1. Teaching Institution	University of Technology Bahrain
2. University Department	College of Computer Studies
3. Programme Title	Bachelor of Science in Information Technology (BSIT)
4. Title of Final Award	Bachelor of Science in Information Technology
5. Modes of Attendance offered	Full-time/ Part-time, actual classroom learning-interactive
6. Accreditation	None
7. Other external influences	**Local External Influences/References** Ministry of Education (MOE), Higher Education Council (HEC), Education and Training Quality Authority in the Kingdom of Bahrain (BQA) **International External Influences/References** Accreditation Board for Engineering and Technology (ABET), Association for Computing Machinery (ACM) in Computing, Quality Assurance Accreditation (QAA) in Computing
8. Total NQF Credits	Level 8 540 Credits units
9. Date of production/revision of this specification	September, 2022

10. Aims of the Programme

The BSIT Programme prepares students to take a leading role in Information Technology by equipping them with the needed knowledge and competencies to effectively evaluate, manage, and maintain computing resources. It has strong emphasis on knowledge to successfully apply information technology theory and principles to address real world opportunities and challenges. The curriculum covers various IT domains which include Information management, Integrated systems, Platform technologies, System paradigm, Networking, User experience design, Software Development, Web and Mobile systems and Project Management. BSIT course is offered with three Majors: Major in Networking and Cyber Security, Major in Data Analytics and Artificial Intelligence and Major in Applications Development.

The Programme goals are:

1. To produce globally competitive graduates and IT professionals with a comprehensive knowledge of various programming languages that make up today's computing and networking systems.
2. To equip graduates with the essential skills in designing and developing different IT projects and computing applications in response to the complex and future demands of the small and medium enterprises as well as global companies.
3. To develop innovative skills in dealing with the computing needs of the industry, using modern data processing systems, information technology tools, techniques and management.

The Programme Educational Objectives:

1. Apply knowledge to effectively analyze and assess real life problems to develop economically viable and socially acceptable IT solutions.

2. Demonstrate excellence in professionalism, moral and ethical conduct, interpersonal skills and adaptable communication to prevalent trends in technology and changing technology

3. Work productively as successful IT professionals in diverse career paths including supportive and leadership roles on multidisciplinary teams or be active in higher studies.

11. Learning Outcomes, Teaching, Learning and Assessment Methods

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline
6. Use systematic approaches to select, develop, apply, integrate and administer secure computing technologies to accomplish user goals.

Teaching and Learning Methods

- Constructive Method: Students are required to attend the sessions regularly. Students learn by doing, writing, and solving. Active participation of the student's during discussion is expected. Learning is an active process, and as such, students must engage with the course materials, i.e. reading the textbook and other assigned advanced readings.
- Inquiry based Method: After each topic, sample problems will be provided to students. Working in groups, students identify what they already know, what they need to know, and how and where to access new information that may lead to resolution of the problem.
- Collaborative Method: Students will be divided into groups with at least three (2) members and each group will be provided with problems or projects that they will work on together to search for understanding, meaning, or solutions Each group is expected to work together in solving Computing problems, discuss the algorithm of the problems, and present the solution in class.
- Experiential learning Method: Engaging students to hands on experience which attempts to apply theories and knowledge learned in the classroom to real-world situations. During laboratory hours,

students will be given experiments to work in groups where they can apply the theories and principles learned. This is an opportunity to have hands-on experience and maximize their learning through actual simulation. This may include team challenges, simulations, company visits/fieldworks and other extracurricular activities

Assessment Methods

- Assessment is through a combination of written examinations (essays, class tests, and homework) and assessed coursework (written reports, software demonstration and computer program/ software development project / programming exercises), oral presentations and interpersonal communication assessed through group projects.

12. Programme Structure

Bachelor of Science in Information Technology

Curriculum Plan Effective SY 2022 - 23

REMEDIAL CLASSES

COURSE CODE	COURSETITLE	LEC Hrs	LAB Hrs	CREDIT UNITS	PRE-REQUISITES
MATH500	Remedial Mathematics	3	0	0	
ENGL501	Effective Speaking	9	0	0	
ENGL504	Grammar and Effective Writing	9	0	0	

FIRSTYEAR

FIRST TRIMESTER

COURSE CODE	COURSETITLE	LEC Hrs	LAB Hrs	CREDIT UNITS	PRE-REQUISITES
CSIT611	Introduction to Computers and IT	2	2	3	
ENGL611	English Communication Skills 1	3	0	3	
ARAB600	Arabic Language	3	0	3	
EUTH400	Euthenics1	1	0	0	
MATH611	College Algebra	3	0	3	
ECON600	Introduction to Economics	3	0	3	
HUMR600	Human Rights	3	0	3	
Total Units				18	

SECOND TRIMESTER

COURSE CODE	COURSETITLE	LEC Hrs	LAB Hrs	CREDIT UNITS	PRE-REQUISITES
CSIT621	Computer Programming 1	2	2	3	CSIT611
CSIT622	Multimedia Development	2	2	3	CSIT611

CSIT623	Digital Design	2	2	3	CSIT611
ENGL621	English Communication Skills 2	3	0	3	ENGL611
EUTH401	Euthenics2	1	0	0	EUTH400
MATH622	Discrete Mathematics	3	0	3	MATH611
HIST600	History of Bahrain and GCC Region	3	0	3	
Total Units				18	

THIRD TRIMESTER

COURSE CODE	COURSETITLE	LEC Hrs	LAB Hrs	CREDIT UNITS	PRE-REQUISITES
CSIT631	Computer Programming 2	2	2	3	CSIT621
CSIT632	Web Content Management	1	2	2	CSIT621
CSIT633	Introduction to Green Computing	3	0	3	CSIT611
CSIT634	Computer Organization and Architecture	2	2	3	CSIT623
MATH631	Differential Calculus with Analytic Geometry	5	0	5	MATH611
ENGL631	Speech and Oral Communication	2	2	3	ENGL621
Total Units				19	

