هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TPG-151

Program Specification
(Postgraduate)

Program Name:	Master of Computer Science
Program Code (as per the Saudi Standard Classification of Educational Levels and Specializations):	MSC
Qualification Level:	Master Degree
Department:	Computer Science
College:	CC
Institution:	Fahd bin Sultan University
Program Specification:	New ☐ updated* ☒
Last Review Date:	20-01-2023

*Attach the previous version of the Program Specification.

Table of Contents

A. Program Identification and General Information:

1. Program's Main Location:

Main Campus

2. Branches Offering the Program (if any):

None

3. System of Study:

☐ Coursework & Thesis	☐ 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:
- Type of Partnership:
- Duration of Partnership:

6. Professions/jobs for which students are qualified:

- Graduate of this program will be able to join the industry in the following positions:
- Network Security Expert/Officer (NW)
- System Administrator (SW)
- Software Engineer (SW)
- Database Administrator (DB)
- Computer Programmer (SW)
- Data Analytics (AI)
- Network and Computer Systems Administrators (NW)
- Computer & Information Systems Manager (SW)
- Computer Network Architect (NW)
- Database Administrator (DB)
- Computer & Information Research Scientist
- Data Mining Specialist (DB)
- Web Developer (SW)
- Data Scientist (AI)
- Systems Software Developer (SW)
- Applications Software Developer (SW)
- Computer Systems Analyst
- Information Security Analysts (NW)
- Lecturer at a computing college in a University or a College.

7. Relevant occupational/ Professional sectors:

- Software Development
- Robotics and Automation
- Healthcare and Medical Technology

- Cybersecurity
- E-commerce and Recommendation Systems
- Social Media and Digital Marketing

8. Major Tracks/Pathways (if any):

	Major track/pathway	Credit hours (For each track)	Professions/jobs (For each track)
1.	Artificial Intelligence (AI)	24	As mentioned in point 8
2.	Computer Networks and security (NW)	24	As mentioned in point 8
3.	Software Engineering (SW)	24	As mentioned in point 8
4.	Database Systems (DB)	24	As mentioned in point 8

9. Total credit hours: 42

B. Mission, Goals, and Program Learning Outcomes

1. Program Mission:

To provide quality education in different advanced computing topics by exposing students to both theoretical and practical experiences, preparing them to contribute significantly to the research of new knowledge in computing, and fostering perception and awareness of their role in the development of their community.

2. Program Goals:

1. Deliver high quality education that is of relevance to the postgraduate studies context.
2. Enable students to address research problems in Computer Science and apply the acquired knowledge in industrial settings.
3. Meet the local needs for highly qualified researchers and professionals supported by advanced knowledge and skills in various fields of computing with a sense of societal and ethical responsibility.
4. Prepare graduates who can continue enhancing their skills and embrace new computing technologies through life-long self-learning activities and post-graduate training or education.

3. Program Learning Outcomes:*

Knowledge and Understanding:	
K1	Describe and illustrate knowledge of fundamental Mathematics, Science, and CS in Real life.
K2	List and describe major modern CS-related problems and reproduce acquired education to understand the impact of computer solutions to these problems in a global, economic, environmental, and societal context.
K3	List and define current up to date techniques, skills, and tools necessary for CS research and practices to meet desired needs within realistic constraints (economic, environmental, social, ethical, health and safety, manufacturability, and sustainability).

K4	Reproduce acquired skills to use CS in business environment to gain a competitive advantage, improve performance, and increase profitability of a business enterprise.
Skills:	
S1	Examine and analyze issues related to the design and implementation of a computer-based system, process, or program to meet desired needs within realistic constraints.
S2	Demonstrate the ability to use mathematical foundations and system principles, of CS in the modelling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices
S3	Research the problems in a field of study and judge the efficiency and usefulness of acquired computing knowledge to solve it.
S4	Show the ability to practice design and development principles in the construction of software system needed to carry out a research study.
Values, Autonomy, and Responsibility:	
V1	Demonstrate communication skills such as: writing, reading, presenting, negotiating and debating
V2	Demonstrate understanding of professional and ethical responsibilities when working independently or as part of a team, and exhibit leadership characteristics
V3	Choose and judge resources, time and team members management needed to accomplish team work in a timely manner.

* * Add a table for each track (if any)

C. Curriculum:

1. Curriculum Structure:

A. Thesis Track

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Course	Required	5	15	36%
	Elective	5	15	36%
Graduation Project (if any)				
Thesis (if any)		4	12	28%
Field Experience(if any)				
Others (.....)				
Total		14	42	100%

A. Project Track

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Course	Required	5	15	36%
	Elective	8	24	36%
Graduation Project (if any)				
Thesis (if any)		1	3	28%
Field Experience(if any)				
Others (.....)				

Total	14	42	100%

* Add a separated table for each track (if any).

2. Program Courses:

A. Thesis Track

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1	MCS 501	Advanced Design and Analysis of Algorithms	R		3	
	MCS 502	Software Engineering	R		3	
	MSC XXX	Elective Course	E		3	
	MSC XXX	Elective Course	E		3	
Level 2	MCS 503	Database Systems	R		3	
	MCS 504	Computer Networks and Security	R		3	
	MCS 514	Research Methodology	R		3	
Level 3	MSC XXX	Elective Course	E		3	
	MSC XXX	Elective Course	E		3	
	MSC XXX	Elective Course	E		3	
	MCS 600	Thesis (A, B)	R		6	
Level 4	MCS 600	Thesis (C, D)	R		6	

B. Project Track

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1	MCS 501	Advanced Design and Analysis of Algorithms	R		3	
	MCS 502	Software Engineering	R		3	
	MSC XXX	Elective Course	E		3	
	MSC XXX	Elective Course	E		3	
Level	MCS 503	Database	R		3	

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
2		Systems				
	MCS 504	Computer Networks and Security	R		3	
	MCS 514	Research Methodology	R		3	
Level 3	MSC XXX	Elective Course	E		3	
	MSC XXX	Elective Course	E		3	
	MSC XXX	Elective Course	E		3	
	MSC XXX	Elective Course	E		3	
Level 4	MSC XXX	Elective Course	E		3	
	MSC XXX	Elective Course	E		3	
	MCS 599	Project	R		3	

3. Course Specifications:

Insert hyperlink for all course specifications using NCAAA template (T-104)

https://forms.fbsu.edu.sa/courses/index.php

4. Program learning Outcomes Mapping Matrix:

Align the program learning outcomes with program courses, according to the following desired levels of performance *(I = Introduced P = Practiced M = Mastered).*

* Add a table for each track (if any)

Course code & No.	Program Learning Outcomes										
	Knowledge and understanding				Skills				Values, Autonomy, and Responsibility		
	K1	K2	K3	K4	S1	S2	S3	S4	V1	V2	V3
MCS 501	I	I			P		P			P	P
MCS 502			I		P		P	P		P	
MCS 503		I				P	P		M		M
MCS 504	P			P	P		P		M	M	
MCS 514		P	P			M		M			M
MCS 599	M			M	M	M			M	M	
MSC 600			M	M	M	M			M	M	

* Add a separated table for each track (if any).

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

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

1. **Curricular Activities**
    - **Lecture-Based Learning**: Traditional lectures for foundational topics such as algorithms, data structures, and software engineering, enhanced with interactive discussions and multimedia presentations.
    - **Project-Based Learning**: Semester-long projects that require students to design and implement software solutions, fostering critical thinking, problem-solving, and collaboration skills.
    - **Flipped Classroom**: Pre-recorded lecture materials provided in advance, allowing classroom time to be used for interactive problem-solving and discussion sessions.
    - **Collaborative Learning**: Group assignments and projects that encourage teamwork and collaboration, preparing students for real-world software development challenges.
    - **Industry Partnerships**: Collaboration with industry partners to offer internships, co-op programs, and guest lectures, providing students with practical exposure and industry insights.
2. **Extra-Curricular Activities**
    - **Research Opportunities**: Providing opportunities for students to work as research assistants on faculty-led projects, fostering a deeper understanding of advanced topics.
    - **Workshops and Seminars**: Regularly organized workshops and seminars on emerging technologies and industry trends, led by experts from academia and industry.

