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2020

Program Specification

Program Name: Bachelor of Computer Science and Information Technology	
Qualification Level : Bachelor of Science	
Department: Computer Science and Information	
College: Science at AzZulfi	
Institution: Majmaah University	

Content

A. Program Identification and General Information

1. Program Main Location:

AzZulfi

2. Branches Offering the Program:

College of Science at AzZulfi

3. Reasons for Establishing the Program:
(Economic, social, cultural, and technological reasons, and national needs and development, etc.)

- Developing highly scientific and academic qualified graduates
- Contribution to scientific research towards achieving sustainable development.
- Requirements of labor market, and
- Contribution to the national development.

4. Total Credit Hours for Completing the Program: (163 credit hours in 8 semesters (4 years) after the preparatory year)

5. Professional Occupations/Jobs:

1. Network Administrator, Telecom Companies , Banks , Universities, and Technical information center

2. Database Administrator, Publishing Press (Journals & Books) and E-Business info System.

3. Project Manager, Business info System Management.

4. Technical Analyst, Banks , Hospitals Maintenance System and Airports.

5. Equipment Manufactural Representative, Manufacturing industry and business

6. Hardware Sales Representative, Hardware Manufacturing industry , Medical instrumentation , and Lab supplies Company.

7. Software Sales Representative, Software Manufacturing industry , Universities , Research centers , and Programming Companies

8. User Interface Specialist, Banks , Enterprising Business Companies and Customer Information System centers

9. Computer Service person

10. Network Manager, Telecom Companies , Banks , Universities Technical Support center And many other fields.

6. Major Tracks/Pathways (if any):

Major track/pathway	Credit hours (For each track)	Professional Occupations/Jobs (For each track)
NA	NA	NA

7. Intermediate Exit Points/Awarded Degree (if any):

Intermediate exit points/awarded degree	Credit hours
NA	NA

B. Mission, Goals, and Learning Outcomes

1. Program Mission:

To provide outstanding accredited academic education in preparing graduates to compete in labor market and contribute in community service and scientific research towards achieving sustainable development

2. Program Goals:

1. Awareness of the broad applicability of Computing.
2. Communication and Organization Skills.
3. Professional Responsibility.
4. Continuous self-learning.

Integrated knowledge for National sustainable development.

3. Relationship between Program Mission and Goals and the Mission and Goals of the Institution/College.

3.1. Relationship between Program Mission and the Mission of the College.

College Mission

The College provides educational services to its community according to national and international standards of quality, and to develop highly scientific and academic qualified graduates and successful competitors in the labor market to contribute to the national development.

Program mission \ College mission	Educational services	Community	Highly scientific	Labor market	National development
Academic education	■		■		
Scientific Research		■	■	■	
Sustainable Development					■
Labor market				■	
Community Service		■			

3.2. Relationship between Program Goals and the Goals of the/College.

Goals of College:

1. Provide recognized educational environment that help students to obtain the knowledge in the modern classroom and laboratories.

2. To provide qualified cadres to meet the needs of the market in various fields.
3. Provide learning facilities and research resources through the library and the database of scientific journals and manuscripts.
4. To make achievements in the research field and to encourage the culture of scientific research.
5. Direct the research to help the local society and motivate students to participate in the research.
6. To establish a communication between the College and society.
7. Obtaining the academic accreditation (nationally and internationally) for all programs in the college.

		College Goals						
		Goal 1	*Goal* 2	*Goal* 3	*Goal* 4	*Goal* 5	*Goal* 6	*Goal* 7
Program Goals	*Goal* 1	■			■			
	Goal 2		■			■	■	
	Goal 3					■	■	
	Goal 4			■	■			
	Goal 5		■			■		■

4. Graduate Attributes:

At the end of the program the graduate will be able to:
1. Technically understand of computer science and Information Technology.
2. Be familiar with common themes and principles.
3. Appreciate of the interplay between theory and practice
4. Recognize System-level perspective.
5. Understand how to apply the knowledge they have gained to solve real problems
6. Possess a solid foundation that allows and encourages them to maintain relevant skills as the field evolves.

Commitment to professional responsibility.

5.Program learning Outcomes*

Knowledge and Understanding

K1	Acquire knowledge of computing and mathematics appropriate to the discipline including simulation and modeling.
K2	Recognize the need for and an ability to engage in continuing professional development.
K3	Understand best practices and standards and their application.

Skills

S1	Analyze a problem to identify and define the computing requirements appropriate for its solution.
S2	Design, implement, develop and evaluate complicated computer-based system, process component, or program to meet desired needs.

S3	Use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, web systems and technologies.
S4	Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
S5	Integrate IT-based solutions into the user environment effectively.
Competence	
C1	Adhere professional, ethical, legal, security, and social issues and their responsibilities.
C2	Analyze the local and global impact of computing on individuals, organization, and society.
C3	Use current techniques, skills, and tools necessary for computing practice.
C4	Function effectively on teams to accomplish a common goal.
C5	Communicate effectively with a range of audiences.

* Add a table for each track and exit Point (if any)

C. Curriculum

1. Curriculum Structure

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Institution Requirements	Required	0	0	0%
	Elective	6	12	7.36%
College Requirements	Required	12	29	17.79%
	Elective	0	0	0%
Program Requirements	Required	8	16	9.81%
	Elective	1	2	1.22%
Capstone Course/Project	Required	31	91	55.828%
Field Experience/ Internship	Elective	4	12	7.3619%
Others (Summer Training)	Required	1	1	0.61349%
Total		**63**	**163**	**100%**

* Add a table for each track (if any)

2. Program Study Plan

Prerequisite – list course code numbers that are required prior to taking this course.

2.1. Preparatory year

Year	Course Code	Course Title	Required or Elective	* Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College or Department)
Preparatory year	PENG 111	Preparatory English(1)	Required	-----	8	Prep.
	PMTH 112	Introduction to Mathematics (1)	Required	------	2	Prep.
	PCOM 113	Computer Skills	Required	-----	2	Prep.
	PSSC 114	Learning and Communication Skills	Required	-----	2	Prep.
	PENG 121	Preparatory English(2)	Required	PENG 111	6	Prep.