SECOND YEAR

FIRST TRIMESTER

COURSE CODE	COURSETITLE	LEC Hrs	LAB Hrs	CREDIT UNITS	PRE-REQUISITES
CSIT711	Web Design Techniques and Tools	2	2	3	CSIT632
CSIT712	Data Structures	2	2	3	CSIT631
CSIT713	Data Communications and Networking 1	2	2	3	CSIT634
CSIT714	Professional Ethics in IT	2	0	2	CSIT621
CSIT715	Introduction to Management Information System	3	0	3	CSIT611
MATH621	Probability and Statistics	3	0	3	MATH631
Total Units				17	

SECOND TRIMESTER

COURSE CODE	COURSETITLE	LEC Hrs	LAB Hrs	CREDIT UNITS	PRE-REQUISITES
ENGL711	Technical Writing	3	0	3	ENGL621
CSIT721	Database Management Systems 1	2	2	3	CSIT712
CSIT722	Operating Systems	2	2	3	CSIT712
CSIT723	Data Communications and Networking 2	2	2	3	CSIT713
CSIT724	System Administration	2	2	3	CSIT714
CSIT725	Technopreneurship	3	0	3	CSIT715
Total Units				18	

THIRD TRIMESTER

COURSE CODE	COURSE TITLE	LEC Hrs	LAB Hrs	CREDIT UNITS	PRE-REQUISITES
CSIT731	Blockchain Technology and Application	3	0	3	CSIT722
CSIT732	System Analysis and Design	2	2	3	CSIT721
CSIT733	IT Project Management	2	2	3	CSIT724
CSIT734	Cyber Security for Information Technology	3	0	3	CSIT724
CSIT735	Cryptographic Algorithms	3	0	3	CSIT724
CSIT736	Specialization Elective 1			3	CSIT721
Total Units				18	

THIRD YEAR

FIRST TRIMESTER

COURSE CODE	COURSE TITLE	LEC Hrs	LAB Hrs	CREDIT UNITS	PRE-REQUISITES
CSIT811	Software Design and Development	2	2	3	CSIT732
CSIT812	Human Computer Interaction	3	0	3	CSIT732
CSIT813	Information Security and Governance	2	2	3	CSIT733
CSIT814	Specialization Elective 2			3	CSIT736
CSIT815	Specialization Elective 3			3	
CSIT816	Specialization Elective 4			3	
Total Units				18	

SECOND TRIMESTER

COURSE CODE	COURSETITLE	LEC Hrs	LAB Hrs	CREDIT UNITS	PRE-REQUISITES
CSIT821	System Integration	3	0	3	CSIT811
CSIT822	Embedded System	3	0	3	CSIT812
CSIT823	Mobile Programming	2	2	3	CSIT812
CSIT824	Specialization Elective 5			3	CSIT816
CSIT825	Specialization Elective 6			3	
CSIT826	Specialization Elective 7			3	
Total Units				18	

THIRD TRIMESTER

COURSE CODE	COURSETITLE	LEC Hrs	LAB Hrs	CREDIT UNITS	PRE-REQUISITES
CSIT831	Practicum in IT	0	12	6	CSIT821
CSIT832	Research Project A	3	0	3	CSIT823

CSIT833	Elective – 1 : Software Expertise	2	2	3	CSIT821
CSIT834	Specialization Elective 8			3	CSIT826
CSIT835	Specialization Elective 9			3	
Total Units				18	

FOURTH YEAR

FIRST TRIMESTER

COURSE CODE	COURSE TITLE	LEC Hrs	LAB Hrs	CREDIT UNITS	PRE-REQUISITES
CSIT841	Internet of Things	3	0	3	CSIT833
CSIT842	Research Project B	0	6	3	CSIT832
CSIT843	Elective 2: Intelligent Systems	2	2	3	CSIT833
CSIT844	Specialization Elective 10			3	CSIT835
CSIT845	Specialization Elective 11			3	
CSIT846	Specialization Elective 12			3	
Total Units				18	
Grand Total				180	

LIST OF ELECTIVES

Elective 1 - Software Expertise

COURSE CODE	COURSE TITLE	LEC HRS	LAB HRS	CREDIT UNITS	Pre-requisite
CSIT833- A	Parallel and Distributed Computing	2	2	3	CSIT821
CSIT833 - B	Enterprise Resource Planning	2	2	3	
CSIT833 - C	Compiler Construction	2	2	3	

Elective – 2 Intelligent Systems

COURSE CODE	COURSE TITLE	LEC HRS	LAB HRS	CREDIT UNITS	Pre-requisite
CSIT843 – A	Artificial Intelligence and Machine Learning	2	2	3	CSIT833
CSIT843 - B	Expert Systems	2	2	3	
CSIT843 - C	Principles of Data Science	2	2	3	

SPECIALIZATION ELECTIVES

Networking and Cyber Security Specialization					
COURSE CODE	**COURSE TITLE**	**LEC HRS**	**LAB HRS**	**CREDIT UNITS**	**Pre-requisite**
CSIT736 – CS	*Introduction to Digital Forensics*	3	0	***3***	CSIT721
CSIT814 – CS	*Network Security*	2	2	***3***	CSIT736CS
CSIT815 – CS	*Security Methods and Practices*	3	0	***3***	
CSIT816 – CS	*Ethical Hacking*	2	2	***3***	
CSIT824 – CS	*Wireless Networks*	2	2	***3***	CSIT816CS
CSIT825 – CS	*System and Security Administration*	2	2	***3***	
CSIT826 – CS	*Intrusion Detection and Prevention Systems*	2	2	***3***	
CSIT834 – CS	*Cloud Computing*	3	0	***3***	CSIT826CS
CSIT835 – CS	Applied Cyber Security	3	0	***3***	
CSIT844 – CS	*Advanced Cryptographic Algorithms*	2	2	***3***	CSIT835CS
CSIT845 – CS	*TCP/IP and Routing*	2	2	***3***	
CSIT846 – CS	*Mobile Internet Technology*	2	2	***3***	