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).

A. **Direct Assessment Methods**

1. **Examinations and Quizzes**
    - **Midterm and Final Exams**: Comprehensive exams assessing students' understanding of core subjects such as algorithms, data structures, and software engineering.
    - **Regular Quizzes**: Frequent quizzes to assess ongoing understanding and retention of key concepts throughout the semester.
2. **Laboratory Reports**
    - **Lab Assignments**: Detailed lab reports from practical sessions in programming, software development, AI, and cybersecurity labs to assess practical skills and application of theoretical knowledge.
    - **Project Documentation**: Documentation of semester-long projects, including design, implementation, and testing phases, to evaluate problem-solving and technical writing skills.
3. **Capstone Projects**
    - **Project Evaluation**: Comprehensive assessment of final year capstone projects, including project planning, execution, and presentation, to measure students' ability to integrate and apply their knowledge.
4. **Course Assignments**
    - **Homework Assignments**: Regular assignments covering a range of topics to assess individual understanding and application of theoretical concepts.
    - **Group Projects**: Collaborative projects that require teamwork, innovation, and

application of engineering principles.

5. **Oral Presentations**
    - **Project Presentations**: Assessing students' ability to communicate their project ideas, process, and results effectively through oral presentations.
    - **Seminar Presentations**: Evaluating students' understanding and articulation of advanced topics through seminar presentations.

B. **Indirect Assessment Methods**

1. **Student Surveys**
    - **Course Evaluation Surveys**: Collecting feedback from students at the end of each course to gauge their perception of learning and teaching effectiveness.
    - **Exit Surveys**: Surveys conducted with graduating students to assess their overall educational experience and perceived attainment of learning outcomes.
2. **Alumni Surveys**
    - **Graduate Feedback**: Periodic surveys of alumni to gather their feedback on how well the program prepared them for their careers and further studies.
3. **Employer Surveys**
    - **Employer Feedback**: Surveys of employers who have hired graduates to assess their satisfaction with the graduates' skills and knowledge.
4. **Focus Groups**
    - **Student Focus Groups**: Organizing focus group discussions with current students to obtain in-depth feedback on the program and learning outcomes.
    - **Alumni Focus Groups**: Gathering insights from alumni through focus group discussions to understand the long-term impact of the program.

C. **Assessment Plan**

- **Cycle of Assessment**: Each learning outcome will be assessed at least twice during the bachelor program's cycle, with a detailed schedule to ensure comprehensive coverage.
- **Continuous Improvement**: Regular review and analysis of assessment results to identify areas for improvement and implement changes in the curriculum and teaching methods.

D. **Assessment Procedure**

- Each course instructor/coordinator starts with preparing his/her course specifications, where he/she needs to designate each part of the concerning course specifications.
- Each course must meet the CLOs and be mapped with the concerning PLOs at the beginning, but keep in mind that each assessment method in the CLOs must be measurable and achievable.
- To ensure that each course meets the required specifications, the instructor/coordinator should create an assessment matrix during the course. Each one of the domains (highlighted by a color) —knowledge and understanding, skills, and values has several CLOs to meet, and each one of those CLOs has some PLOs that need to be met.
- To ensure that each CLO is properly mapped to the corresponding PLOs, the instructor/coordinator should review the assessment methods and determine how well they measure up to those PLOs. Meanwhile, the program academic committee and the Quality Assistant to the Dean (QAD) review the assessment methods and the course portfolio contents of the courses and report any issues or discrepancies to the chairperson. In the meantime, to ensure that each course meets the predefined CLOs, the program

chairpersons conduct a QA committee reporting any discrepancies to him/her.

- The direct assessment of each course are using the mapping matrix (see Table 1), which links every CLOs with the concerned assessment method decided by the respective instructor.

Course Code:		Course Title:								
CLOs		Aligned PLOs	Assess. 1		Assess. 2		Assess. 3		Assess. 4	
1	Knowledge and Understanding		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
1.1		K2	1		2					
1.2		K2			1				2	
1.3		K2		1			2			
1.4		K2	1					2		
2	Skills :		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
2.1		S3						1		
2.2		S3				1				
2.3		S5								
3	Values:		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
3.1		V1					1			
3.2		V2								
3.3		V2								
CLO Weights										
Total		26								

Table 1: direct assessment matrix

- Then each student of a concerned course will undergo an assessment process for each assessment method using one of the assessment measurement tools as shown here, Table 2:

Course Code:		Course Title:

Student Grades

#	Student ID	Student Name	Knowledge												Skills									Values								
		No.	1.1		Target	1.2		Target	1.3		Target	1.4		Target	2.1		Target	2.2		Target	2.4		Target	3.1		Target	3.2		Target	3.3		Target
		Write the target			5			5			8			8			6			5			5			8			8			8
		Write the actual	QQ1	QQ3	Actual	QQ3	EQ12	Actual	QQ3	H1	Actual	H5	Classwork	Actual	QQ6	EQ2	Actual	QQ4	EQ11	Actual	QQ10	EQ2	Actual	QQ5	Classwork	Actual	Project	Classwork	Actual	QQ9	Classwork	Actual
		Question Grade	2	6	8	5	2	7	5	5	10	5	5	10	2	7	10	5	2	5	3	5	5	10	5	15	10	5	15	6	5	11
1																																
2																																
3																																
4																																
5																																
6																																
7																																
8																																
9																																
10																																
11																																
12																																
13																																
14																																
15																																
16																																
17																																
18																																

Student Numbers																																
0																																
Target		62.50%		71.43%		80.00%		80.00%		60.00%		100.00%		100.00%		53.33%		53.33%		72.73%
No. of students passed the target	1.1	0	1.2	0	1.3	0	1.4	0	2.1	0	2.2	0	2.4	0	3.1	0	3.2	0	3.3	0
Percentage of students passed the target		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%

Table 2: CLOs direct assessment matrix

- Meanwhile, the indirect assessment method is also utilized in the program to ensure that all CLOs have been achieved and approached. The CLO assessment matrix is distributed for all enrolled students in a course to fill it out with the corresponding assessment values of each CLO as follows, Table 3:

Course Code:	Course Name:	Section:	Term/Academic Year: Fall/21-22
Course Instructor:		Coordinator:	

Please use " ✓" to indicate your agreement with each CLO

CLOs		Strongly disagree	Disagree	Undecided	Agree	Strongly agree
		1	2	3	4	5
1. Knowledge and Understanding	1.1					
	1.2					
	1.3					
	1.4					
	..					
	2.1					
	2.2					

2. Skills	2.3					
	2.4					
	..					
3. Values	3.1					
	3.2					
	…					

Table 3: CLOs indirect assessment matrix

D. Thesis and Its Requirements (if any):

1. Registration of the thesis:

(Requirements/conditions and procedures for registration of the thesis as well as controls, responsibilities and procedures of scientific guidance)

Requirements and Conditions:

1. **Track Determination:**
   - All postgraduate students must determine their study track (thesis track or non-thesis track) during admission.
2. **Supervisor Appointment:**
   - Students in the thesis track must apply for the appointment of a thesis supervisor within the first two semesters of their study.
3. **Thesis Proposal:**
   - A graduate student must submit a thesis proposal to the department by the end of the second semester.
4. **Eligibility:**
   - The student must pass all required courses and any comprehensive exams before the formation of the thesis defense committee.

Procedures for Registration:

1. **Thesis Supervisor Appointment:**
   - The student, in coordination with the department, must fill out the "Thesis Supervisor Appointment Form" (GS-300-F1).
   - The appointment of the thesis supervisor must be approved by the Department Graduate Studies Committee, the College Graduate Studies Committee, and the Graduate Studies Council.
2. **Thesis Proposal Submission:**
   - The student must submit the "Thesis Proposal Form" (GS-300-F4), which includes the thesis title, research objectives, and methodology.
   - The thesis proposal must be defended before the departmental committee and approved with or without revisions.
3. **Thesis Committee Formation:**
   - The "Thesis Committee Appointment Form" (GS-300-F2) must be completed to form the

thesis committee, which includes internal and external members.
    - The committee must be approved by the Department Graduate Studies Committee, the College Graduate Studies Committee, and the Graduate Studies Council.
4. **Committee Evaluation:**
    - Each member of the thesis committee must complete the "Thesis Committee Member Evaluation Form" (GS-300-F3) to evaluate the thesis readiness for defense.
5. **Defense Scheduling:**
    - Once the thesis is ready, the thesis supervisor must request the formation of the defense committee and schedule the defense date.
    - The defense date must be announced and the thesis must be forwarded to the committee members at least one week before the defense.