PENG 123	English for Science and Engineering	Required	PENG 111	2	Prep.
PMTH 127	Introduction to Mathematics (2)	Required	PMTH 112	4	Prep.
PPHS 128	General Physics	Required	-----	3	Prep.
	Total			**29**	

- **Curriculum Plan of Program(4-years)**

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College or Department)
Level 1	**CSI 211**	Programming 1	Required	PCOM 113	3	Department
	CSI 212	Disc. Math for CS 1	Required	PMTH 127	3	Department
	MATH 112	Calculus 1	Required	PMTH 127	3	Department
	PHYS 217	Physics 2	Required	PPHS 128	3	Department
	ENG 210	Tech. English	Required	PENG 121	2	Department
	------	Elective science Course	**Elective**	----	2	College
Level 2	CSI 221	Programming 2	Required	CSI 211	3	Department
	CSI 222	Disc. Math for CS 2	Required	CSI 212	2	Department
	MAT 224	Calculus 2	Required	MATH 112	3	Department
	CSI 223	Digital Logic Design	Required	PHYS 217	3	Department
	CSI 124	Fund. Info. Systems	Required	----	3	Department
	ZPSY 211	Educational & Thinking Skills	Required	----	2	College
Level 3	CSI 311	Visual Programming	Required	CSI 221	3	Department
	CSI 312	Data Structure	Required	CSI 221, CSI 212	3	Department
	CSI 313	Computer Organization and Assembly Language	Required	CSI 223	3	Department
	CSI 314	Database	Required	CSI 211	3	Department
	MATH 319	Linear Alg. & Diff. Eq.	Required	MAT 224	3	College
	SALM***	Univ. Elective course	**Elective**	-----	2	Institution
Level 4	CSI 321	Design & Analysis of Algorithms.	Required	CSI 312	3	Department
	CSI 322	Computer Networks	Required	CSI 313	3	Department
	CSI 323	Computer Architecture	Required	CSI 313	3	Department
	CSI 324	Advanced Database	Required	CSI 314	3	Department
	CSI 325	Software Engineering 1	Required	CSI 221	3	Department
	STAT 320	Probability & Statistics	Required	MAT 224	3	College
Level 5	CSI 411	Artificial Intelligence	Required	CSI 321	3	Department
	CSI 412	Operating Systems	Required	CSI 313	3	Department

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College or Department)
	CSI 413	Computational Complexity	Required	CSI 222	3	Department
	CSI ***	Dept. Elective Course 1	Required	***	3	Department
	ARAB ***	Univ. Elective	Elective	***	2	Department
	SALM ***	Univ. Elective	Elective	***	2	Institution
	CSI 400	Summer Training	Required	72 Cr. Hrs.	1	Department
Level 6	CSI 421	Compiler Design	Required	CSI 221, CSI 212	3	Department
	CSI 422	Software Engineering 2	Required	CSI 325	3	Department
	CSI 423	Cryptography and Information Security	Required	CSI 321	3	Department
	CSI 425	Computer Graphics	Required	Math 319	3	Department
	CSI ***	Dept. Elective Course 2	Elective	***	3	Department
	SALM ***	Univ. Elective	Elective	***	2	Institution
Level 7	CSI 510	Capstone Project 1	Required	120 Cr. Hrs.	2	Department
	CSI 511	Web Programming & Internet Technology	Required	CSI 322	3	Department
	CSI 512	Data Mining	Required	CSI 314	3	Department
	CSI 513	Concepts of Prog.. Lang.	Required	CSI 222	3	Department
	CSI ***	Dept. Elective Course 3	Elective	***	3	Department
	***	Univ. Elective	Elective	***	2	Institution
Level 8	CSI 520	Capstone Project 2	Required	CSI 510	3	Department
	CSI 522	Human Computer Interaction	Required	CSI 511	3	Department
	CSI 525	Professional Ethics	Required	CSI 422	3	Department
	CSI ***	Dept. Elective Course 4	Elective	***	3	Department
	CSI 524	Distributed Systems & Parallel Processing	Required	CSI 321	3	Department
	***	Univ. Elective	Elective	***	2	Institution

* Include additional levels if needed
** Add a table for each track (if any)

Foundation Year Core Requirements (College core Requirements) (29 Credits):

Course Number	Course Title	Credit Hours	Weekly Hours			Prerequisite
			Lecture	Lab	EX	
PENG 111	Preparatory English (1)	8	20	0	0	-
PMTH 112	Introduction to Mathematics (1)	2	2	0	1	-
PCOM 113	Computer Skills	2	1	2	0	-
PSSC 114	Learning and Communication Skills	2	1	2	0	-
PENG 121	Preparatory English (2)	6	14	0	0	PENG 111

Course Number	Course Title	Credit Hours	Lecture	Lab		Prerequisite
PENG 123	English for Science and Engineering	2	2	0	0	PENG 111
PMTH 127	Introduction to Mathematics (2)	4	4	0	1	PMTH 112
PPHS 128	General Physics	3	2	2	0	-
Total		**29**	**48**	**6**	**2**	

University Requirements (12 Credits):

Course Number	Course Title	Credit Hours	Weekly Hours		Elections	Credits Total
			Lecture	Lab		
SALM 101	Introduction to Islamic Culture	2	2	0	**Students choose 3 courses**	6
SALM 102	Islam and Society Building	2	2	0		
SALM 103	Economic System in Islam	2	2	0		
SALM 104	Fundamentals of Political System in Islam	2	2	0		
ARAB 101	Arabic Language Skills	2	2	0	**Students choose 1 course**	2
ARAB 103	Arabic Writing	2	2	0		
ELEC 101	Principles of Health and Fitness	2	2	0	**Students choose 1**	4
ELEC102	Business Entrepreneurship	2	2	0		
SOCI 101	Societal Issues	2	2	0		
LHR 101	Human Rights Systems	2	2	0		
FCH 101	Family and Childhood	2	2	0		
VOW 101	Volunteering Systems	2	2	0		
ENG 101	English Language	2	2	0		
				Total		12