Data Analytics and Artificial Intelligence Specialization					
Course Code	**COURSE TITLE**	**LEC HRS**	**LAB HRS**	**CREDIT UNITS**	**Pre-requisite**
CSIT736 – DA	*Database Management Systems 2*	2	2	***3***	CSIT721
CSIT814 – DA	*Data Integration*	2	2	***3***	CSIT736DA
CSIT815 – DA	*Database Administration*	2	2	***3***	
CSIT816 – DA	*Data Mining and Analysis in Information Technology*	2	2	***3***	
CSIT824 – DA	*Web mining and Information Retrieval*	2	2	***3***	CSIT816DA
CSIT825 – DA	*Big Data Analytics in Business Intelligence*	2	2	***3***	
CSIT826 – DA	*Big Data Architecture and Design*	2	2	***3***	
CSIT834 – DA	*Cloud Based Data Distribution and Virtualization*	3	0	***3***	CSIT826DA
CSIT835 – DA	*Principles of Data Science and Visualization*	2	2	***3***	
CSIT844 – DA	*Computational Thinking with Python*	2	2	***3***	CSIT835DA
CSIT845 – DA	*Data Interpretation and Statistical Analysis in Information Technology*	3	0	***3***	
CSIT846 – DA	*Database Driven Web Applications*	2	2	***3***	

Applications Development Specialization

Course Code	COURSE TITLE	LEC HRS	LAB HRS	CREDIT UNITS	Pre-requisite
CSIT736 – AD	*Database Management Systems 2*	*2*	*2*	***3***	CSIT721
CSIT814 – AD	*Python Programming*	*2*	*2*	***3***	CSIT736AD
CSIT815 – AD	*Database Administration*	*2*	*2*	***3***	
CSIT816 – AD	*Agile Project Management*	*3*	*0*	***3***	
CSIT824 – AD	*C# Programming and Application development*	*2*	*2*	***3***	CSIT816AD
CSIT825 – AD	*Mobile Application Development*	*2*	*2*	***3***	
CSIT826 – AD	*Computer Graphics and Applications*	*2*	*2*	***3***	
CSIT834 – AD	*Cloud Computing*	*3*	*0*	***3***	CSIT826AD
CSIT835 – AD	*Server Side Programming*	*2*	*2*	***3***	
CSIT844 – AD	*Software Quality Assurance*	*3*	*0*	***3***	CSIT835AD
CSIT845 – AD	*.Net Technologies*	*2*	*2*	***3***	
CSIT846 – AD	*Software Testing Tools*	*2*	*2*	***3***	

13. Awards and Credits

Degree/ Certificate Awarded	Bachelor's Degree in Information Technology
Total Units for Degree	180 ACS (540 NQF Credits)
Total Trimesters Completed	10

14. Personal Development Planning

1. Conduct in-house trainings and seminars on current trends in computing, such as Network Security, Web Design and Techniques, ERP and Database Administration
2. Send faculty members to local and international conferences, seminars and trainings related to their fields of specialization.
3. Support faculty members to conduct research projects aligned to college research thrusts and priorities.
4. Establish partnerships and linkages where research collaborations can be made.
5. Encourage research publication and dissemination through participation in international research conferences and fora.

15. Admission Criteria

Admission to UTB International University - Bahrain (UTB) is open to all qualified applicants.

Criteria for Admission to the University

Acceptance to the University depends on the following criteria:

Admissions Criteria for Undergraduate Students

A. For First Year Undergraduate Applicants

Acceptance to the University depends on the following admissions requirements:

1. Completely filled out an admission application form.
2. Minimum secondary school scores 60% or its equivalent.
3. UTB Placement Test (Oxford Online Placement Test (OOPT)) result.
4. Submission of all required documents stated in the Admissions Policy.
   To be admitted to any undergraduate programme, the applicant must satisfy the minimum secondary school grades or its equivalent without the need to take the UTB placement test and remediation classes of English, and Math, as shown in the following table:

Subtest Component for Bahraini, KSA, Kuwait, Qatar, Yemen, Switzerland, USA, and Ecuador Qualification		**Programme**			
		Engineering Studies (BSIE, BSME, BSEnE)	**Computing Studies (BSCS, BSIT)**	**Business (BSBI, BSAF)**	**International Business**
Mathematics	Science/ Technical/General Track	At least 70% or C	At least 70% or C	At least 70% or C	At least 60% or D
	Commercial and Literature Tracks	At least 80% or B	At least 80% or B	At least 80% or B	At least 60% or D
Science		60	60	60	N/A
English		At least 80 or B	At least 80 or B	At least 80 or B	At least 80 or B

	Programme

Subtest Component for Other Qualification (Indian, Pakistan, and West African)		Engineering Studies (BSIE,BSME, BSEnE)	Computing Studies (BSCS, BSIT)	Business (BSBI, BSAF)	International Business
Mathematics	Science/ Technical/General Track	At least 51 or C1	At least 51 or C1	At least 51 or C1	At least 41 or C2
	Commercial and Literature Tracks	At least 71 or B1	At least 71 or B1	At least 71 or B1	At least 41 or C2
Science		60	60	60	N/A
English		At least 71 or B1	At least 71 or B1	At least 71 or B1	At least 71 or B1

*Note: Science component is subject to the evaluation of the Dean.