Controls, Responsibilities, and Procedures of Scientific Guidance:

1. **Thesis Supervisor Responsibilities:**
    - The thesis supervisor must guide the student in the research process, ensuring the thesis meets the required academic standards.
    - The supervisor must submit a progress report at the end of each semester to the head of the department.
    - Upon completion of the thesis, the supervisor must notify the department that the thesis is ready for defense.
2. **Committee Responsibilities:**
    - The thesis committee is responsible for evaluating the thesis proposal and the final thesis.
    - The committee must provide constructive feedback and ensure the research meets the academic standards.
3. **Department and College Responsibilities:**
    - The department and college are responsible for overseeing the thesis registration process, ensuring all forms and approvals are completed in a timely manner.
    - They must ensure the defense committee is properly formed and that the defense is conducted according to university regulations.
4. **Graduate Studies Council:**
    - The Graduate Studies Council reviews and approves the appointment of supervisors and committee members.
    - They oversee the adherence to the thesis writing policy and ensure all procedures are followed.

For detailed procedures and related forms, please refer to the Thesis Writing Policy and the associated forms:

- Thesis Supervisor Appointment Form (GS-300-F1)
- Thesis Committee Appointment Form (GS-300-F2)
- Thesis Committee Member Evaluation Form (GS-300-F3)
- Thesis Proposal Form (GS-300-F4)
- Master Thesis Defense Decision Form (GS-300-F5).

2. Scientific Supervision:

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

Regulations for the Selection of the Scientific Supervisor:

1. **Eligibility Criteria:**
   - Professors and associate professors are eligible to supervise master's theses.
   - Assistant professors who have held their rank for at least two years and have published (or had accepted) two research papers in their area of specialization in refereed international academic journals may also supervise master's theses.
2. **Appointment Process:**
   - The student, in coordination with the department, must identify a suitable faculty member to act as the thesis supervisor.
   - The "Thesis Supervisor Appointment Form" (GS-300-F1) must be completed, detailing the supervisor and, if applicable, the co-supervisor.
   - The Department Graduate Studies Committee reviews and recommends the appointment.
   - The recommendation must be approved by the College Graduate Studies Committee and the Graduate Studies Council.
3. **Co-Supervisor:**
   - Faculty members from other departments can act as co-supervisors, provided the main supervisor is from the student's department.
   - If the co-supervisor works outside the university, their C.V. must be appended to the appointment form.

Responsibilities of the Scientific Supervisor:

1. **Guidance and Mentorship:**
   - The supervisor must guide the student throughout the research process, ensuring the thesis meets the required academic standards.
   - They must assist the student in developing a rigorous and original research topic.
2. **Progress Reporting:**
   - The supervisor is required to submit a progress report to the head of the department at the end of each semester, detailing the student's progress and any issues encountered.
3. **Final Thesis Preparation:**
   - Once the thesis is complete, the supervisor must certify that it is ready for defense and inform the head of the department.
   - The supervisor must coordinate the formation of the defense committee and schedule the defense date.
4. **Committee Participation:**
   - The supervisor typically chairs the thesis defense committee and is responsible for coordinating the defense proceedings.
5. **Student Performance Monitoring:**
   - The supervisor must monitor the student's performance and address any academic or research-related issues that arise.

Procedures and Mechanisms of Scientific Supervision and Follow-Up:

1. **Initial Steps:**
   - Within the first two semesters, the student must apply for the appointment of a thesis supervisor.
   - The "Thesis Supervisor Appointment Form" (GS-300-F1) must be completed and approved through the appropriate departmental and college councils.
2. **Regular Meetings:**
   - The student and supervisor should meet regularly to discuss the progress of the research, address any challenges, and plan subsequent research activities.
3. **Progress Reports:**
   - The supervisor submits a progress report each semester to the head of the department, which includes updates on the student's research activities and any issues that need to be addressed.
4. **Thesis Proposal and Defense Preparation:**
   - The student must submit a thesis proposal by the end of the second semester, which must be defended and approved by the departmental committee.
   - The supervisor assists the student in preparing for the thesis defense, including organizing the defense committee and scheduling the defense date.
5. **Defense Committee Formation:**
   - The "Thesis Committee Appointment Form" (GS-300-F2) is used to form the defense committee, which must be approved by the relevant academic bodies.
   - The committee evaluates the thesis and provides feedback and recommendations.
6. **Post-Defense Follow-Up:**
   - After the defense, the supervisor ensures that any required revisions are completed to the committee's satisfaction.
   - The supervisor, verifies that amendments are made and recommends degree awarding if appropriate.

For detailed procedures and related forms, please refer to the Thesis Writing Policy and the associated forms:

- Thesis Supervisor Appointment Form (GS-300-F1)
- Thesis Committee Appointment Form (GS-300-F2)
- Thesis Committee Member Evaluation Form (GS-300-F3)
- Thesis Proposal Form (GS-300-F4)
- Master Thesis Defense Decision Form (GS-300-F5).

3.Thesis Defense/Examination:

(The regulations for selection of the defense/examination committee and the requirements to proceed for thesis defense, the procedures for defense and approval of the thesis, and criteria for evaluation of the thesis)

Regulations for Selection of the defense/examination committee

1. **Eligibility and Appointment:**
   - The defense committee, also known as the thesis examination committee, is proposed by the thesis supervisor and the student.
   - The committee must include faculty members and at least one external examiner.
   - The "Thesis Committee Appointment Form" (GS-300-F2) is used to appoint committee

members, and the appointment must be approved by the Department Graduate Studies Committee, the College Graduate Studies Committee, and the Graduate Studies Council.

2. **Committee Composition:**
    - The number of committee members must be odd, with a minimum of three faculty members.
    - The supervisor must chair the committee, but the supervisor and co-supervisor (if any) must not form the majority.
    - At least one professor or one associate professor must be included in the committee.
    - The external examiner should be an expert in the field relevant to the thesis.
3. **Appointment Approval:**
    - The Department Graduate Studies Committee recommends the appointment, which is then reviewed by the College Graduate Studies Committee and finally approved by the Graduate Studies Council.

Requirements to Proceed for Thesis Defense:

1. **Completion of Coursework:**
    - The student must complete all required coursework and pass any comprehensive exams prior to the defense.
    - The student must also ensure that any required supplementary courses are completed, although these do not count towards the cumulative GPA for the degree.
2. **Thesis Readiness:**
    - The thesis must be reviewed and deemed ready for defense by the supervisor and the department.
    - The "Thesis Committee Member Evaluation Form" (GS-300-F3) is used by committee members to evaluate the thesis and determine its readiness for defense.
3. **Defense Scheduling:**
    - The defense must be scheduled before the end of week 13 of the semester.
    - The "Master Thesis Defense Decision Form" (GS-300-F5) is used to schedule and document the defense proceedings.

Procedures for Defense and Approval of the Thesis:

1. **Defense Preparation:**
    - The supervisor submits the thesis to the head of the department, who forwards it to the committee members.
    - The defense date is set and announced, and the thesis is distributed to committee members at least one week before the defense.
2. **Defense Conduct:**
    - The defense is conducted in a formal setting, where the student presents the thesis and answers questions from the committee.
    - The committee deliberates and pronounces the verdict immediately after the defense.
3. **Committee Deliberation:**
    - The committee may recommend one of the following outcomes:
        - Pass
        - Pass with minor revisions
        - Pass with major revisions
        - Pass with major revisions and require a new defense
        - Fail

- The "Master Thesis Defense Decision Form" (GS-300-F5) documents the committee's decision and any required revisions.

