- Partnership Arrangement: None - Type of Partnership: Not Applicable - Duration of Partnership: Not Applicable		
6. Professions/jobs for which students are qualified:		
– Network Engineer – Data Systems Engineer – Cybersecurity Analyst – Computer Hardware Engineer – IT Consultant – AI/ML Engineer – Cloud Solutions Architect – Embedded Systems Engineer		
7. Relevant occupational/ Professional sectors:		
Academic, Manufacturing, ICT, Tourism and Hospitality, Oil and Gas, Military, Retail and E-commerce		

8. Major Tracks/Pathways (if any):

	Major track/pathway	Credit hours (For each track)	Professions/jobs (For each track)
1.	General Track	42	Network Engr., IT Consultant, Embedded Systems Engr.
2.	Intelligent Systems	42	ML Engr., AI Engr., Data Engr.
3.	Wireless Communications and Networks	42	Network Engr.
4.	Embedded Systems and IoT	42	Embedded Systems Engr.

9. Exit Points/Awarded Degree (if any):

Exit points/Awarded degree	Credit hours
1. Higher Degree Diploma in Computer Engineering	24

10. Total credit hours: (42)

B. Mission, Goals, and Program Learning Outcomes

1. Program Mission:

The mission of the program is: "To cultivate competent and conscientious computer engineering graduates capable of intellectual leadership in industry, government, and academia. It also aims to foster an academic environment conducive to applied and innovative research, and to provide valuable professional services to the Saudi community."

2. Program Goals:

Graduates of the programs will:

1. Practice as computer engineers in problem-solving, designing, and implementing computing systems.
2. Utilize their professional education/knowledge for the benefit of the society or/and the profession.
3. Keep their professional knowledge updated through further education or exploring available resources and through engineering educational seminars or workshops.
4. Assume leadership positions in industry, academia and public service, and/or contribute positively to their growth and sustainability.

3. Program Learning Outcomes:

Knowledge and Understanding:	
K1	Identify and formulate complex computer engineering problems
K2	Explain fundamental concepts and recent advances of computer engineering at a deep level
Skills:	
S1	Design and implement creative and novel solutions and models for current issues in various complex contexts related to computer engineering by applying critical thinking and principles of engineering, science, and mathematics.
S2	Acquire and apply new specialized knowledge in the field of computer engineering as needed, using appropriate learning strategies
S3	Communicate effectively with a range of audiences to transfer computer engineering knowledge and skills
S4	Conduct inquiries, investigations and research for complex computer engineering issues and problems
Values, Autonomy, and Responsibility:	
V1	Demonstrate commitment to ethical and professional responsibilities in scientific research and engineering situations to make informed judgments while considering global, economic, environmental, and societal impacts
V2	Function effectively as an individual and in a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

C. Curriculum:

1. Curriculum Structure:

General Track:

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Course	Required	8	24	57%
	Elective	4	12	29%
Graduation Project (if any)	Required	1	6	14%
Thesis (if any)				
Field Experience(if any)				
Others (.....)				
Total				100%

Intelligent Systems Track, Wireless Communications and Networks Track, and Embedded Systems and IoT Track:

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Course	Required	11	33	79%
	Elective	1	3	7%
Graduation Project (if any)	Required	1	6	14%
Thesis (if any)				
Field Experience(if any)				
Others (.....)				
Total				100%

2. Program Courses:

General Track (T1):

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1	CE6000	Computer Architecture	Required		3	Program
	CE6024	Advanced Computer Networks	Required		3	Program
	CE6003	Advanced Engineering Mathematics	Required		3	Program
	CE6007	Research Methods for Engineers	Required		3	Program
Level 2	CE6004	Embedded Systems	Required		3	Program
	CE6028	Distributed Systems	Required		3	Program
	CE6029	Networks Security Engineering	Required		3	Program
	CE6030	Seminars in Computer Engineering	Required		3	Program
Level 3	CE6XXX	Elective Course 1	Elective		3	Program
	CE6XXX	Elective Course 2	Elective		3	Program
	CE6097	Master's Capstone Research Project	Required		6	Program
Level 4	CE6XXX	Elective Course 3	Elective		3	Program
	CE6XXX	Elective Course 4	Elective		3	Program
	CE6097	Master's Capstone Research Project (continuing from last level)	Required		6	Program