For the undergraduate applicant who did not meet the minimum required secondary school grades in Mathematics, Science and English or its equivalent, his/her admissions depends on the following criteria:

Programme	Secondary School Grade	Placement Test in English (OOPT)	Remarks
All Programmes	60-79 % grade in English	Score ≥ 55 %	No need for remediation in English
		Score < 55 %	Remediation in English
Engineering (BSIE, BSME, BSEnE), Computing (BSCS, BSIT) Business (BSBI, BSAF)	For Commercial Track: Score 60-79% in Math For Scientific and technical Track: Score 60-69% in Math	N/A	Remediation in Math
	For Science score <60%	N/A	Tutorial class in general sciences
International Business	Score <60% in Math	N/A	Remediation in Math

All Programmes	CGPA < 60% for Bahraini and KSA CGPA < 41% for Indian and Pakistan	N/A	Will be subjected to 5% admission rule of UTB (As explained under note)

*This is applicable to Bahraini and similarly equivalent qualification

a. Secondary Grade in English

A qualified applicant for all programmes whose secondary school grade in English is within 60-79%, needs to take the placement test in English (OOPT). If the OOPT test result is 55 or above, applicant will not take remediation course in English. However, if the result is lower than 55%, applicant will take remediation course in English.

b. TOEFL/IELTS

Qualified applicant who attain the score of at least 500 (173 CBT, 61 iBT) for TOEFL, or with a score of 5.5 for IELTS, is exempted to sit the required English placement test.

c. Secondary Grade in Math

A qualified applicant for Engineering (BSIE, BSME, BSEnE), Computing (BSCS, BSIT) or Business (BSBI, BASF) programme who has a secondary grade score in Math of 60-79% for commercial track and 60-69% for scientific and technical tracks and lower than 60% for the International Business programme has to take the remediation course in Math.

Note: UTB can accept new students equivalent to 5% of the total enrollment where student applicant has a CGPA below 60% but not lower than 50% from Bahraini Schools; below 41% but not lower than 33% from Indian and Pakistan Schools; and for other non-Bahrain based Schools, it will be based on the passing mark of the school. The 5% is subject to strict evaluation by the dean and the applicant's score in the OOPT and the secondary school grades.

d. Secondary Grade in Science

A qualified applicant for Engineering (BSIE, BSME, BSEnE), Computing (BSCS, BSIT) or Business (BSBI, BASF) programme who has a secondary grade score in science of lower than 60% has to take tutorial class in general science before taking any university-level science course.

B. For Undergraduate Transfer Student Applicants

Application Requirements:

1. Completely filled out an admission application form
2. Official Transcript of Records (TOR) from the university previously attended. Rules and regulations of the HEC-Bahrain regarding the authentication of foreign certificates and private school certificates are to be applied when necessary.
3. Course description of all completed courses for which transfer credit is sought (authenticated by the originating university)
4. Certificate of Transfer from the university previously attended stamped by MOE, if any.
5. Withdrawal Certificate stamped by MOE
6. Submission of all required documents stated in the admissions policy.
7. The applicant should have a good moral standing from the university from which he/she is transferring.

Admissions Requirements:

a. For Bahrain and KSA qualifications, the applicant should have at least a secondary school average of 60%. For non-Bahrain secondary qualifications (Indian and Pakistan) the applicant should have at least 41% secondary school average; and for other non-Bahraini qualifications please refer to the table of cut-off.

b. If the applicant has taken and passed courses in English and Mathematics in the previous university, the applicant will be exempted in taking the remedial courses in both English and Mathematics. The applicant may proceed to mainstream university courses and is eligible to apply for credit transfer.

c. If the applicant has not taken any courses in English, he/she shall take the OOPT. If the results on the two parts of OOPT results is passed, he will proceed to university English courses, otherwise, he/she will enroll the remedial courses in English where he/she fails.

d. If the applicant has not taken any course in Mathematics, the basis for evaluation whether remedial course in mathematics is required or not is the score in mathematics subjects in his/her last year in the secondary school certificate using the table presented earlier.

The transfer of course credits is accepted at UTB provided that courses applied for crediting are equivalent to the courses where credit will be transferred. Practicum (Internship) course is eligible for credit transfer with the same practicum (internship) course from other university or re-admitted student from UTB .

The University requires the undergraduate student to complete at least 50% of the required credit units/hours of a programme in residence at UTB . The maximum credit units/hours that are eligible for transfer credits should not exceed two-thirds (66%) of the required credit units/hours based on his/her original degree from another university.

16. Key Resources of information about the programme

1. Included in the University Course Catalogue
2. Included in the College Catalogue
3. Uploaded on the UTB website

17. Curriculum Skills Map

Year / Level	Course Code	Course Title	Core (C) or Option (O)	Program Learning Outcomes					
				1	2	3	4	5	6
Year 1 1st Tri	ENGL611	English Communication Skills1	(C)			√			
	MATH611	College Algebra	(C)	√					
	ARAB600	Arabic Studies	(C)				√		
	EUTH400	Euthenics1	(C)						
	ECON600	Introduction to Economics	(C)	√			√	√	
	HUMR600	Human Rights	(C)				√		
	CSIT611	Introduction to Computers and IT	(C)	√		√		√	√
Year 1 2nd Tri	ENGL621	English Communication Skills2	(C)			√			
	EUTH401	Euthenics2	(C)						
	MATH622	Discrete Mathematics	(C)	√					
	HIST600	History of Bahrain and the GCC Region	(C)			√			
	CSIT621	Computer Programming1	(C)		√			√	√
	CSIT622	Multimedia Development	(C)		√	√		√	√
	CSIT623	Digital Design	(C)		√			√	