4. **Post-Defense Follow-Up:**
    - If revisions are required, the student must complete them within a specified timeframe.
    - The supervisor verifies that the revisions are made and, if authorized, approves the final thesis for degree awarding.
    - The final thesis is submitted to the head of the department and the Graduate Studies Council for final approval.

Criteria for Evaluation of the Thesis:

1. **Quality of Research:**
    - The thesis must demonstrate original research, a clear research question, and a rigorous methodology.
    - The research should contribute to the field of study and be of publishable quality.
2. **Academic Consistency:**
    - The thesis must be well-written, logically structured, and free of grammatical and typographical errors.
    - It should demonstrate a thorough understanding of the subject matter and relevant literature.
3. **Presentation and Defense:**
    - The student must effectively present the thesis, demonstrating clarity, coherence, and the ability to answer questions from the committee.
    - The defense should reflect the student's mastery of the topic and their ability to engage in scholarly discourse.
4. **Committee Feedback:**
    - The committee provides detailed feedback on the thesis, including strengths, weaknesses, and areas for improvement.
    - The evaluation form (GS-300-F3) is used to document individual committee member's evaluations and overall recommendations.

For detailed procedures and related forms, please refer to the Thesis Writing Policy and the associated forms:

- Thesis Supervisor Appointment Form (GS-300-F1)
- Thesis Committee Appointment Form (GS-300-F2)
- Thesis Committee Member Evaluation Form (GS-300-F3)
- Thesis Proposal Form (GS-300-F4)
- Master Thesis Defense Decision Form (GS-300-F5).
- Postgraduate Examination and Grading Policy.

H. Student Admission and Support:

1. Student Admission Requirements:

1. **Academic Qualifications:**
    - Hold a Bachelor's degree in the program or related streams from an academic institution accredited/recognized by the KSA's Ministry of Education (MOE).

- Have a cumulative GPA with a minimum rating of "Good" (2.75/5) or (1.75/4). Applicants with a rating of "Pass" (less than 2.75/5 or 1.75/4) can be accepted if they have at least three years of work experience and approval by the University Council.

2. **Language Proficiency:**
   - Provide proof that the undergraduate program was taught in English or achieve a minimum score of 4.5 on the IELTS exam or equivalent, or a passing score on the University English placement exam. Applicants who do not meet these conditions may be required to take additional English courses based on their scores.
3. **Standardized Tests:**
   - A General Graduate Record Examination (GRE) score will be advantageous at the time of admission.
4. **Letters of Recommendation:**
   - Provide at least two letters of recommendation (sealed and signed) from faculty who taught the applicant undergraduate courses.
5. **Departmental/University Requirements:**
   - Satisfactorily meet any additional departmental or university admission requirements.
6. **Academic Standing:**
   - Should not have been dismissed from any academic institution.

Specific Admission Considerations:

1. **Non-Specialization Admission:**
   - A student may be accepted into a postgraduate program outside their field of specialization based on recommendations from the academic department and college councils and the approval of the Graduate Studies Council.
2. **Supplementary Courses:**
   - The academic department may require the student to pass supplementary courses as a condition of admission. The time period for completing these courses is not counted towards the limited period for obtaining the degree, and they are not included in the calculation of the cumulative GPA for the postgraduate program.
3. **Simultaneous Enrollment:**
   - A student may be enrolled in two postgraduate programs simultaneously based on recommendations from the concerned academic department and college councils and the approval of the Graduate Studies Council.
4. **Transfer of Students:**
   - A student may be transferred from one major to another within the university based on the recommendations of the councils of the two departments and academic colleges and the approval of the Graduate Studies Council. Additionally, transfer from another recognized university is subject to the conditions set forth in the Graduate Students Transfer Policy (AA-105).
5. **Program Completion Timeline:**
   - The time period for the successful completion of the postgraduate program is subject to the conditions set by the Ministry of Education.

For more details, please refer to the Postgraduate Admission Policy and the Postgraduate Admission Procedure.

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).

1. **Student Orientation Policy** [1]**,** [2]**,** [3]**:**
   - At the beginning of the academic year, students will attend an Orientation Program designed to assist them with their transition to study at the University. The orientation program will welcome students to University life and introduce them to the important aspects of the University's operations, activities, regulations, and rights and responsibilities.
2. **Orientation Procedure** [2]**,** [3]**:**
   - All new students attend the orientation sessions organized by the Deanship of Student Affairs prior to the beginning of each regular semester.
   - Students meet at the Main Theater with the Dean of the Student Affairs Deanship, Foundation Year Program Director, representatives of the University colleges, and heads of the major concerned departments (Admission and Registration Dept., Facilities Dept., IT Center, Library, Finance Dept., Counseling Unit, among others).
   - The Orientation Session starts with a welcoming speech by the Dean of the Student Affairs Deanship.
   - Each head of the concerned departments will brief students on the services provided by them with special emphasis on:
     - Facilities and resources
     - Code of Conduct
     - Attendance, absence, and tardiness
     - Satisfactory academic progress policy and procedure
     - IT Acceptable Use Policy
     - Student support services available to students
     - Health and Counselling services
     - Safety matters
     - Complaints and appeals processes
   - Distributing student IDs and computer usernames and passwords.
   - Updating student contact details (Address, telephone number, email address, and emergency contact).
   - Identifying and collecting information on students with special needs or medical conditions.
   - Taking students on a campus tour, introducing them to the different departments and services.
3. **Freshman Student Orientation** [3]**:**
   - New students are encouraged to attend the orientation sessions organized by Student Affairs Deanship the week before a new term starts. Student Affairs sends out information about orientation closer to the start of the student's first term.
   - New students had the opportunity to meet professors, program chairs, and current students.
   - Freshman Student Orientation included on:
     - Successful tips and strategies
     - Tools to help in academic success
     - Facilities dedicated to better student services.

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 Academic Counseling Policy and Procedure documents at FBSU outline a comprehensive approach to student counseling services. These services include academic, professional, psychological, and social support tailored to meet the exceptional needs of students in the program.

1. **Academic Counseling Services**

- Pre-counseling Phase:
  - The student sets a time to meet with the counselor.
  - The student reads and signs the Consent Form.
  - The student completes the Primary Questionnaire.
- Primary Session:
  - The counselor introduces himself and collects general information about the student and their concerns.
  - The student defines their objectives for the session and expectations from the counselor.
  - The counselor clarifies the professional relationship between the counselor and the student.
  - The counselor assesses the situation and identifies a service or approach that will best assist the student.
  - The counselor and the student set a period for the case (number of sessions, duration, and place).
- Post-counseling Phase:
  - The student completes the feedback form.
  - The counselor evaluates the student's satisfaction level with the service and prepares a case file [1], [2]

2. **Professional Counseling Services**

- Career Planning and Development:
  - Help students define goals, plan action, and gain insights into career paths.
  - Assist students in selecting courses that integrate their educational and personal goals with the university's objectives [1]

3. **Psychological Counseling Services**

- Individual and Group Counseling:
  - Work with individuals, groups, and communities to improve mental health.
  - Address issues such as substance abuse, aging, bullying, anger management, careers, depression, relationships, stress, and suicide.
- Therapeutic Processes:
  - Develop therapeutic processes tailored to individual student needs.
- Crisis Management:
  - Provide immediate support and intervention for students experiencing crises.
- Confidential Assistance:
  - Ensure confidentiality of psychological assistance.
  - Students can be direct and honest without fear of information disclosure.
  - Confidential documents are secured and not accessible to unauthorized personnel.
  - Information is not released without written permission except in cases of imminent danger [1]

4. **Social Counseling Services**

- Integration and Adaptation Support:
  - Help freshmen adapt to the educational environment and develop sound social relationships.
- Promotion of Islamic Values:
  - Shape student personalities based on Islamic behavior, encouraging cooperation and community spirit.
- Developing Belonging and Team Spirit:
  - Encourage students to develop a sense of belonging and teamwork within the university community [1]

4. Special Support:

(Low achievers, disabled, and talented students).