Intelligent Systems Track (T2):

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1	CE6000	Computer Architecture	Required		3	Program
	CE6024	Advanced Computer Networks	Required		3	Program
	CE6003	Advanced Engineering Mathematics	Required		3	Program
	CE6007	Research Methods for Engineers	Required		3	Program
Level 2	CE6004	Embedded Systems	Required		3	Program
	CE6028	Distributed Systems	Required		3	Program
	CE6029	Networks Security Engineering	Required		3	Program
	CE6030	Seminars in Computer Engineering	Required		3	Program
Level 3	CE6100	Edge and Cloud Computing	Required		3	Program
	CE6101	Machine Learning Engineering	Required		3	Program
	CE6097	Master's Capstone Research Project	Required		6	Program
Level 4	CE6102	Tiny Machine Learning (TinyML)	Required		3	Program
	CE6XXX	Elective Course 1	Elective		3	Program
	CE6097	Master's Capstone Research Project (continuing from last level)	Required		6	Program

Wireless Communications and Networks Track (T3):

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1	CE6000	Computer Architecture	Required		3	Program
	CE6024	Advanced Computer Networks	Required		3	Program
	CE6003	Advanced Engineering Mathematics	Required		3	Program
	CE6007	Research Methods for Engineers	Required		3	Program
Level 2	CE6004	Embedded Systems	Required		3	Program
	CE6028	Distributed Systems	Required		3	Program
	CE6029	Networks Security Engineering	Required		3	Program
	CE6030	Seminars in Computer Engineering	Required		3	Program
Level 3	CE6011	Digital Communications	Required		3	Program
	CE6201	Wireless Sensor Networks	Required		3	Program
	CE6097	Master's Capstone Research Project	Required		6	Program
Level 4	CE6202	Mobile Networks	Required		3	Program
	CE6XXX	Elective Course 1	Elective		3	Program
	CE6097	Master's Capstone Research Project (continuing from last level)	Required		6	Program

Embedded Systems and IoT Track (T4):

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1	CE6000	Computer Architecture	Required		3	Program
	CE6024	Advanced Computer Networks	Required		3	Program
	CE6003	Advanced Engineering Mathematics	Required		3	Program
	CE6007	Research Methods for Engineers	Required		3	Program
Level 2	CE6004	Embedded Systems	Required		3	Program
	CE6028	Distributed Systems	Required		3	Program
	CE6029	Networks Security Engineering	Required		3	Program
	CE6030	Seminars in Computer Engineering	Required		3	Program
Level 3	CE6100	Edge and Cloud Computing	Required		3	Program
	CE6300	System Level Design for Embedded Systems	Required		3	Program
	CE6097	Master's Capstone Research Project	Required		6	Program
Level 4	CE6301	Design Principles of IoT Systems	Required		3	Program
	CE6XXX	Elective Course 1	Elective		3	Program
	CE6097	Master's Capstone Research Project (continuing from last level)	Required		6	Program

Elective Courses of the General Track (T1), the Intelligent Systems Track (T2), the Wireless Communications and Networks Track (T3), and the Embedded Systems and IoT Track (T4):

The check mark indicates that the course is allowed to be taken as elective course in the track

Course Code	Course Title	Credit Hours	T1	T2	T3	T4
CE6002	Applied Cryptogrophy	3	✓	✓	✓	✓
CE6032	Reconfigurable Hardware Accelerators	3	✓	✓	✓	✓
CE6015	Hardware Security	3	✓	✓	✓	✓
CE6021	Image Processing and Computer Vision	3	✓	✓	✓	✓
CE6035	Generative Models and Systems	3	✓	✓	✓	✓
CE6036	Computer Systems for Crowd Management	3	✓	✓	✓	✓
CE6037	Special Topics in Intelligent Systems	3	✓	✓	✓	✓
CE6038	Special Topics in Wireless Communication and Networking	3	✓	✓	✓	✓
CE6039	Special Topics in Embedded Systems and IoT	3	✓	✓	✓	✓
CE6100	Edge and Cloud Computing	3	✓		✓	
CE6101	Machine Learning Engineering	3	✓		✓	✓
CE6102	Tiny Machine Learning (TinyML)	3	✓		✓	✓
CE6011	Digital Communications	3	✓	✓		✓
CE6201	Wireless Sensor Networks	3	✓	✓		✓
CE6202	Mobile Networks	3	✓	✓		✓
CE6300	System Level Design for Embedded Systems	3	✓	✓	✓	
CE6301	Design Principles of IoT Systems	3	✓	✓	✓	