17. Curriculum Skills Map

Year / Level	Course Code	Course Title	Core (C) or Option (O)	Program Learning Outcomes					
				1	2	3	4	5	6
Year 1 3rd Tri	ENGL631	Speech and Oral Communication	(C)			√			
	MATH631	Differential Calculus with Analytic Geometry	(C)	√					
	CSIT631	Computer Programming2	(C)	√	√			√	√
	CSIT632	Web Content Management	(C)		√	√	√	√	√
	CSIT633	Introduction to Green Computing	(C)	√	√	√	√	√	
	CSIT634	Computer Organization and Architecture	(C)	√	√	√		√	
Year 2 1st Tri	MATH621	Probability and Statistics	(C)	√					
	CSIT711	Web Design Techniques and Tools	(C)	√	√	√			√
	CSIT712	Data Structures	(C)	√	√			√	√
	CSIT713	Data Communications and Networking 1	(C)		√	√	√	√	
	CSIT714	Professional Ethics in IT	(C)			√	√	√	
	CSIT715	Introduction to Management Information System	(C)	√	√	√	√		
Year 2 2nd Tri	ENGL711	Technical Writing	(C)			√		√	
	CSIT721	Database Management Systems 1	(C)	√	√			√	√
	CSIT722	Operating Systems	(C)	√	√	√		√	
	CSIT723	Data Communications and Networking 2	(C)	√	√	√		√	
	CSIT724	System Administration	(C)	√	√			√	√
	CSIT725	Technopreneurship	(C)	√		√	√	√	
Year 2	CSIT731	Blockchain technology and Application	(C)	√		√		√	
	CSIT732	System Analysis and Design	(C)	√	√	√			√

17. Curriculum Skills Map

Year / Level	Course Code	Course Title	Core (C) or Option (O)	Program Learning Outcomes					
				1	2	3	4	5	6
3rd Tri	CSIT733	IT Project Management	(C)		√	√	√	√	√
	CSIT734	Cyber Security for Information Technology	(C)	√	√	√		√	√
	CSIT735	Cryptographic Algorithms	(C)	√	√			√	√
	CSIT736	Specialization Elective 1	(E)						
Year 3 1st Tri	CSIT811	Software Design and Development	(C)	√	√	√		√	√
	CSIT812	Human-Computer Interaction	(C)		√		√	√	
	CSIT813	Information Security and Governance	(C)	√		√	√	√	
	CSIT814	Specialization Elective 2	(E)						
	CSIT815	Specialization Elective 3	(E)						
	CSIT816	Specialization Elective 4	(E)						
Year 3 2nd Tri	CSIT821	System Integration	(C)	√				√	√
	CSIT822	Embedded Systems	(C)	√	√	√			√
	CSIT823	Mobile Programming	(C)		√	√		√	√
	CSIT824	Specialization Elective 5	(E)						
	CSIT825	Specialization Elective 6	(E)						
	CSIT826	Specialization Elective 7	(E)						
Year 3 3rd Tri	CSIT832	Practicum in IT	(C)	√	√	√	√	√	√
	CSIT833	Research Project A	(C)	√		√	√	√	
	CSIT834	Elective – 1 : Software Expertise	(E)						
	CSIT835	Specialization Elective 8	(E)						
	CSIT836	Specialization Elective 9	(E)						
	CSIT841	Internet of Things	(C)	√	√	√			√

17. Curriculum Skills Map

Year / Level	Course Code	Course Title	Core (C) or Option (O)	Program Learning Outcomes					
				1	2	3	4	5	6
Year 4 1st Tri	CSIT842	Research Project B	(C)	√	√	√	√	√	√
	CSIT843	Elective 2: Intelligent Systems	(E)						
	CSIT844	Specialization Elective 10	(E)						
	CSIT845	Specialization Elective 11	(E)						
	CSIT846	Specialization Elective 12	(E)						
COMPULSORY ELECTIVES									
	CSIT834 – A	Parallel and Distributed Computing	(E)	√	√				√
	CSIT834 – B	Enterprise Resource Planning	(E)	√		√		√	
	CSIT834 – C	Compiler Construction	(E)	√				√	√
	CSIT843 – A	Artificial Intelligence and Machine Learning	(E)	√		√		√	√
	CSIT843 – B	Expert Systems	(E)	√	√	√			
	CSIT843 – C	Principles of Data Science	(E)	√				√	√
SPECIALIZATION ELECTIVES									
	CSIT736 – CS	Introduction to Digital Forensics	(E)	√	√			√	√
	CSIT814 – CS	Network Security	(E)	√		√	√	√	√
	CSIT815 – CS	Security Methods and Practices	(E)	√	√	√		√	√
	CSIT816 – CS	Ethical Hacking	(E)	√	√	√		√	√
	CSIT824 – CS	Wireless Networks	(E)	√	√	√		√	√
	CSIT825 – CS	System and Security Administration	(E)	√	√	√		√	√

17. Curriculum Skills Map

Year / Level	Course Code	Course Title	Core (C) or Option (O)	Program Learning Outcomes					
				1	2	3	4	5	6
	CSIT826 – CS	Intrusion Detection and Prevention Systems	(E)	√	√	√		√	√
	CSIT835 – CS	Cloud Computing	(E)	√		√	√	√	
	CSIT836 – CS	Applied Cyber Security	(E)	√	√		√	√	√
	CSIT844-CS	Advanced Cryptographic Algorithms	(E)	√	√	√		√	√
	CSIT845-CS	TCP/IP and Routing	(E)	√	√	√		√	√
	CSIT846-CS	Mobile Internet Technology	(E)	√	√	√		√	√
	CSIT736 – DA	Database Management Systems 2	(E)	√	√			√	√
	CSIT814 – DA	Data Integration	(E)	√	√			√	√
	CSIT815 – DA	Database Administration	(E)	√	√			√	√
	CSIT816 – DA	Data Mining and Analysis in Information Technology	(E)	√		√		√	√
	CSIT824 – DA	Web Mining and Information Retrieval	(E)	√		√		√	√
	CSIT825 – DA	Big Data Analytics in Business Intelligence	(E)	√		√		√	√
	CSIT826 – DA	Big Data Architecture and Design	(E)	√	√		√	√	√
	CSIT835 – DA	Cloud-based Data Distribution and Virtualization	(E)	√		√	√	√	
	CSIT836 – DA	Principles of Data Science and Visualization	(E)	√				√	√
	CSIT844 – DA	Computational Thinking with Python	(E)	√	√			√	√