A. For Low Achievers

1. Academic Support Programs:
   - Remedial Classes: Offering additional classes focusing on fundamental programming, data structures, and algorithms.
   - Tutoring Sessions: Providing peer tutoring and mentoring by senior students or graduate assistants specializing in subjects like operating systems, databases, and software engineering.
2. Mentorship and Counseling:
   - Academic Counseling: Regular one-on-one counseling sessions to identify academic challenges and develop personalized improvement plans.
   - Faculty Mentorship: Assigning faculty mentors to guide students through difficult courses and projects.
3. Assessment and Feedback:
   - Progress Reports: Frequent assessments and progress reports to monitor student performance in subjects such as artificial intelligence, machine learning, and cybersecurity.
   - Constructive Feedback: Providing detailed feedback on lab reports, project work, and exams to help students improve.

B. For Disabled Students

1. Accessibility Services:
   - Accessible Labs: Ensuring that all computer science labs are accessible, including adaptive workstations for students with mobility issues.
   - Assistive Devices: Providing devices like voice recognition software for students with disabilities.
2. Accommodation Plans:
   - Customized Lab Assignments: Offering lab assignments and projects that accommodate the specific needs of disabled students without compromising learning outcomes.
   - Exam Accommodations: Providing extended time, separate rooms, or alternative formats for exams.
3. Assistive Technologies:
   - Software Tools: Incorporating assistive software tools such as screen readers and magnification software in lab environments.
   - Training Sessions: Conducting training sessions for students on how to use these assistive technologies effectively, if needed.

C. For Gifted and Talented Students

1. Advanced Placement Programs:
   - Professional Courses: Offering honors sections for advanced topics like machine learning,

cybersecurity, Arduino, and advanced digital design.

- Research Projects: Facilitating participation in faculty-led research projects and encouraging independent research.

2. Research Opportunities:
   - Research Assistantships: Providing opportunities for students to work as research assistants in cutting-edge labs.
   - Conference Participation: Supporting attendance and presentation at national and international conferences.
3. Extracurricular Activities:
   - Competitions and Hackathons: Encouraging participation in programming competitions, hackathons, and robotics contests.
   - Special Interest Groups: Forming groups focused on emerging technologies like AI, Data Science and Cybersecurity.

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		1				
Associate Professor	3					
Assistant Professor	2					
Technicians and Laboratory Assistant						
Administrative and Supportive Staff						
Others (specify)						

F. Learning Resources, Facilities, and Equipment:

1. Learning Resources:

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

- Textbooks available through the FBSU library
- Electronic libraries
- Electronic and web-based resources available through ELearning gateway

2. Facilities and Equipment:

(Library, laboratories, classrooms, etc.)

1. **Library**

   - **Technical Resources**: A well-stocked library with a comprehensive collection of textbooks, reference materials, and journals focused on computer engineering, including subjects like digital systems, microelectronics, and embedded systems.
   - **Online Databases**: Access to online databases such as Saudi Digital Library, providing a wide range of research papers, conference proceedings, and e-books.
   - **Study Areas**: Designated quiet study areas and collaborative workspaces equipped with computers and high-speed internet for research and project work.

2. **Laboratories**

   - **AI Lab:** Includes powerful GPU servers, cutting-edge display screens, 3D printers, and VR headsets. This lab support projects and research in artificial intelligence, machine learning, and related emerging technologies.
   - **Robotics Lab:** Includes robotic kits, sensors, actuators, and programming tools for designing and building robotic systems.
   - **Networking Lab:** Equipped with routers, switches, and network simulation software like Cisco Packet Tracer for studying network design and implementation.
   - **Programming Lab:** Equipped with the proper software, tools and packages used for developing and programming new ideas and projects.

3. **Classrooms**

   - **Smart Classrooms:** Classrooms equipped with smart boards, projectors, and audio-visual systems to facilitate interactive learning and presentations.
   - **Flexible Seating:** Modular seating arrangements to support both traditional lectures and collaborative group work.
   - **IT Infrastructure:** High-speed internet access and ample power outlets to support student laptops and devices.

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

(According to the nature of the program)

1. **Laboratory Safety Protocols**
   - **Safety Training**: Safety training sessions for all students and staff before they begin working in the laboratories. Training includes guidelines on electrical safety, proper handling of computer equipment, and emergency procedures.
   - **Safety Equipment**: Ensuring all computer labs are equipped with necessary safety equipment such as fire extinguishers and first aid kits. Clear instructions and signage on the proper use of safety equipment.
   - **Regular Inspections**: Routine safety inspections of laboratory equipment and facilities to ensure they are in proper working order and comply with safety standards.
   - **Emergency Procedures**: Clear and accessible emergency procedures, including evacuation plans and contact information for emergency services. Regular drills to ensure everyone is familiar with these procedures.
2. **Classroom Safety Measures**
   - **Ergonomic Furniture**: Providing ergonomically designed furniture to prevent strain and injury. Ensuring that seating arrangements and desks are comfortable and adjustable.

- **Clean and Ventilated Spaces**: Maintaining clean and well-ventilated classrooms to ensure a healthy environment. Regular cleaning schedules and air quality checks.
- **First Aid Kits**: Availability of first aid kits in classrooms and labs.

3. **Health Protocols**
   - **Health Monitoring**: Implementation of health monitoring protocols, including regular health check-ups and vaccination drives to prevent the spread of contagious diseases.
   - **Sanitation Stations**: Placement of hand sanitizing stations at entrances to buildings, classrooms, and labs to encourage good hygiene practices.
   - **Mental Health Support**: Providing access to mental health resources, including counseling services and stress management workshops to support students' overall well-being.
4. **Cybersecurity Measures**
   - **Secure Networks**: Ensuring all digital resources and networks are secure. Regular updates and maintenance of cybersecurity protocols to protect students' and faculty's data.
   - **Training on Digital Safety**: Offering training sessions on digital safety and privacy, teaching students and staff how to protect their personal information online.
5. **Environmental Safety**
   - **Waste Management**: Proper disposal and recycling of laboratory and electronic waste to minimize environmental impact. Clear guidelines and facilities for safe disposal.
   - **Sustainable Practices**: Encouraging sustainable practices such as energy conservation, water-saving measures, and the use of environmentally friendly materials.

G. Program Quality Assurance:

1. Program Quality Assurance System:

Provide a link to quality assurance manual.

The Program Quality committee adheres to the policies, rules, and procedures of the University's Quality Assurance Center as shown here:

- http://www.fbsu.edu.sa/centers/quality-assurance.html
- http://arabic.fbsu.edu.sa/PDF/FBSU.Catalogue...pdf

2. Program Quality Monitoring Procedures:

The quality monitoring procedures for the Computer Engineering postgraduate program are designed to ensure continuous improvement and high standards of education. These procedures involve several key steps and responsibilities:

1. **Course Report Completion:**
   - **Responsibility:** Each faculty member
   - **Frequency:** Every semester
   - **Description:** Each faculty member completes a "Course Report" for each course they have taught. This report highlights the areas of strengths, weaknesses, and necessary improvements for the course.
2. **Student Feedback and Surveys:**
   - **Responsibility:** Deanship of Quality

- **Frequency:** Every semester
- **Description:** Program quality is monitored through the evaluation of student feedback and surveys. The results are requested and reviewed to identify areas needing improvement.