4. Department Requirements (103 Credits):

Course Number	Course Title	Credits	Weekly Hours			Prerequisite
			Lec.	Lab	EX.	
ZPSY 211	Educational & Thinking Skills	2	2	0	0	--
ENG 210	Technical English	2	2	0	0	--
CSI 211	Programming 1	3	2	2	0	--
CSI 212	Discrete Math for Computer Science 1	3	2	0	2	-
CSI 222	Discrete Math for Computer Science 2	2	2	0	0	CSI 212
CSI 221	Programming 2	3	2	2	0	CSI 211
CSI 223	Digital Logic Design	3	2	2	0	PHYS 217
CSI 124	Fundamentals of Information Systems	3	3	0	0	---
CSI 311	Visual Programming	3	2	2	0	CSI 221
CSI 312	Data Structure	3	2	2	0	CSI 221, CSI 212
CSI 313	Computer Organization and Assembly Language	3	2	2	0	CSI 223
CSI 314	Database	3	2	2	0	CSI 211
CSI 321	Design & Analysis of Algorithms	3	2	0	2	CSI 312
CSI 322	Computer Networks	3	2	2	0	CSI 313
CSI 323	Computer Architecture	3	3	1	0	CSI 313
CSI 324	Advanced Database	3	1	4	0	CSI 314
CSI 325	Software Engineering 1	3	2	2	0	CSI 221
CSI 411	Artificial Intelligence	3	2	2	0	CSI 321
CSI 412	Operating Systems	3	2	2	0	CSI 313
CSI 413	Computational Complexity	3	2	0	2	CSI 222
CSI 421	Compiler Design	3	2	2	0	CSI 221, CSI 222
CSI 422	Software Engineering 2	3	2	2	0	CSI 325
CSI423	Cryptography and Information Security	3	3	1	0	CSI 321
CSI 425	Computer Graphics	3	2	2	0	MATH 319
CSI 510	Capstone Project 1	2	0	6	0	120 Cr. Hrs
CSI 511	Web Programming & Internet Technology	3	2	2	0	CSI 322
CSI 512	Data Mining	3	2	2	0	CSI 314
CSI 513	Concepts of Programming Languages.	3	2	2	0	CSI 222
CSI 520	Capstone Project 2	3	0	9	0	CSI 510
CSI 522	Human Computer Interaction	3	2	2	0	CSI 511
CSI 524	Distributed Systems & Parallel Processing	3	2	2	0	CSI 321
CSI 525	Professional Ethics	2	2	0	0	CSI 422
Total		**91**	**62**	**59**	**6**	

- Student must select 4 courses from either of the next three tracks:

Track I: Computer Graphics and Multimedia

Course Number	Course Title	Credits Hr.	Weekly Hours		Prerequisite
			Lecture	Lab	
CSI 414	Digital Image Processing	3	2	2	MATH 319
CSI 424	Computer Vision	3	2	2	CSI 414
CSI 514	Interactive Computer Graphics	3	2	2	CSI 425
CSI 521	Multimedia Technology	3	2	2	CSI 425
CSI 530	Digital Photography	3	2	2	MAT 224

Track II: Computer Networks

Course Number	Course Title	Credits Hr.	Weekly Hours		Prerequisite
			Lecture	Lab	
CSI 431	Advanced Computer Networks	3	2	2	CSI 322
CSI 432	Network Security	3	2	2	CSI 413
CSI 531	Wireless & Mobile Computing	3	2	2	CSI 322
CSI 532	Network Programming	3	2	2	CSI 431
CSI 533	Cloud Computing	3	2	2	CSI 322, CSI321

Track III: Individual Track: Student should select his courses from the above two tracks or from the following table

Course Number	Course Title	Credits Hr.	Weekly Hours		Prerequisite
			Lecture	Lab	
CSI 441	Machine Learning	3	2	2	CSI 411
CSI 442	Introduction to Robotics	3	2	2	CSI 411
CSI 443	Expert Systems	3	2	2	CSI 41
CSI 444	Computational Methods	3	2	2	Math 319
CSI 445	Operational Research	3	2	2	STAT 320, MATH 319
CSI 446	Information System Management	3	2	2	CSI 314
CSI 447	Information Security	3	2	2	CSI 423
CSI 448	Project Management	3	2	2	CSI 422
CSI 449	Geographic Information Systems (GIS)	3	2	2	CSI 324

3. Course Specifications

Insert hyperlink for all course specifications using NCAAA template

https://www.mu.edu.sa/ar/colleges/college-of-science-al-zulfi/19844

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**)

Course code & No.	Knowledge and understanding			- - -	Skills				S5	Competence			C4	C5	C6
	K1	K2	K3		S1	S2	S3	S4		C1	C2	C3			
CSI101	I				P							I			
MATH112			I		P							P			
CSI212	P		I		I					I					
PHYS217			P		I							P			
CSI211	P		I		I	I									
ENG210		P									I			I	
MATH224	M												P		
CSI223	P		P		I							I			
CSI222	I				P							I			I
CSI124	P	P			I			I							
CHEM226	M	M									I				
CSI221		I			P	P						I			
CSI313		P			I			P				I			
CSI312	P	I						I				I			
CSI314	I		I		P					I					
MATH319	M				M										
CSI311			I		I	I					P				
CSI324		P			I			M		I					
CSI323		I			I			I		P					
CSI322		I													
CSI321	I	I						I						I	
STAT320	M				P							P			
CSI325		I	I					P		P					
CSI411		P						P				I			I
CSI413		I			I	I						P			
CSI412		P	P			M								P	
CSI422		I						M	P			I			
CSI421	M				M							P			
CSI425		P				P				P		P			
CSI423	M	P						M		P					

Course code & No.	Knowledge and understanding			---	Skills				S5	Competence			C4	C5	C6
	K1	K2	K3	---	S1	S2	S3	S4		C1	C2	C3			
CSI510					I				I				P	P	
CSI513			P			P		P				P			
CSI512		I			M	M				I					
CSI511		P					P			P				P	
CSI520								P	P			P		P	
CSI524		P				P	P							P	
CSI522		M					M			M			M		
CSI525										M	P		M	M	
CSI431		P				P		M						P	
CSI533		M						M		P					
CSI444	M				I							P			P
CSI424		M				P				M					
CSI414		M				M				P					
CSI530		M				M				M					
CSI447		P						M		M					
CSI446		M						M		M					
CSI432	P	P						P		P					
CSI445	M				P										M
CSI448	P	P				P				P					

* Add a table for each track (if any)

<table>
<tr><td colspan="4">5. Teaching and learning strategies to achieve program learning outcomes
Describe policies, teaching and learning strategies, learning experience, and learning activities, including curricular and extra-curricular activities, to achieve the program learning outcomes.</td></tr>
</table>

	NQF Learning Domains and Learning Outcomes	Teaching Strategies	Assessment Methods
K	**Knowledge**		
K1	Acquire knowledge of computing and mathematics appropriate to the discipline including simulation and modeling.	• **Direct teaching:** Lectures, Power Point slides and discussion. • **Aimed teaching** Discovery and Oral Questions.	• Formative assessment. • Essays • Asked to answer
K2	Recognize the need for and an ability to engage in continuing professional development.		