17. Curriculum Skills Map

Year / Level	Course Code	Course Title	Core (C) or Option (O)	Program Learning Outcomes					
				1	2	3	4	5	6
	CSIT845 – DA	Data Interpretation and Statistical Analysis in Information Technology	(E)	√				√	√
	CSIT846 – DA	Database Driven Web Applications	(E)	√	√			√	√
	CSIT736 – AD	Database Management Systems 2	(E)	√	√			√	√
	CSIT814 – AD	Python Programming	(E)	√	√			√	√
	CSIT815 – AD	Database Administration	(E)	√	√			√	√
	CSIT816 – AD	Agile Project Management	(E)	√	√			√	√
	CSIT824 – AD	C# Programming and Application Development	(E)	√	√			√	√
	CSIT825 – AD	Mobile Application Development	(E)	√	√	√		√	√
	CSIT826 – AD	Computer Graphics and Applications	(E)	√	√			√	√
	CSIT835 – AD	Cloud Computing	(E)	√		√	√	√	
	CSIT836 – AD	Server Side Programming	(E)	√				√	√
	CSIT844 – AD	Software Quality Assurance	(E)		√		√	√	√
	CSIT845 – AD	.Net Technologies	(E)	√	√			√	√
	CSIT846 – AD	Software Testing Tools	(E)	√		√	√		√

Course Description

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
ENGL611	English Communication Skills 1	3	0	3
This is an introductory course in English communication designed to provide comprehensive, up-to-date and relevant instruction in the correct use of grammar. It intends to build up students' confidence in communicating their thoughts, ideas, information and messages through the functions and structures of different words, phrases, clauses, sentences and paragraphs.In addition, the integration of language skills increases their communicative competence and prepares them for the academic and social challenges in college and beyond.				
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**
MATH611	College Algebra	3	0	3
This course is designed to familiarize learners with main theories, principles and concepts of college algebra that are useful in analysis and simplification of basic and some advanced mathematical problems. Content includes functions which are polynomial, rational, exponential, logarithmic and related equations. Sketching graphs, Matrices, determinants, progressions and inequalities as applied to engineering.				
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**
ARAB600	Arabic Language	3	0	3
The course focuses on the fundamentals of Arabic language, such as reading, analyzing, and critique. It explains the characteristics of the required texts, which deal with different literary genres, proseand poetry. The course also focuses on the understanding and application of grammatical rules and basic morphological methods in Arabic, taking into account the correct spelling skills.				
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**
EUTH400	Euthenics 1	**1**	**0**	**0**
This course is designed to bring in the policies and procedures in the university, to guide the students in the performance of their respective role and to become adept on ideals needed in their academic pursuit. Thus,				

students are oriented on the history, vision, mission, values and objectives of the university, the services and academic support available, the academic and non-academic policies, the different misconduct and violations with corresponding penalties in which the learning objectives are better facilitated by various classroom discussion through collaborative team work learning experience.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
ECON600	Introduction to Economics	3	0	3

The course presents tools of economic analysis, demand and supply, price discrimination and income distribution in a systematic way which imparts intuitive appreciation of the power and scope of microeconomics. The learners are introduced to the economic realities that a country is facing today along with some statistical tools to understand these broader economic realities. The learners who have no prior exposure to this course will be to develop an understanding of the basic tools, concepts and theories of microeconomics.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
HUMR600	Human Rights	3	0	3

This course makes the students able to know the background, main concepts of Human Rights and the philosophical thoughts and Islamic view which contribute in modern Human Rights. It makes them able to analyze what is mentioned in different kinds of Human Rights sources as Universal Declaration of Human Rights, International Covenant on Civil and Political Rights and International Covenant on Economic, Social and Cultural Rights. It deals in the same approach with the National Sources of Human Rights such as the Constitutional Law of Kingdom of Bahrain andNational Action Charter with applications as well. The course makes the students able to analyze, discuss and debate Human Rights issues in different ways..

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT611	Introduction to Computers and IT	2	2	3

This course covers a detailed knowledge and understanding of computer hardware and software. It includes the discussion of number systems, networking and the internet and the interdisciplinary science of computing. It also provides a discussion of programme development structures, algorithm and flowchart development.
The laboratory delivers practices in Microsoft 365 Apps, configuring web browsers security, configuring E-mail security, configuring OS security.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
ENGL621	English Communication Skills 2	3	0	3

This is an intermediate course in English communication geared towards equipping the college students with writing skills in preparation for academic writing. It progresses from familiarizing the sentence conventions to balancing the structures of the sentence for variation and rhythm. Further, it enables students to follow the principles that govern the composition writing in achieving unity, coherence and

emphasis; to improve their expository, descriptive, narrative and argumentative works and to get hold of the discipline in academic writing for future advantages by providing them the opportunity in adhering the process of writing for effective communication.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
EUTH401	Euthenics 2	1	0	0

This course is designed to provide the discussion on the students' rules and regulations of the university in order to practice the right conduct of behavior inside and outside the university premises. It intends to teach the students on the different stages of personality development, the equivalent penalties in different academic offences and factors that influence behavioral multiple intelligences. Further, the incorporation of oral/written communication through individual and group discussions can encourage learners to ponder on the meaning of life and discover the purpose of their existence.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
MATH622	Discrete Mathematics	3	0	3

This course introduces fundamental concepts and techniques in set theory in preparation for its many applications in computer science. Topics include propositions, predicates, proofs, sets, relations, functions, graphs and trees. It simplifies and evaluates basic logic statements including compound statements, implications, inverses, converses, and contrapositives using truth table and the properties of logic.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
HIST600	History of Bahrain and the GCC Region	3	0	3

This Course includes the history of the Kingdom of Bahrain and the Arabian Gulf region. It includes the important events in Bahrain and the Arabian Gulf region and their impact on the current situation. It covers the strategic importance of Bahrain, starting with "Ancient civilizations and passing through" the Islamic era, Bahrain's entry into Islam, Portuguese occupation, competition of powers in the 17th century and the rise of a tribe of Al-Atub. It includes the history of Bahrain under the British protection and the conventions between Bahrain and Great Britain up to British troops leaving the region. It describes the places and persons as well as the historical developments and achievement in Bahrain during the time of Al- Khalifah. It includes independence of Bahrain, issuing of the first constitutional law, reform project by His His Majesty King Hamad, constitutional amendments, establishment of GCC, history of Arab Gulf states. It makes the student able to present his patriotic character through historical discussions

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT621	Computer Programming 1	2	2	3

This course covers detailed knowledge in problem solving and algorithm development, with emphases on developing good programming habits, and programming in a modern computer language. The course familiarizes the students with the features of object-oriented programming and its applications to solve the problems. It includes a discussion of an overview of the Java language syntax, including packages, classes, methods, variables, conditional statements, control flow and Arrays.