3. **Annual Program Review:**
   - **Responsibility:** Department's faculty members
   - **Frequency:** Annually
   - **Description:** The program is reviewed annually by faculty members individually and as a whole. These reviews help assess the program's strengths and weaknesses and determine necessary improvements.
4. **Departmental Committee Recommendations:**
   - **Responsibility:** Departmental committee
   - **Frequency:** As needed
   - **Description:** A departmental committee is formed to consider the recommendations of faculty members. The committee prepares a final proposal for program improvements, which is then implemented.
5. **Course Specifications Adherence:**
   - **Responsibility:** Course coordinator
   - **Frequency:** Every semester
   - **Description:** Course coordinators ensure that instructors adhere to course specifications, which is crucial for maintaining quality and relevance.
6. **Program Operation Plan:**
   - **Responsibility:** University/College/Department/Quality Committee
   - **Frequency:** Annually, at the start of the semester
   - **Description:** The quality committee puts together an annual program operation plan to follow the quality process during the academic year.
7. **Program Specification:**
   - **Responsibility:** Quality Committee, Course instructor
   - **Frequency:** Annually and every semester
   - **Description:** Using the updated NCAAA form, the program specifications are reviewed and updated.
8. **Course Files and Documentation:**
   - **Responsibility:** Course instructor
   - **Frequency:** Every semester
   - **Description:** Instructors upload all documents to the course portfolios by the end of the semester.
9. **Program Evaluation Surveys:**
   - **Responsibility:** Deanship of Quality
   - **Frequency:** Annually
   - **Description:** Surveys are conducted for program evaluation, employer evaluation, and alumni feedback to gather comprehensive insights.
10. **Program KPIs Report:**
    - **Responsibility:** College/Department
    - **Frequency:** Annually
    - **Description:** Program KPIs are measured and compared to benchmarks to ensure standards are met.
11. **Program Annual Report:**
    - **Responsibility:** Quality Committee
    - **Frequency:** Annually
    - **Description:** An annual report is prepared using the updated NCAAA form to document

the program's performance and improvements.

12. **Course Portfolio Assessment:**
    - **Responsibility:** Quality Committee
    - **Frequency:** Every semester
    - **Description:** Course portfolios are assessed using the course portfolio assessment procedure to ensure quality and consistency.
13. **SWOT Analysis:**
    - **Responsibility:** Department chair
    - **Frequency:** Annually
    - **Description:** An annual SWOT analysis is conducted to highlight the program's strengths and weaknesses and recommend necessary procedures to address weaknesses.
14. **Collaboration for Course Quality:**
    - **Responsibility:** Department chair and course coordinators
    - **Frequency:** As needed
    - **Description:** The department chair and course coordinators collaborate to set expectations and guidelines for instructors, ensuring courses meet the program's quality standards.

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

The program quality monitoring procedures (Figure 1) start with a careful evaluation of the program requirements. The first requirement is that each faculty member complete the "Course Report" for each course s/he has taught in that semester to indicate the areas of strengths, weaknesses, and necessary improvements.

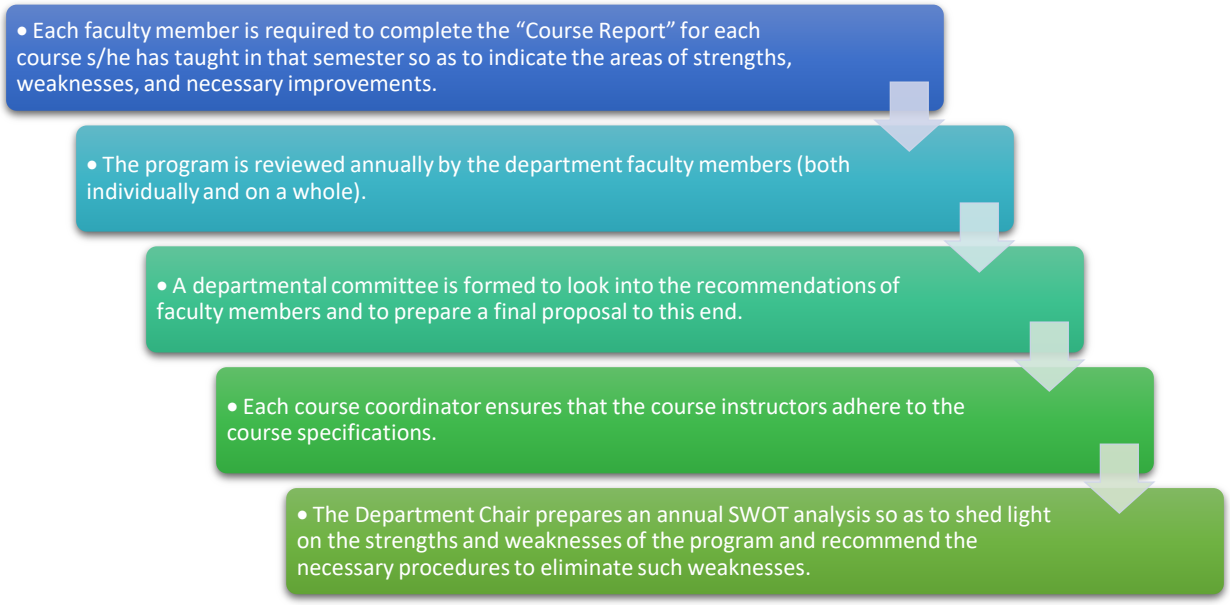

Figure 1: program quality monitoring procedures

This Course Report allows administrators and faculty members to accurately evaluate the program quality. Additionally, program quality is monitored through the evaluation of student feedback and surveys. Then, the program is reviewed annually by the department's faculty members (both individually and as a whole). These reviews allow the faculty members to assess the program's strengths and weaknesses, as well as determine any areas in which improvement is needed.

A departmental committee is formed to look into the recommendations of faculty members and to prepare a final proposal to this end. After the proposal is finalized, changes are made to the program to ensure its quality and address any issues that have been identified. Each course coordinator ensures that the course instructors adhere to the course specifications. This process is important for departments to be able to keep up with changing trends and advancements in the field, as well as make sure that their programs are providing students with a high-quality education. In addition, the following tasks are regularly implemented either annually or per semester.

Task	Time	Responsibility	Repetition	Description
Program Operation plan	Start of Semester	University/College /Department/Quality Committee	Annually	The quality committee in the program is encouraged to put its annual program operation plan to follow the quality process during the academic year
Program Specification	Start of Semester	Quality Committee	Annually	Using NCAAA updated form
Syllabus	Start of Semester	Course instructor	Every semester	Using standard form
Program Specification	Start of Semester	Course instructor	Every semester	Using NCAAA updated form
Course files	End of the semester	Course instructor	Every semester	Upload all documents on the course portfolios
Course report	End of the semester	Course instructor	Every semester	Using NCAAA updated form
Course evaluation survey	End of the semester	Deanship of Quality	Every semester	Results of evaluation should be requested every semester
Program evaluation survey	End of the academic year	Deanship of Quality	Annually	Results of evaluation should be requested every year
Employer evaluation survey	End of the academic year	Deanship of Quality	Annually	Results of evaluation should be requested every year
Alumni Survey	End of the academic year	Deanship of Quality	Annually	Results of evaluation should be requested every year
Program KPIs report	End of the academic year	College / Department	Annually	Program KPIs should be measured and compared to a benchmark
Program annual report	End of the academic	Quality Committee	Annually	Using NCAAA updated form

	year			
Course Portfolio assessment	End of the semester	Quality Committee	Every semester	Using course Portfolio assessment procedure

Table 4: Operational routinely plan

The department chair prepares an annual SWOT analysis to shed light on the strengths and weaknesses of the program and recommend the necessary procedures to eliminate such weaknesses. After the SWOT analysis is completed, the department chair and course coordinators collaborate to create a set of expectations for all instructors, as well as guidelines to ensure that each course meets the program's quality standards. This collaboration between the department chair and course coordinators helps to ensure that all courses are up-to-date and adhere to the expectations of the program.