3. Course Specifications:

Insert hyperlink for all course specifications using NCAAA template

https://uqu.edu.sa/ccomp_cen/App/FILES/173981

4. Program learning Outcomes Mapping Matrix:

Align the program learning outcomes with the program's courses according to the desired performance levels.
(I = Introduced, P = Practiced, M = Mastered).
(General Track = T1, Intelligent Systems Track = T2, Wireless Communications and Networks Track = T3, Embedded Systems and IoT Track = T4)

Course code	Required (R) or Elective (E) in the Track				Program Learning Outcomes							
					Knowledge and understanding		Skills				Values, Autonomy, and Responsibility	
	T1	T2	T3	T4	K1	K2	S1	S2	S3	S4	V1	V2
CE6000	R	R	R	R	I	I	I	I	I	I	I	I
CE6024	R	R	R	R	I	I	I		I	I	I	I
CE6003	R	R	R	R		I	I	I				
CE6007	R	R	R	R	I	I			I	I	I	I
CE6004	R	R	R	R	P	P	P	P	P	P	P	P
CE6028	R	R	R	R	P	P	P	P	P	P		P
CE6029	R	R	R	R	P	P	P	P	P		P	P
CE6030	R	R	R	R	P	P		P	P	P	P	
CE6097	R	R	R	R	M	M	M	M	M	M	M	
CE6100	E	R	E	R	M	M	M		M	M	M	
CE6101	E	R	E	E	M	M	M	M		M	M	M
CE6102	E	R	E	E	M	M	M	M	M	M	M	M
CE6011	E	E	R	E	M	M	M	M	M	M	M	M
CE6201	E	E	R	E	M	M	M	M	M	M	M	M
CE6202	E	E	R	E	M	M	M	M	M	M	M	M
CE6300	E	E	E	R	M	M	M	M	M	M	M	M
CE6301	E	E	E	R	M	M	M	M	M	M	M	M
CE6002	E	E	E	E	M	M	M	M	M	M	M	M
CE6032	E	E	E	E	M	M	M	M	M	M	M	M
CE6015	E	E	E	E	M	M	M	M	M	M	M	M
CE6021	E	E	E	E	M	M	M	M	M	M	M	M
CE6035	E	E	E	E	M	M	M	M	M	M	M	M
CE6036	E	E	E	E	M	M	M	M	M	M	M	M
CE6037	E	E	E	E	M	M	M	M	M	M	M	M
CE6038	E	E	E	E	M	M	M	M	M	M	M	M
CE6039	E	E	E	E	M	M	M	M	M	M	M	M

5. Teaching and learning strategies applied to achieve program learning outcomes:

Describe teaching and learning strategies to achieve the program's learning outcomes in all areas.

Classroom lectures, reading assignments, research articles reviews and presentations, presentations by the students on stat-of-the art research, introducing simulation tools, research and industrial talks, hands-on projects and video tutorials

6. Assessment Methods for program learning outcomes:

Describe assessment methods (Direct and Indirect) that can be used to measure the achievement of program learning outcomes in all areas.

The program should devise a plan for assessing Program Learning Outcomes (all learning outcomes should be assessed at least once in the program's cycle).

Direct: homeworks, exams, projects, oral presentations, and technical reports Indirect: projects, oral presentations, and technical reports

D. Master's Capstone Research Project and Its Requirements:

1. Registration of the Master's Capstone Research Project:

(Requirements/conditions and procedures for registration of the Master's Capstone Research Project as well as controls, responsibilities and procedures of scientific guidance)

Students can register the Master's Capstone Research Project at their second year of the program. It is registered as 6 credit hours across two semesters. The students should talk to faculty members by the second semester to search for potential advisor for their Master's Capstone Research Project. The student should obtain a verbal consent from a faculty member to supervise their research project. The student should submit a "research project registration" from to the GSC for approval by the end of the second semester. The department will register students in CE6097 after the approval.