K3	Understand best practices and standards and their application.			• *Questions and answers (oral)* • Presentations.
S	**Skills**			
S1	Analyze a problem to identify and define the computing requirements appropriate for its solution.		• **Direct teaching:** Lectures, Power Point slides and discussion. • **Indirect Teaching:** Brainstorming - Free Discovery – Inquiry. • **Comparison of methods**	▪ Interviews ▪ *Practical test* ▪ *Written test* ▪ *Individual and group activities* ▪ *Short cognitive tests*
S2	Design, implement, develop and evaluate complicated computer-based system, process component, or program to meet desired needs.			
S3	Use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, web systems and technologies.			
S4	Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.			
S5	Integrate IT-based solutions into the user environment effectively.			
C	**Competition**			
C1	Adhere professional, ethical, legal, security, and social issues and their responsibilities.		• Learning styles and motivation • Comparison of methods	• Quizzes, tests, examinations • Student self-assessments
C2	Analyze the local and global impact of computing on individuals, organization, and society.			
C3	Use current techniques, skills, and tools necessary for computing practice.			
C4	Function effectively on teams to accomplish a common goal.			

C5	Communicate effectively with a range of audiences.		
C6	Apply advanced numerical methods.		

6. **Assessment Methods for program learning outcomes.**
Describe assessment methods (Direct and Indirect) that can be used to measure achievement of program learning outcomes in every domain of learning.

Assessment Strategies:

Assessment Strategy	Definition
Classroom presentations	A classroom presentation is an assessment strategy that requires students to verbalize their knowledge, select and present samples of finished work
Essays	An essay is a writing sample in which a student constructs a response to a question, topic, or brief statement, and supplies supporting details or arguments
Interviews	An interview is a face-to-face conversation in which teacher and student use inquiry to share their knowledge and understanding of a topic or problem, and can be used by the teacher to explore the student's thinking;
Learning logs	A learning log is an ongoing, visible record kept by a student and recording what he or she is doing or thinking while working on a particular task or assignment.
Observation	Observation is a process of systematically viewing and recording students while they work, for the purpose of making programming and instruction decisions.
Performance tasks	During a performance task, students create, produce, perform, or present works on "real world" issues.
Questions and answers (oral)	In the question–and-answer strategy, the teacher poses a question and the student answers verbally, rather than in writing.
Quizzes, tests, examinations	A quiz, test, or examination requires students to respond to prompts in order to demonstrate their knowledge (orally or in writing) or their skills (e.g., through performance). Quizzes are usually short; examinations are usually longer
Student self-assessments	Self-assessment is a process by which the student gathers information about, and reflects on, his or her own learning. It is the student's own assessment of personal progress in terms of knowledge, skills, processes, or attitudes.

D. Student Admission and Support:

1. Student Admission Requirements

1. The applicant should have obtained a general high school certificate or its equivalent from within or without the Kingdom of Saudi Arabia.
2. The high school certificate or its equivalent should not be older than five years. The University Council may make some exceptions if convincing reasons.
3. The applicant should be of a good conduct.
4. The applicant should successfully pass any test or interview assigned by the University Council.
5. The applicant should be medically fit.
6. The applicant should provide a permission for study from his reference, if he works in government or private sector
7. The applicant should satisfy any other conditions the University Council determines, announces during admission process.
8. 8 The University Council, or whomever it delegates, may enroll a student dismissed from the university because of academic reasons in some programs that do not award a bachelor degree. It does not allowed for the transitional program.

2. Guidance and Orientation Programs for New Students

Students receive a package that includes:
1. The Student ID Card, with terms and conditions.
2. The Student Schedule (students are oriented to reading their schedule (days, times, instructors), locating the classrooms prior to the beginning of classes; this can be demonstrated during the tours.
3. The Academic Calendar.

Departmental Participation in the Orientation Agenda:
4. Academic Departments: Prep and Core (Expectations, curriculum, syllabi, attendance, advisor, academic support, contact info).
5. Registrar (Guides, calendar, tips, important registration information, reading your schedule, changing your section, attendance policy).
6. Campus Life (Rights and Responsibilities, Code of Conduct, Campus opportunities and campus tour).
7. LRC (Library and services).
8. IT (services and important applications).
9. Security (ID and security car sticker check).

3. Student Counseling Services

(academic, career, psychological and social)

1. Create department academic advising committee and distribute students to the members of the Committee.
2. Follow up of the Academic Advisory Committee members with the students to ensure solving their Problems.

Scheduled meeting between the Academic Advisory Committee and the students.

4. Special Support

(low achievers, disabled, gifted and talented)

1. Maintain an organized classroom and limit distractions.
2. Break down instructions into smaller, manageable tasks.
3. Use music and voice inflection.
4. Use multi-sensory strategies.
5. Give students with special needs opportunities for success.

E. Teaching and Administrative Staff

1. Needed Teaching and Administrative Staff

Academic Rank	Specialty		Special Requirements / Skills (if any)	Required Numbers		
	General	Specific		M	F	T
Professors	-	Computer Networks Artificial Intelligence		2	1	3
Associate Professors		Computer Organization Data Science		1	2	3
Assistant Professors		Programming Languages		1	1	2
Lecturers	Computer science Information Technology			0	2	2
Teaching Assistants	-	-	-	0	0	0
Technicians and Laboratory Assistants	Lab Technicians			5	5	10
Administrative and Supportive Staff	-	-	-	-	-	-
Others (specify)	-	-	-	-	-	--

2. Professional Development

2.1 Orientation of New Teaching Staff

Describe briefly the process used for orientation of new, visiting and part-time teaching staff

1. Introducing new staff to the essential information needed to successfully teach at MU. Topics may include communication systems, the virtual learning environment, teaching spaces and policies, course coordination.
2. A consultation is designed to provide an introductory overview of the teaching technologies available in MU.
3. A meeting is normally designed to provide an introductory overview of life-style in MU to new staff.

2.2 Professional Development for Teaching Staff

Describe briefly the plan and arrangements for academic and professional development of teaching staff (e.g., teaching & learning strategies, learning outcomes assessment, professional development, etc.)

The deanship of quality assurance is usually prepared courses to teaching staff to keep high skills for faculty staffs.