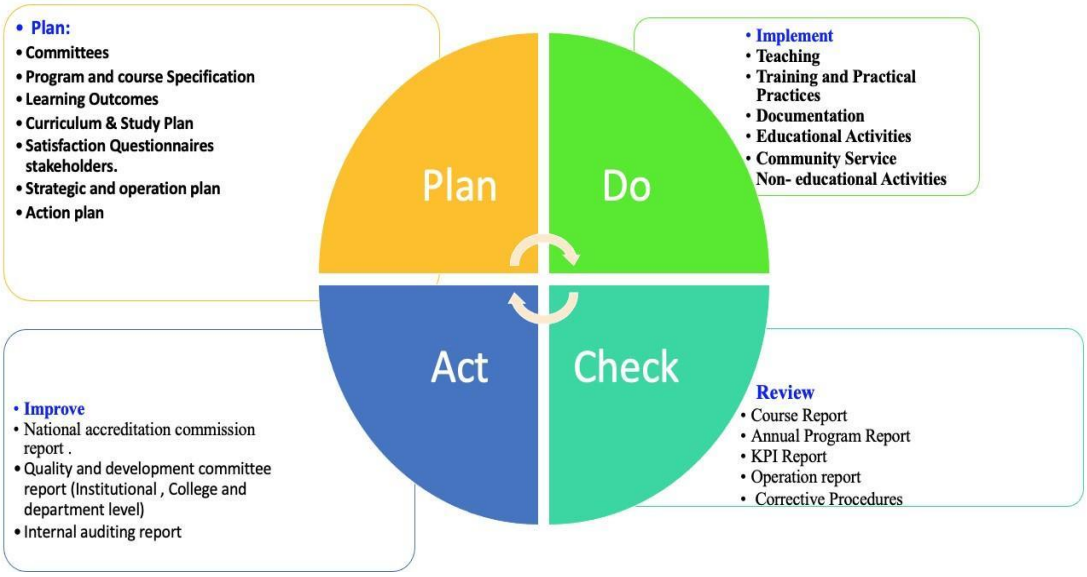

Figure 2: SWOT program plan

4. Procedures Used to Ensure the Consistency between within the main campus:

(including male and female sections).

There is a common campus for Male and Female.

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

Direct Assessment Methods

1. **Examinations and Quizzes**
   - **Midterm and Final Exams**: Comprehensive exams assessing students' understanding of core subjects such as algorithms, data structures, and software engineering.
   - **Regular Quizzes**: Frequent quizzes to assess ongoing understanding and retention of key concepts throughout the semester.
2. **Laboratory Reports**
   - **Lab Assignments**: Detailed lab reports from practical sessions in programming, software development, AI, and cybersecurity labs to assess practical skills and application of

theoretical knowledge.
    - **Project Documentation**: Documentation of semester-long projects, including design, implementation, and testing phases, to evaluate problem-solving and technical writing skills.
3. **Capstone Projects**
    - **Project Evaluation**: Comprehensive assessment of final year capstone projects, including project planning, execution, and presentation, to measure students' ability to integrate and apply their knowledge.
4. **Course Assignments**
    - **Homework Assignments**: Regular assignments covering a range of topics to assess individual understanding and application of theoretical concepts.
    - **Group Projects**: Collaborative projects that require teamwork, innovation, and application of computing principles.
5. **Oral Presentations**
    - **Project Presentations**: Assessing students' ability to communicate their project ideas, process, and results effectively through oral presentations.
    - **Seminar Presentations**: Evaluating students' understanding and articulation of advanced topics through seminar presentations.

Indirect Assessment Methods

1. **Student Surveys**
    - **Course Evaluation Surveys**: Collecting feedback from students at the end of each course to gauge their perception of learning and teaching effectiveness.
    - **Exit Surveys**: Surveys conducted with graduating students to assess their overall educational experience and perceived attainment of learning outcomes.
2. **Alumni Surveys**
    - **Graduate Feedback**: Periodic surveys of alumni to gather their feedback on how well the program prepared them for their careers and further studies.
3. **Employer Surveys**
    - **Employer Feedback**: Surveys of employers who have hired graduates to assess their satisfaction with the graduates' skills and knowledge.
4. **Focus Groups**
    - **Student Focus Groups**: Organizing focus group discussions with current students to obtain in-depth feedback on the program and learning outcomes.
    - **Alumni Focus Groups**: Gathering insights from alumni through focus group discussions to understand the long-term impact of the program.

Assessment Plan

1. **Cycle of Assessment:** Each learning outcome will be assessed at least twice during the bachelor program's cycle, with a detailed schedule to ensure comprehensive coverage.
2. **Continuous Improvement:** Regular review and analysis of assessment results to identify areas for improvement and implement changes in the curriculum and teaching methods.

Assessment Procedure Plan

The assessment procedure plan for PLOs, and the mechanisms for using its results in the development processes are conducted as follows:

- The assessment plan for PLOs includes developing an evaluation framework for the learning outcomes, creating a system for collecting data related to those outcomes, analyzing that data, and utilizing the results in decision-making related to program development.
- The chairperson of the program collects all course specifications ahead of each semester to evaluate the context of each course concerning the program learning outcomes.
- The matrix contains all PLOs of the program and all related CLOs mapped with it. In the same vein, the CLOs are prepared in a way that all CLOs of the courses are mapped with the concerned assessment methods.
- By mapping PLOs and CLOs with assessment methods, the program chairperson can obtain feedback from students on how well they are achieving the program's learning objectives by conducting an indirect assessment by examining each one of the CLOs of the respective course.
- This matrix allows the chairperson to accurately and efficiently assess the learning objectives of each course and adjust accordingly, while also providing evidence that all PLOs and CLOs are being effectively taught and assessed in the program.
- The matrix is an essential tool for the program chairperson to ensure that the learning objectives of each course are being met and remain consistent across the program.
- The program chairperson is also able to compare the results of each CLO assessment to ensure that the objectives of each course are up-to-date and still relevant.
- The study results of the programs and courses are periodically measured(each semester) and the improvement plans are supervised and therefore confirmed
- The program learning outcomes development and monitoring are shown below, Figure 3:

Figure 3: SWOT program procedure

The program learning outcomes (PLOs) assessment plan is available at:
https://arabic.fbsu.edu.sa/Bylaws/AA-407-G02-Guide-to-LOs-Assessment.pdf

6. Program Evaluation Matrix:

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time
Program leadership	Staff members	Surveys and interviews	End of the academic year
Effectiveness of teaching & assessment	Students and independent reviewers	Surveys and interviews	End of the academic year
Program Evaluation Survey	1) Graduates 2) Alumni 3) Faculty 4) Employers	Surveys	Periodically
Learning Resources, Facilities, and Equipment	1) Students 2) Faculty	Surveys	End of semesters
Students mid programs Survey	Stakeholders, graduates and employers	Surveys and interviews	End of the academic year
Exit Survey	1) Students 2) Faculty	Surveys	After graduation End of contract period
Overall quality of the program	All aspects, PLOs, teaching/assessment, evaluation, improvement surveys, review etc.	Advisory committee recommendations KPIs	2-3 meetings/year End of Academic Year

Evaluation Areas/Aspects (e.g., leadership, effectiveness of teaching & assessment, learning resources, services, partnerships, etc.)
Evaluation Sources (students, graduates, alumni, faculty, program leaders, administrative staff, employers, independent reviewers, and others.
Evaluation Methods (e.g., Surveys, interviews, visits, etc.)
Evaluation Time (e.g., beginning of semesters, end of the academic year, etc.)

7. Program KPIs:*

The period to achieve the target (_2_) year(s).

No.	KPIs Code	KPIs	Targeted Level	Measurement Methods	Measurement Time
1	KPI-PG-01	Students' evaluation of the quality of learning experience in the program	4.5/5	Student Survey	At the end of each semester or academic year.
2	KPI-PG-02	Students' evaluation of the quality of learning experience in the courses	4.5/5	Student course evaluation survey at the end of each course	At the end of each course.
3	KPI-PG-03	Students' evaluation of the quality of academic supervision	4.5/5	Student survey	Calculated at the end of each academic year.

4	KPI-PG-04	Average time for students' graduation	2.5 years	Analyze student graduation data.	Annually
5	KPI-PG-05	Rate of students dropping out of the program	<10%	Track student enrollment and dropout data throughout the academic year, analyzing the number of students who withdraw or discontinue the program for any reason.	Annually
6	KPI-PG-06	Employers' evaluation of the program graduates' competency	4.5/5	Employer survey	Annually
7	KPI-PG-07	Students' satisfaction with services provided	4.5/5	Student satisfaction survey	Annually
8	KPI-PG-08	Ratio of students to faculty members	25:1	Calculate the ratio based on student enrollment and faculty	Counted at the end of each semester.
9	KPI-PG-09	Percentage of publications of faculty members	75%	Analyze the number of publications by faculty members	Annually
10	KPI-PG-10	Rate of published research per faculty member	2	Calculate the average number of publications per faculty member	Annually
11	KPI-PG-11	Citations rate in refereed journals per faculty member	10	Analyze the number of citations received per faculty member	Annually
12	KPI-PG-12	Percentage of students' publication	10%	Track student publications	Annually
13	KPI-PG-13	Number of patents, innovative products, and awards of excellence	2	Track patents, products, and awards received annually	Annually

*including KPIs required by NCAAA

H. Specification Approval Data:

Council / Committee	Departmental Council Committee
Reference No.	Meeting NO. 1
Date	3-10-2023

Courses Description

A) MSC Core Courses:

MSC 501 Advanced Design and Analysis of Algorithms (3 Credits)

This course offers a review of major data structures and basic design techniques mainly: Divide and conquer - Greedy method Backtracking - Dynamic programming. It also covers Parallel algorithms - Analysis of algorithms - Orders of magnitude - Lower bound theory - Time and space complexity - NP-hard and NP-complete problems - applications and examples - Correctness of algorithms - Structure of algorithms.