2. Scientific Supervision:

(The regulations of the selection of the academic supervisor and their responsibilities, as well as the procedures/ mechanisms of the scientific supervision and follow-up)

- By the beginning of every term, GSC sends an email to encourage CNE faculty members to submit a form showing their desire to supervise students on their research project (CE6097). GSC also encourages them to provide brief paragraphs describing their current and active research projects that students can join during their CE6097 course.
  - The number of students for each faculty member will be limited and determined by GSC according to a fair assignment policy of the students for all faculty members who are willing to act as advisors for a research project. The policy is approved by the department's council.
  - The GSC maintains a list of eligible faculty members for advising MS students. Eligibility depends on the academic rank (assistant professor and above), the number of their current supervised students, and the evolution of their previous successful projects.

- After getting all the responses of all faculty members, GSC sends an email to students to inform them about the available faculty members and their research interests to supervise their research projects in CE6097.
- During their second semester, students should start discussing the registration of CE6097 with potential faculty members whose research projects align with their research interests. Students should then decide on a topic and a research plan with a faculty member. The research plan must have a clear scope and deliverables to ensure the successful execution of the project.
- By the end of the second semester, the student should obtain verbal consent from a faculty member to supervise their research project. Also, the student should submit a "research project registration" form to the GSC https://uqu.edu.sa/ccomp_cen/App/Forms/Show/143064?ticket_cat_id=174118
- GSC reviews submitted research plans to ensure that they are clear and executable over two semsters.
- By the end of every semester, GSC creates a list of students with committee-approved registrations. The list is submitted to the department for final approval in the department's council, which allows them to register for CE6097 to the students in the following term.

3. Master's Capstone Research Project Completion:

(The regulations for selection of the Master's Capstone Research Project evaluation committee, the procedures for completion of the Master's Capstone Research Project, and criteria for evaluation)

- Students should submit a progress report to their advisor by the end of the semester in which they registered CE6097, typically by the end of their third semester. The progress report should show what has been done and what remains to be done in the following semester.
  - The advisor must submit the progress report alongside his/her evaluation and comments on the progress of the student to GSC. The required information is submitted using the "research project progress report". https://uqu.edu.sa/ccomp_cen/App/Forms/Show/143065?ticket_cat_id=174119
- Student should submit the final project report to their advisor by the end of the following term that they registered CE6097, typically, by the end of their fourth semster.
  - The advisor must evaluate and approve the final report.
  - After that, the advisor forms an evaluation committee consisting of at least three faculty members, including the advisor. The advisor then shares the final report with the committee to get their evaluation and comments.
  - The advisor must give the student a grade for the Master's Capstone Research Project after taking into consideration the work of the student, the progress report of the previous term, the final report, and the evaluation of the evaluation committee.
  - The advisor must submit the "research project completion" form to GSC. https://uqu.edu.sa/ccomp_cen/App/Forms/Show/143066?ticket_cat_id=174119

H. Student Admission and Support:

1. Student Admission Requirements:

Any bachelor degree that are relevant to computer field with at least a GPA of 2.75 out of 4 or its equivalent. The admission and transfer requirements are set according to the university regulations. They are set every year by the department, college and university councils

2. Guidance and Orientation Programs for New Students:

(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level).

The Graduate Studies Committee in the department organizes a yearly program for newly admitted student that includes workshops on program requirements, registration, available student resouceses.

3. Student Counseling Services:

(Academic, professional, psychological and social)

(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level)

The Graduate Studies Committee in the department provide acadmic counseling

4. Special Support:

(Low achievers, disabled, and talented students).

The Ghali Center of the University provides support to special students.

E. Faculty and Administrative Staff:

1. Needed Teaching and Administrative Staff:

Academic Rank	Specialty		Special Requirements / Skills (if any)	Required Numbers		
	General	Specific		M	F	T
Professor	Computer Engineering	Intelligent Systems, Networks, Embedded Systems and IoT	none	2	2	4
Associate Professor			none	3	3	6
Assistant Professor			none	5	5	10
Technicians and Laboratory Assistants			none	0	0	0
Administrative and Supportive Staff	Management	Network admin, instructional support	none	3	3	6
Others (specify)			none	0	0	0

F. Learning Resources, Facilities, and Equipment:

1. Learning Resources:

Learning resources required by the program (textbooks, references, e-learning resources, web-based resources, etc.)