The laboratory focuses on the implementation of the programming theories and concepts in Java programming language.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT422	Multimedia Development	2	2	3

This course provides detailed information and some advanced necessary skills on multimedia development and delivery. The course familiarizes the students with the components of multimedia, its applications, underlying techniques of incorporating multiple media, compression and sharing. Students will learn to apply the art of visual communication using multimedia technologies.
The laboratory focuses on training the students to implement the theoretical knowledge that they have gained in lecture along with their creativity using any multimedia software.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT623	Digital Design	2	2	3

TThis course focuses on the concept of digital design and provides an overview of the principles underlying coding systems, logic gates, digital circuits, Boolean function and Boolean algebra. It extends to the combinational logic circuits which comprise Encoder, Decoder and Multiplexer and sequential logic circuits include Latches, flip-flops, registers and counters.
The laboratory consists of hands-on assignments on Logic Gate Designer Simulation to illustrate concepts discussed in the class and to give students the opportunity to build and test real systems

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
ENGL631	Speech and Oral Communication	2	2	3

This is a developmental course in English communication geared towards competent, efficient and effective interpersonal speaking across communicative contexts. It refines oral communication skills through accurate articulation of segmental phonemes, pronunciation drills and enunciation of the suprasegmental features of speech, specifically sentential stress and intonation. Further, it incorporates the mechanics and techniques of speech craft and delivery with emphases on practical speaking experiences and analysis of audience psychology, which are deemed applicable in diverse speech situations.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
MATH631	Differential Calculus with Analytic Geometry	5	0	5

This course is intended to develop practical skills in differential calculus and analytic geometry. Emphasis is placed on functions, limits and continuity, fundamental concepts of analytic geometry, explicit and implicit differentiation of algebraic and transcendental functions, conics, higher derivatives, polar coordinates and its applications (equations of tangent and normal lines, sketching polynomial curves, maxima and minima problems and time rates

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT631	Computer Programming 2	2	2	3
This course covers object-oriented techniques using modern fourth generation language. Topics include inheritance, method overloading, overriding, polymorphism, packages, exception handling, multithreading, file operations and Event driven programming using swing components. The laboratory focuses on the implementation of the programming theories and concepts in Java programming language.				
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**
CSIT632	Web Content Management	1	2	2
This course explores the use of the three most popular open-source web-based content management systems to create dynamic and flexible websites. Students explore the fundamentals of planning dynamic websites, CMS database management, developing CSS-controlled site templates, and creating database-driven websites through the planning and creation of their own topic-based sites.				
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**
CSIT633	Introduction to Green Computing	3	0	3
This course empowers students to reduce the energy use, waste, and other environmental impacts of IT systems while reducing life cycle costs, thereby improving competitive advantage. Students learn how to measure computer power usage, minimize power usage, procure sustainable hardware, design green data centers, recycle computer equipment, configure computers to minimize power, use virtualization to reduce the number of servers, and other green technologies. Students also learn how to make green IT an integral part of organizational culture and planning, to foster long term sustainable information technology.				
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**
CSIT634	Computer Organization and Architecture	2	2	3
This course provides critical knowledge and understanding of computer organization and architecture, functions, components and their interconnections. It also describe theories, principles and concepts of memory hierarchy and organization; I/O peripherals and interfacing; instruction sets, addressing modes and access; processor structure and functions including interrupts, RISC and CISC. Through laboratory and in-course project, the students will creatively implement complex applications of microprocessor-based systems using Assembly language				

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
MATH621	Probability and Statistics	3	0	3
This course provides a demonstration of the main concepts of probability and statistics with applications. IT also covers identifying the theorem of probability and linked with real life problems. How to differentiate				

between the combination and permutation, Explain how to find the mean and variance from the moment generating function. Explain and interpret the findings from different hypothesis tests for decision making. Finally, SPSS will be used to run the statistical measures (e.g. hypothesis tests and regression model)

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT5711	Web Design Techniques and Tools	2	2	3

This course focuses on dynamic database-driven Web site development. It covers more advanced tools and techniques for designing web sites using current web design and development tools. It also includes client-and-server-side scripting, maintaining persistent information on the Web, user-interface design concepts, client-side and server-side technologies, Web Site Management with Content Management Systems (CMS) and Web databases.
The laboratory focuses on implementing a Web Application using tools such as PHP, MySQL, PostgreSQL, Apache and AJAX.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT712	Data Structures	2	2	3

This course covers advanced problem solving in linear and non-linear data structures and their implementation. Topics include arrays, sorting and searching techniques, stacks, queues, linked lists, trees and hash tables. In addition, it covers various strategies for choosing appropriate structures according to the system requirements.
The laboratory portion covers the implementation of linear data structures such as stacks and queues and nonlinear data structure like trees and graphs using array and linked list.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT713	Data Communications and Networking 1	2	2	3