F. Learning Resources, Facilities, and Equipment

1. Learning Resources.

Mechanism for providing and quality assurance of learning resources (textbooks, references and other resource materials, including electronic and web-based resources, etc.)

Required Textbooks:

1. Tom Jenkyns; Ben Stephenson, Fundamentals of Discrete Math for Computer Science, 2018, ISBN: 9783319701516.

2. David J. Ellenbogen, Calculus and Its Applications, Addison Wesley, 2007, ISBN: 9783319701516.

3. James Stewart, Calculus, Brooks/Cole Publishing Company, 2007.

4. M. Morris Mano, Digital Logic and Computer Design, 2015.

5. Giuliano Donzellini Luca Oneto Domenico Ponta, Introduction to Digital Systems Design, Springer, Sep 2019, ISBN: 10: 030065200, ISBN-13: 978-3030065201.

6. Cay S. Horstmann, Core Java Volume I-Fundamentals (11th Edition) , Prentice Hall; 11 edition, (August 27, 2018), ISBN: 978-0135166307.

7. Paul Laurence, Java Simple Beginner's Guide to Java Programming, Create Space Independent Publishing Platform, May 5, 2018, ISBN: 978-1718753914.

8. Kenneth H. Rosen, Discrete Mathematics and Its Applications, 7th Edition, McGraw Hill, 2012, ISBN-13: 978-0130188304.

9. Robert T. Smith, Calculus, McGraw Hill, 3rd Edition, 2009.

10. K. A. Stroud, Engineering Mathematics, Palgrave Macmillan, 6th Edition, 2007.

11. R. Larson, Calculus with Analytic Geometry, Houghton Mifflin Company, 7th Edition, 2002.

12. Thomson, Principles of modern Chemistry, 6th ed, 2008.

13. Peter Atkins and Julio de Paula, The Elements of Physical Chemistry, 2005.

14.   Robert J. Silbey, Robert A. Alberty, and Moungi G. Bawendi, Physical Chemistry, 2004.

15.   Maja Olejniczak, English for Information Technology, Pearson Longman, 2012.

16.   Norma D. Mullen, English for Computer Science, Oxford University Press, March 1988; ISBN-10: 0194376559;ISBN-13: 978-0194376556.

17.   Iris Eisenbach, English for Materials Science and Engineering, Vieweg and Teubner, 2011, ISBN : 978-3-8348-0957-5; Online ISBN 978-3-8348-9955-2.

18.   Kenneth M Hoffman, Ray Kunze, Linear Algebra and Its Applications 4th Edition, Pearson, December 2018, ISBN: 978-0321836144.

19.   Seymour Lipschutz, Marc Lipson, Schaum's Outline of Linear Algebra , 5th Edition, McGraw-Hill Education, December 2017, ISBN: 978-0071794565.

20.   David Barnes, Object-Oriented Programming with Java: An Introduction 1st Edition, Prentice Hall, January 28, 2000, ISBN-13: 978-0130869005.

21.   Poo, Danny C.C., Kiong, Derek B.K, Object-Oriented Programming and Java, Springer, 2008, ISBN 978-981-3083-96-7.

22.   Silberschatz, Korth and Sudarshan, Database System Concepts 7th Edition, Mc Graw Hill, 2017, ISBN-13: 978-0078022159.

23.   Ramez Elmasri and Shamkant Navathe, Fundamentals of Database Systems(7th Edition), Pearson, 2015, ISBN-10: 0133970779.

24.   Michael McLaughlin, Oracle Database 11g & MySQL 5.6 Developer Handbook, Mc Graw Hill, 2012, ISBN: 978-0-07-176885-6.

25.   Alan Dix, Janet Finlay, and Russell Beale, Human Computer Interaction (3rd Edition) , Prentice Hall, 2004, ISBN: 13:978-0-13-046109-4.

26.   I. Scott MacKenzie, Human Computer Interaction, Morgan Kaufmann, December 2012, ISBN: 9780124058651.

27.   Linda Null, Julia Lobur, The essentials of computer organization and architecture, Jones and Bartlett Publishers, Inc., 2012.

28.   William Stallings, Computer Organization and Architecture, Prentice Hall, 2012.

29.   Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying E. Ye, Probability and Statistics for Engineers and Scientists" 9 edition, Pearson, 2011.

30.   I. Scott MacKenzie, Introduction to Probability and Statistics, <u>William Mendenhall</u>, 2008.

31.   Douglas C. Montgomery and, George C., Applied Statistics and Probability for Engineers", 5 edition, Wiley, March 2012.

32.   Clifford A. Shaffer, Data Structures & Algorithm Analysis in java, Dover Publications, 2011, ISBN: 978-0486485812.

33.   James Cutajar, Beginning Java Data Structures and Algorithms, Packt Publishing, 2018, ISBN: 978-1789537178.

34.   Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating System Concepts, John Wiley & Sons, Inc., 2012, ISBN: 9781118063330.

35.   Andrew S. Tanenbaum, Modern Operating Systems, Pearson India, 2016, ISBN: 9780133591620.

36.   Anany Levitin, Introduction to the design and analysis of algorithms: Third Edition, Pearson Publisher, 2012.

37.   Andrew S. Tanenbaum, Thomas Cormen, Charles Leiserson, Ronald Rivest, and Clifford Stein, Introduction to Algorithms, Third Edition, MIT Press, 2009.

38.   Michael T. Goodrich, Roberto Tamassia, and Divid Mount, Data Structures and Algorithms in Java, John Wiley & Sons Inc, 2014.

39.   <u>Eric J. Braude</u> and <u>Michael E. Bernstein</u>, Software Engineering: Modern Approaches, Second Edition, Waveland Press, Inc.; 2 edition, February 15, 2016, ISBN- 10: 1478632305, ISBN-13: 978-1478632306.

40.   Douglas Comer, Computer Networks and Internets, Global Edition, 6/E, Pearson, 2016, ISBN-10: 1292061170, ISBN-13: 9781292061177.

41.   Russ White, Ethan Banks, Computer Networking Problems and Solutions: An innovative approach to building resilient, modern networks, Addison-Wesley, 2018, ISBN-10: 1587145049 • ISBN-13: 9781587145049.

42.   M. Sipser, Introduction to the Theory of Computation, Cengage Learning, Third Edition, Cengage Learning, 2013, ISBN-10: 1292061170, ISBN-13: 9781292061177.