The students have access to the university and college libraries, there they find all required learning resources. Students have access to online knowledge databases for free where they can search for papers and articles concerning their study courses

2. Facilities and Equipment:

(Library, laboratories, classrooms, etc.)

The college and the department of Computer and Network Engineering have sufficient classes to conduct teaching. Moreover, research and learning labs are available for students to utilize to conduct any practical parts of their studies

3. Procedures to ensure a healthy and safe learning environment:

(According to the nature of the program)

The Healthy and Safe Environment at Department is checked and maintained regularly by the university health and safety department to ensure safe and healthy environment for students and staff

G. Program Quality Assurance:

1. Program Quality Assurance System:

Provide a link to the quality assurance manual.

https://drive.uqu.edu.sa/_/ccomp_cen/files/d06709e1-8941-4e84-9012-cf760ff9db43.pdf

2. Program Quality Monitoring Procedures:

The program quality is monitored as part of the university programs quality assurance procedures which are carried out regularly by the deanship of quality and development. The program outcomes are collected and analyzed against the set outcomes and objectives. Corrective measures are taken to improve the quality of the program.

3. Procedures to Monitor Quality of Courses Taught by other Departments:

All program courses are taught by the department of Computer and Network Engineering. No other departments are involved in the teaching of the program.

4. Procedures adopted to ensure consistency between the program's sections (male and female sections, if any).

Instructors are provided with course specification documents that includes learning outcomes, topics, textbooks, assessment methods, and teaching strategies. The instructors are required to follow these documents to insure the consistency among all sections.

5. Assessment Plan for Program Learning Outcomes (PLOs):

The department will carry out program assessment on a yearly basis. Course reports will be collected by the end of each semester. They will be analyzed to check CLO and PLO satisfaction. for CLOs, then the quality committee check the PLOs based on these feedbacks. Improvements and amendment to the program contents will be suggested based on these assessments.

6. Program Evaluation Matrix:

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time
effectiveness of teaching & assessment	Students	Survey	end of academic year
learning resources	Students	Survey	end of academic year
Quality of faculty research	Faculty	Google Scholar	end of academic year

7. Program KPIs: (including KPIs required by NCAAA)

The period to achieve the target is 3 years.

No.	KPIs Code	KPIs	Targeted Level	Measurement Methods	Measurement Time
1	KPI-PG-01	Students' Evaluation of quality of learning experience in the program	70	Survey by the department	Annually
2	KPI-PG-02	Students' evaluation of the quality of the courses	70	Survey by the department	Annually
3	KPI-PG-03	Students' evaluation of the quality of academic supervision	70	Survey by the department	Annually
4	KPI-PG-04	Average time for students' graduation	2 years	Academic System Reports	Annually
5	KPI-PG-05	Rate of students dropping out of the program	20%	Academic System Reports	Annually
6	KPI-PG-06	Employers' evaluation of the program graduates' competency	70	Survey by the Deanship of Development and Quality	Annually
7	KPI-PG-07	Students' satisfaction with services provided	70%	Survey by the department	Annually
8	KPI-PG-08	Ratio of students to faculty members	5:1	Academic System Reports	Annually
9	KPI-PG-09	Percentage of publications of faculty members	70%	Journal Citation Reports and Google Scholar	Annually
10	KPI-PG-10	Rate of published research per faculty member	1	Journal Citation Reports and Google Scholar	Annually
11	KPI-PG-11	Citations rate in refereed journals per faculty member	10	Journal Citation Reports	Annually

No.	KPIs Code	KPIs	Targeted Level	Measurement Methods	Measurement Time
12	KPI-PG-12	Percentage of students' publication	15%	Journal Citation Reports and Google Scholar	Annually
13	KPI-PG-13	Number of patents, innovative products, and awards of excellence	5	Survey by the department	Annually

H. Specification Approval Data:

COUNCIL /COMMITTEE	Computer and Network Engineering Department Council
REFERENCE NO.	The 18th Session Of The Academic Year 1446
DATE	15/4/2025