MSC 502 Software Engineering (3 Credits)

The course emphasis on the knowledge needed to be able to model, design, implement and evaluate larger software systems effectively. Software engineering is an inherently practical subject and applying the concepts being taught is a vital component of developing expertise in this area. The course aims to enable you to achieve the following: develop a deep understanding of the nature and impact of current challenges faced by the IT industry, Develop an awareness of the methodologies and technologies that are available within computer science to address these challenges, by evaluating and analyzing specific situations, and convey knowledge and develop practical skills in the use of some of these technologies, including both fundamental concepts and stateof-the-art support tools.

MSC 503 Database Systems (3 Credits)

To explain the concepts of Database systems, DBMS functions; database architecture and data independence, the different issues involved in the design and implementation of a database system, Data modeling, relational, hierarchical, manipulation and control languages to design and manage the database. Also, this course aims to explain the Database query languages: Overview of database languages; SQL; query optimization; 4th-generation environments; embedding non-procedural queries in a procedural language; introduction to Object Query Language and to design and build a simple database system and demonstrate competence with the fundamental tasks involved with modelling, designing, and implementing a DBMS, Relational databases, the essential DBMS concepts and relational database design.

MSC 504 Computer Network and Security (3 Credits)

To provide comprehensive knowledge of the concepts of hardware and networking, expose the students to the various networking components and their organization, provide the in-depth knowledge of the principles of routing and the semantics and syntax of IP, an overview of the design and implementation aspects of networks, familiarize the student with current topics such as security, network management, sensor networks, and/or other topics, this course unit aims also to develop skills needed to go out and setup secured networks in small and medium sized organizations.

MSC 514 Research Methodology (3 Credits)

This course aims to pay attention to all dimensions of Research including, literature survey, design and implementation, finding and results, conclusion and research methodology. The course will enable the Researchers to develop the most appropriate methodology for their research studies. The mission of the course is to impart research skills to the postgrads and help them

improve the quality of their research by the existing researchers. The course also focuses on foundations of research such as objectives, motivation, and concept of theory, deductive and inductive theories. Characteristics of scientific method, understanding the language of research, research process, problem identification and formulation, research question, research design such as concept and importance in research and features of a good research design.

599 Project (3 Credits) A dissertation project that is accomplished via the formal, academic, and scientific approach under the supervision of an academic advisor.

MSC 600 Thesis (12 Credits) A dissertation thesis that is accomplished via the formal, academic, and scientific approach under the supervision of an academic advisor.

B) MSC Elective Courses:

MSC 520 Artificial Intelligence (3 Credits)

This course aims to apply advanced techniques implemented to AI problem solving - Knowledge representation – Evolutionary algorithms – supervised learning - Learning by analogy - Learning by discovery - Self-reference and Self-production - Reasoning: causal reasoning - common sense reasoning - Bayesian network – logical agents and approaches - reasoning with uncertainty Confirmation theory - Belief theory - Necessity and possibility theory - Theory of endorsements - Spatial and temporal reasoning.

MSC 521 Computer Security (3 Credits)

Threats and vulnerabilities - Identification and authentication - Access control - Intrusion detection - Encryption and privacy Security policies and their evaluation.

MSC 522 Web Databases and Information Retrieval (3 Credits)

Modeling - Query operations - Markup languages - XML technologies and its applications - Searching the Web - IR models and Languages - Indexing and Searching - Digital libraries - Project: Designing and developing parts of IR Systems.

MSC 523 Advanced Computer Graphics (3 Credits)

Mathematics for computer graphics in three dimensions - Hierarchical representation and basic shapes - Surfaces and curves in three dimensions - Three-dimensional modelling - Solid bodies modelling – Three-dimensional viewing - Visible surface Illumination and shades - Texture mapping - Computer Graphics Systems: Open GL - Animation techniques - Case study.

MSC 524 Graphical User Interface (3 Credits)

This course aims to introduce the foundations of human computer interaction, to examine and teach structured approaches to the design of human computer interaction and how it fits into overall system development, to show how concepts from different disciplines are applied to the design of interactive SW systems, implement the techniques and skills to develop usable interactive SW systems, to be aware of the different interaction styles that can be used in the design of interactive software systems, to enable students to make sound judgments about the design of the user interface and its usability based on usability attributes and evaluation.

MSC 525 Software Project Management (3 Credits)

Introduction to project management - Basic activities of software project management -
Charts used in project management - Evaluation and acceptance of project phases - Advanced techniques of project management as for maintenance - Project scheduling - Project insurance and arbitrage - Project management tools - Case study.

MSC 526 Data Warehouse and Mining Systems (3 Credits)

Introduction to Decision Support Systems (DSS) - Development of DSS - Data
Modelling Techniques and Development of Data Warehouse in an architecture Environment - Study of different Data Warehouse Architectures and Development Techniques - User-Interface for Data Warehouses - Data Mining - Application Domains for Data Warehouse and Mining - Project: Development of a Prototypical Data Warehouse/Mining System.

MSC 527Object Oriented Programming and Designing (3 Credits)

This course introduces the concepts of object-oriented programming (OOP) and design principles. Students will learn how to design and implement software systems using an object-oriented approach, leveraging principles such as encapsulation, inheritance, and polymorphism. The course will cover advanced topics in OOP, including design patterns, software architecture, and best practices for writing maintainable and extensible code.

MSC 528 Selected Topics in Computer Science (3 Credits)

New trends in Computer science - methodology of application - current research topics.

MSC 539Neural Network and Machine Learning Applications (3 Credits)

Approaches to machine learning: Explanation-based learning - Learning by observation and discovery - Analogical and Casebased Learning - Learning Models - Evaluation of Learning Algorithms - Experimental Methodology - Empirical Learning Reinforced Learning and Genetic algorithms - Neural Computations: examples and applications - History of Artificial Neural System development - Fundamental Concepts and Models of Artificial Neural systems. Applications: Neural Network Simulation and Implementations and other emerging applications of Neural Algorithms and Systems.

MSC 540 Database System Implementation (3 Credits)

In this course we will study four major topics relating to database system implementation. The emphasis is on the ``systems" components of a database management system. To better understand these components, a database implementation project will be required where you will build some of the basic ``system" components for a simple database management system. We start with a brief overview of the basic components of a database system and discuss a set of open issues in designing and implementing a database management system, including relational DBMS and NoSQL database system before we detail the four core system components: Storage, Query Processing, Transaction Management and Distributed Data Management

MSC 541 - Advanced Topics in Cybersecurity (3 Credits)

This course explores advanced topics and emerging trends in the field of cybersecurity. Students will delve into specialized areas of cybersecurity, such as cloud security, mobile security, industrial control systems security, and cyber-physical system security. The course will also cover advanced techniques and tools used in cybersecurity operations, including threat hunting, incident response, and digital forensics.

MSC 542 - Cybersecurity Policies, Ethics, and Law (3 Credits)

This course examines the legal, ethical, and policy frameworks that govern cybersecurity practices and operations. Students will learn about the various laws, regulations, and standards that apply to cybersecurity, as well as the ethical considerations and guidelines for conducting cybersecurity activities. The course will also cover topics such as cybercrime, digital forensics, and incident response from a legal and policy perspective.