43.   Thomas A. Sudkamp, An Introduction to the Theory of Computer Science Languages and Machines. Third Edition, Addison Wesley, 2006, ISBN-10: 1587145049,

ISBN-13: 9781587145049

44. J. E. Hopcroft., R. Motwani, and J. D. Ullman, Introduction to Automata Theory, Languages, and Computation, Third Edition, Addison Wesley, 2007.

45. Donald D. Hearn, M. Pauline Baker, "Computer Graphics with Open GL" (4th Edition), Prentice Hall, 2013, ISBN-13: 9780136053583.

46. W. Stalling, W. Stallings, Cryptography and Network Security: Principles and Practice, Prentice Hall, 2016, ISBN-13: 9780136053583.

47. C. Kaufman, Radia Perlman, Mike Speciner, Network Security, Private Communication in a Public World, Prentice Hall,.2002

48. Paula Deitel, Harvey Deitel, and Abbey Deitel, Internet & World Wide Web, How to Program 5th edition , Deitel, 2012, ISBN: 978-0-13-215100-9.

49. Jennifer Niederst Robbins, Learning Web Design, 4th edition, Wiley, August 2012, ISBN:978-1-449-31927-4.

50. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall, 2009, ISBN-13: 978-0136042594.

51. Richard E. Neapolitan, Xia Jiang, Artificial Intelligence: With an Introduction to Machine Learning, Chapman and Hall/CRC, 2018, ISBN 9781138502383.

52. Google Developer Training Team, Google Developer Training, "Android Developer Fundamentals Course – Concept Reference", Prentice Hall, 2016, https://www.gitbook.com/book/google-developer-training/android-developer-fundamentals-course-practicals/details.

53. Jeff McWherter, Scott Gowell, Professional Mobile Application Development, John Wiley & Sons, 2012, ISBN: 978-1-118-22842-5.

54. Erik Hellman, Android Programming – Pushing the Limits, Wiley, 2013, ISBN-13: 978-1118717370.

55. Dawn Griffiths and David Griffiths, Headfirst Android Development, O'Reilly SPD Publishers, 2015 ISBN-13: 978-1491974056.

56. J F DiMarzio, Beginning Android Programming with Android Studio, Wiley,2016, ISBN-13: 978-8126565580.

57. Alfred V. Aho, Monica S. Lam, and Ravi Sethi, Compilers: Principles, Techniques & Tools, 2nd edition , Addison Wesley, 2014, ISBN:978-0321486813

58. Dick Grune, Kees van Reeuwijk, Henri E. Bal, Ceriel J.H. Jacobs, Koen Langendoen, Modern Compiler Design, 2nd edition , Springer, 2012, ISBN: 978-1461446989.

59. Jeffrey S. Saltz, An Introduction to Data Science, Wiley, 2018, ISBN-13: 978-1506377537.

60. Cady Field, the Data Science Handbook, Wiley, 2017, ISBN-13: 978-1119092940.

61. Calvin Lin, Principles of Parallel Programming, Addison-Wesley, 2008,ISBN: 978-0321487902.

62. Gerassimos Barlas, Multicore and GPU Programming, Morgan Kaufmann, 2015, ISBN: 978-0-12-417137-4.

63. Ian Foster, Cloud Computing for Science and Engineering, MIT Press, 2017, ISBN: 9780262037242.

References

1. Harold Kerzner, Project Management, 2009, ISBN: 9780470278703.

2. Mark C. Layton, Fundamentals of Agile Project Management, Wiley, April 2012, ISBN: 9780791861585.

3. Joseph Heagney, Fundamentals of Project Management, 5th Edition, 2016, ISBN: 9780814437360.

4. Stephen McGloughlin, Multimedia: Concepts and Practice, Prentice Hall, 2001, ISBN-13: 978-0130188304.

5. Ralf Steinmetz, Klara Narstedt, Multimedia Fundamentals, Prentice Hall PTR, 2r.e. edition (November 2002), ISBN-13: 978-0130454980.

6. Robert C. Appleby, Modern Business Administration 6 Sub Edition, Financial Times Management; 6 Sub edition, 1997, ISBN13: 978-0273602828.

7. Les Dlabay, James L. Burrow and Steven A. Eggland, Introduction to Business - 6th edition, South-Western Publishing Co., Published: 2006, ISBN13: 9780538440639 ISBN10: 0538440635

8. Michael McLaughlin, Oracle Database 12c PL/SQL Programming, McGraw-Hill Education, 2014, ISBN-13: 978-0071812436, ISBN-10: 0071812431.

9. Ramez Elmasri and Shamkant Navathe, Fundamentals of Database Systems (7th Edition), Pearson, 2015, ISBN-10: 0133970779.

10. Rajkumar Buyya , James Broberg, Andrzej Goscinski, Cloud Computing Principles and Paradigms, Create Space Independent Publishing Platform, Willey 2019,ISBN: 978-0470887998.

11. **Hill**, R., **Hirsch**, L., **Lake**, P., **Moshiri**, S, Guide to Cloud Computing Principles and Practice, Springer Verlag, 2013,ISBN: 978-0135166307.

12. D. S. Malik, C++ Programming: From Problem Analysis to Program Design, Cengage Learning, 2018, ISBN: 9781337102087, 1337102083.

13. Robin R. Murphy, Introduction to AI Robotics, MIT Press, 2000, ISBN: 0262133830.

14. Roland Siegwart, Illah R. Nourbakhsh, andDavide Scaramuzza, Introduction to Autonomous Mobile Robots, 2nd Edition, MIT Press, 2011, ISBN: 9780262015356.

15. A. Forsyth and J. Ponce, Computer Vision: A Modern Approach, Prentice Hall, 2003.

16. Bassini, Sanzio, Marco Danelutto, and Patrizio Dazz, Parallel Computing is Everywhere, IOS Press, 2018, ISBN print 978-1-61499-842-6, ISBN online 978-1-61499-843-3.

17. Pawel Czarnul, Parallel Programming for Modern High-Performance Computing Systems, Chapman and Hall/CRC; 1 edition (February 28, 2018), 2018, ISBN-10: 9781138305953, ISBN-13: 978-1138305953.

18. Michael L. Pinedo, Scheduling, Theory, Algorithms, and Systems, Springer, Cham, 2012, Print ISBN 978-3-319-26578-0, Online ISBN 978-3-319-26580-3.

19. Maria Petrou, "Fundamental Digital Image Processing", John Wiley and Sons, 2010,ISBN: 9781119458661.

20. Wilhelm Burger, Mark Burge, Principles of digital image processing: fundamental techniques, Springer, 2009, ISBN: 978-1-84882-918-3.

21. M. Wooldridge, "An Introduction to Multi-Agent Systems", 2nd ed. (or later ed.), Wiley, 2009, ISBN: 978-0-470-51946-2.

22. George F. Luger, Artificial Intelligence: structures and strategies for complex problem solving, Pearson, 2011, ISBN: 978-0321545893.

23. Michael B. White, Computer Networking: The Complete Guide to Understanding Wireless Technology, Network Security, Computer Architecture and Communications Systems (Including Cisco, CCNA and CCENT), September 2018, ASIN: B07HLVYYJS.

24. K. J. Ray Liu Beibei Wang, Wireless AI: Wireless Sensing, Positioning, IoT, and Communications, Pearson Education, June 2018, ISBN-13: 978-1108497862 ISBN-10: 1108497861.
25. Douglas Jacobson, Introduction to Network Security, Taylor & Francis, 2008, ISBN-13: 978-1584504641.
26. W. Stallings, Cryptography and Network Security, Principles and Practice, 2013, ISBN: 9780134850757.
27. Norman Ramsey, Programming Languages: Build, Prove, and Compare, Cambridge University Press, 2018.
28. Stephen Mc Gloughlin, Multimedia: Concepts and Practice, Prentice Hall, 2001, ISBN-13: 978-0130188304.
29. Ralf Steinmetz, Klara Narstedt, Multimedia Fundamentals, Prentice Hall PTR, 2r.e. edition (November 2002), ISBN-13: 978-0130454980.
Rajkumar Buyya , James Broberg, Andrzej Goscinski, Cloud Computing Principles and Paradigms, Create Space Independent Publishing Platform, Willey 2019,ISBN: 978-0470887998.

2. **Facilities and Equipment** (Library, laboratories, medical facilities, classrooms, etc.).
Class rooms Computer Laboratories Research laboratories Project laboratories Seminar rooms Staff offices 12
3. **Arrangements to Maintain a Healthy and Safe Environment** (According to the nature of the program)
Available at Al-Zulfi Bulidings

G. Program Management and Regulations

1. Program Management **1.1 Program Structure** (including boards, councils, units, committees, etc.)
Department council Head of the department (Programs Coordinator) department's higher unit Measurement and Evaluation unit

Quality assurance unit
Study plan unit
Academic advising unit
Graduation Projects unit

1.2 Stakeholders Involvement
Describe the representation and involvement of stakeholders in the program planning and development. (students, professional bodies, scientific societies, alumni, employers, etc.)
Advisory Board Student advisory board Both have two meetings every year to discuss important issues concerning the program.

2. Program Regulations
Provide a list of related program regulations, including their link to online version: admission, study and exams, recruitment, appeals and complaint regulations, etc.)
http://mu.edu.sa

H. Program Quality Assurance

1. Program Quality Assurance System
Provide online link to quality assurance manual
https://m.mu.edu.sa/en/colleges/college-science-al-zulfi/quality-assurance

2. Program Quality Monitoring Procedures
• **Staff members:** Processes are used for evaluating the skills of faculty and teaching staff in using the planned strategies 　- *Conduct questionnaires to faculty members and to students.* 　- *Evaluation forms from student to faculty members.* 　- *Evaluation carried out by the department head and the dean of the college*

3. Arrangements to Monitor Quality of Courses Taught by other Departments.
Monitor Quality procedures for developing and accessing learning outcomes: • *Evaluation and report forms for different courses.* • *Forms of student assessment to faculty members.* • *Workshops and department meetings to discuss about the improvements necessary to the courses .* • *Continuous review of the program plans to assure that it meets the latest technologies in computer science and the fast changing society needs.* • *Continuous assure that the program plan satisfies and fulfills the IEEE/ACM Computing Curricula guidelines for computer science curriculum and meets the Computing Accreditation Criteria (CAC).*

Ongoing training for faculty staff members on modern teaching aids such as the use of smart board and e-learning methods as well as to provide laboratories section with modern equipment.

- *Encourage faculty member to attend conferences and workshops, whether financially or academically through promotions.*
- *Internal department seminars and workshops.*
- *Holding a weekly seminar for all the faculty members of the college of Science in Az-Zulfi.*
- *Encouraging faculty members to perform scientific research and publishing.*

4. Arrangements Used to Ensure the Consistency between Main Campus and Branches (including male and female sections)

There are Advisory Council for Male and Female students:
1: College of Science at Al-zulfi (Male)
2: College of Science at Al-zulfi (Female)

5. Arrangements to Apply the Institutional Regulations Governing the Educational and Research Partnerships (if any).

NA

6. Assessment Plan for Program Learning Outcomes (PLOs), and Mechanisms of Using its Results in the Development Processes

1. **Assessment Plan for Program Learning Outcomes (PLOs) is divided into two sectors (staff and students):**

   Faculty/Staff: (Direct method)
   – Work with the Chairs and Directors to align courses reports and learning outcomes with division and College goals.
   - Set an individualized routine to collect data, assess and reflect on its value to the overarching success of goals of program.
   - Communicate assessment results to all faculty within the program and seek feedback regarding successful and unsuccessful achievement of desired benchmarks.
   - Courses Report results and prescribed actions designed to improve program efficiency.
   - Act on assessment results!!
   - In the coming assessment cycle, show evidence of resulting changes due to the action taken using the previous year's data. This is the completion of the assessment cycle.
   - As part of the assessment process and as appropriate, engage students in the assessment of PLOs offering transparency to continuous improvement.

   Students (Indirect method):

- Seek to complete all assessment projects and surveys to the best of their ability and for the sake of improvement for the future.
- Serve on assessment and curriculum committees offering an active voice.
- Provide meaningful feedback on division/program functions and other activities as requested by faculty/staff.

2. **Program Goal Development**

Goals in program embody broad educational goals (ultimately to prepare students for the workplace upon graduation) and programmatic elements to include the following (KPIs):

– Total number of students enrolled
- Minority student percentage
- Applications/Admissions for students
- Admitted/Graduated
- Number of years (median) to graduate
- Attrition rate (median)
- Completion rate
- Total # of graduates
- Faculty/Student ratio

7. Program Evaluation Matrix

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time
Evaluation of effectiveness of teaching and quality of teaching materials	Current students and Graduates	*Questionnaires for students already graduated*	*In 15th and 16th week each semester*
Independent advisors and reviewers	see their point of view on the process of educational department and the suitability of the curriculum with the developments occurring.	• *Questionnaires to governmental and private sector agencies* *Visits*	*In 15th and 16th week each semester*
Independent reviewers	Annual Repot of Program	Surveys	End of academic year
Employers and other Stakeholders	Real requirements of them and meet their needs through the application of graduates satisfaction	• Questionnaire • Survey • Visits	End of academic year

Evaluation Areas/Aspects (e.g., leadership, effectiveness of teaching & assessment, learning resources, partnerships, etc.)

Evaluation Sources (students, graduates, alumni, faculty, program leaders, administrative staff, employers, independent reviewers, and others (specify)

Evaluation Methods (e.g., Surveys, interviews, visits, etc.)
Evaluation Time (e.g., beginning of semesters, end of academic year, etc.)

8. Program KPIs*
The period to achieve the target (.........) year.

No	KPIs Code	KPIs	Target	Measurement Methods	Measurement Time
1	S1.1	1. Stakeholder evaluation ratings of the Mission Statement and Objectives	95%	• *Questionnaire*	**End of academic year**
2	S2.1	2. Stakeholder evaluation of the Policy Handbook, including administrative flow chart and job responsibilities.	90%		
3	S3.1	3. Students overall evaluation on the quality of their learning experiences at the institution.	70%		**End of each semester**
4	S3.2	4. Proportion of courses in which student evaluations were conducted during the year.	100%	• *Questionnaire*	**End of each semester**
5	S3.3	5. Proportion of programs in which there was independent verification within the institution of standards of student achievement during the year.	100%		
6	S3.4	6. Proportion of programs in which there was independent verification of standards of student achievement by people external to the institution during the year.	100%		
7	S3.2	4. Proportion of courses in which student evaluations were conducted during the year.	10:1	**Registration of students**	
8	S3.3	5. Proportion of programs in which there was independent verification within the institution of standards of student achievement during the year.	95%	• *Questionnaire*	**End of each semester**
9	S3.4	6. Proportion of programs in which there was independent verification of standards of student achievement by people external to the institution during the year.	80%	**Staff committee**	

No	KPIs Code	KPIs	Target	Measurement Methods	Measurement Time
10	S3.2	4. Proportion of courses in which student evaluations were conducted during the year.	85%	**Registration of students**	
11	S3.3	5. Proportion of programs in which there was independent verification within the institution of standards of student achievement during the year.	40%	**Registration of students**	
12	S4.7	employed	NA	**Graduate Committee**	**End of each semester**
		enrolled in further study	60%		
		not seeking employment or further study	10%		
13	S5.1	14. Ratio of students to administrative staff	40%		
14	S5.2	15. Proportion of total operating funds (other than accommodation and student allowances) allocated to provision of student services.	8:1		
15	S5.3	16. Student evaluation of academic and career counselling. (Average rating on the adequacy of academic and career counselling on a five point scale).	NA		
16	S6.1	17. Stakeholder evaluation of library and media center. (Average overall rating of the adequacy of the library & media center, including: a) Staff assistance, b) Current and up-to-date c) Copy & print facilities, d) Functionality of equipment, e) Atmosphere or climate for studying f) Availability of study sites.	80%	• *Questionnaire*	**End of each semester**
17	S6.1	17. Stakeholder evaluation of library and media center. (Average overall rating of the adequacy of the library & media center, including: a) Staff assistance, b) Current and up-to-date c) Copy & print facilities,	80%	• *Questionnaire*	**End of each semester**

No	KPIs Code	KPIs	Target	Measurement Methods	Measurement Time
		d) Functionality of equipment, e) Atmosphere or climate for studying f) Availability of study sites.			
18	S6.1	17. Stakeholder evaluation of library and media center. (Average overall rating of the adequacy of the library & media center, including: a) Staff assistance, b) Current and up-to-date c) Copy & print facilities, d) Functionality of equipment, e) Atmosphere or climate for studying f) Availability of study sites.	80%	• *Questionnaire*	**End of each semester**
19	S6.1	17. Stakeholder evaluation of library and media center. (Average overall rating of the adequacy of the library & media center, including: a) Staff assistance, b) Current and up-to-date c) Copy & print facilities, d) Functionality of equipment, e) Atmosphere or climate for studying f) Availability of study sites.	80%	• *Questionnaire*	**End of each semester**
20	S6.1	17. Stakeholder evaluation of library and media center. (Average overall rating of the adequacy of the library & media center, including: a) Staff assistance, b) Current and up-to-date c) Copy & print facilities, d) Functionality of equipment, e) Atmosphere or climate for studying f) Availability of study sites.	80%	• *Questionnaire*	**End of each semester**
21	S7.3	22. Stakeholder evaluation of a) Websites, b) e-learning services	5	• *Questionnaire*	**End of academic year**

No	KPIs Code	KPIs	Target	Measurement Methods	Measurement Time
		c) Hardware and software d) Accessibility e) Learning and Teaching f) Assessment and service g) Web-based electronic data management system or electronic resources.			
22	S8.1	23. Total operating expenditure (other than accommodation and student allowances) per student.	4		
23	S9.1	24. Proportion of teaching staff leaving the institution in the past year for reasons other than age retirement.	NA	**Staff committee**	**End of academic year**
24	S9.2	25. Proportion of teaching staff participating in professional development activities during the past year.	10%	**Staff committee**	**End of academic year**
25	S10.1	26. Number of refereed publications in the previous year per full time equivalent member of teaching staff.	50%	**Research Committee**	**End of academic year**
26	S10.2	27. Number of citations in refereed journals in the previous year per full time equivalent teaching staff.	2:1	**Research Committee**	**End of academic year**
27	S10.3	28. Proportion of full time member of teaching staff with at least one refereed publication during the previous year.	2:1	**Research Committee**	**End of academic year**
28	S10.4	29. Number of papers or reports presented at academic conferences during the past year per full time equivalent members of teaching staff.	60%	**Research Committee**	**End of academic year**
29	S10.5	30. Research income from external sources in the past year as a proportion of the number of full time teaching staff members.	10	**Research Committee**	**End of academic year**

* including KPIs required by NCAAA

I. Specification Approval Data

Council / Committee	Department Council Committee NO 2 1442_1443H
Reference No.	
Date	17/1/1443