This course integrates the core theories, principles, concepts, structure, functions and components of the Internet and computer networks. The OSI and TCP/IP models are used to examine the services and the associated protocols in each layer. The concepts and structure of IPv4 addressing and subnetting, its application, operation and implementation to networks are discussed.
The laboratory part makes use of a range of approaches including the Packet Tracer and GNS3 to allow students to implement static routing and critically analyze network requirements, issues and/or problems. These simulators will allow the students to build networks, use appropriate devices and IP addresses, and perform configurations.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT714	Professional Ethics in IT	2	0	2

This course provides exploration and analysis of a broad range of topics regarding the ethical implications of widespread use of computer technology. Topics include socio-technical computer ethics, ethics and information technology, ethics in IT configured societies, information flow privacy and surveillance, digital intellectual property, and professional ethics in computing.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units

CSIT715	Introduction to Management Information Systems	3	0	3

The course integrates with the current Information Systems concepts and technologies. Students will learn how information systems could be used effectively at different levels of management for the purpose of decision making process. The course will cover concepts on how information system give a business or organization a competitive edge by providing technologies that help managers plan, organize, control, and lead. Includes topics such as information systems components, decision support system, e-business concepts and implementation, enterprise resource planning and common information systems used today.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
ENGL711	Technical Writing	3	0	3

This is an advanced course in English academic writing designed to deal with the application of the technical writing principles with the correspondence on business, science, and technology. It aims to develop the technical writing skills and communication of the college students thru the discussions of its elements and ethics with the use of digital technologies. Furthermore, it enables students to adapt the various communication routes in the workplace, to conceptualize suitable contents of technical writing, to understand the characteristics and other methods of communication techniques, to plan and organize advanced level tasks and to work effectively and with accountability with other team members in a creative and productive manner, in any language learning scenario when achieving personal and group outcomes.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT721	Database Management Systems 1	2	2	3

This course provides advanced core theories and practical skills in the databases and database management systems with information technology applications. The theoretical knowledge covers Database Environment, Relational Model, Database Operations, Structured Query Language, Entity Relationship Model and Normalization. It exposes the student to the advance concepts and techniques in database and development as well provides a foundation for research in databases.

The laboratory practices the Data Definition Language (DDL) Commands, Data Manipulation Language (DML) Commands, Data Query Language (DQL) Commands, Transaction Control Language (TCL) Commands, SQL Built-in Functions, Constraints, Joins, GroupBy Command, Subqueries and Database Objects.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT722	Operating Systems	2	2	3

This course provides advanced and detailed information about the components and functionalities of an operating systems. Topics include operating system structures, process management & scheduling, memory management, virtual memory management, deadlocks, file systems, directory structure, protection, security and distributed operating systems.

In laboratory, the various operating system commands are illustrated using Windows and Linux Operating Systems. scheduling, memory management and page replacement algorithms are implemented using Java.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units

CSIT723	Data Communications and Networking 2	2	2	3

This course provides an in-depth and advanced discussion of routing technology. It integrates the core theories, concepts, functions and operations of a router including the principles and applications of routing protocols. Topics include router components and configuration; Unicast and Multicast routing protocols: RIPv1, RIPv2, EIGRP, OSPF and BGP; VLSM and IPv6.
The students make use of a range of approaches including the Packet Tracer, GNS3 and the actual network devices in the laboratory in performing advanced and complex network configurations using the different routing protocols and in the critical analysis of network requirements, issues and/or problems.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT724	System Administration	2	2	3

This course provides critical knowledge and experience for IT professionals. Students will have the knowledge required to assemble components based on customer requirements. Install, configure and maintain devices. PCs and software for end users understand the basics of networking and security/forensics properly and safely diagnose, resolve and document common hardware and software issues while applying troubleshooting skills Student will also provide appropriate customer support; understand the basics of virtualization, desktop Imaging and deployment.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT725	Technopreneurship	3	0	3

This course discusses on creative new venture in internet marketing. The road to entrepreneurial success is long, winding and strewn with pitfalls, obstacles and blind turns. This course intends to give an understanding of technopreneurship fundamentals. The topics covered include in information age, developing business plan, financing and marketing business, innovation and creativity, financial management, and products identification. Students will be exposed to various case studies on successful entrepreneurs.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT731	Blockchain Technology and Applications	3	0	3

This course will discuss the limitations of the Internet for business and economic activity, and explain how blockchain technology represents the way forward. This course includes what blockchain is, how it works, and why it is revolutionary. Moreover it discusses as mining, hashing, proof-of-work, public key cryptography, and the double-spend problem. Also describe seven design principles for blockchain technology, and the challenges facing the people developing it, players in the blockchain ecosystem, and consider students own role in stewarding the blockchain revolution.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT732	System Analysis and Design	2	2	3

The course describes the concepts and methods used in the analysis and design of computer-based information systems. It includes the discussion of typical computer systems life cycles, system requirements and specification, feasibility concerns, system design, fault tolerance, people and interface issues, compliance with ethical and legal standards and quality issues.
The laboratory focuses on training the students with hands-on experience Microsoft Visio using UML.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT733	IT Project Management	2	2	3

This course focuses on the management and development of software project management techniques and methods. It covers project definition, project scheduling, team management, software measurement and estimation techniques, risk analysis, project management tools and software process models, process measurement, software project planning, cost estimation and scheduling, project management tools, factors influencing productivity and success. Furthermore, it covers the software process standards and process implementation, software contracts and intellectual property and approaches to maintenance and long term software development.
In the laboratory focuses on training the students with hands-on experience on UML using Ms Visio

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT734	Cyber Security for Information Technology	3	0	3

This course is designed to provide concepts and practices cyber security with sufficient coverage of essential topics required for entry-level cyber security certifications. An effective cyber security defense consists of four distinct challenges: securing the infrastructure, securing devices, securing local networks, and securing the perimeter. Overcoming these challenges requires a detailed understanding of the concepts and practices within each realm. This course covers each challenge individually for greater depth of information, with real-world scenarios that show what vulnerabilities look like in everyday computing scenarios.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT735	Cryptographic Algorithms	3	0	3

This course emphasizes systematic authentication to follow the advancement of cryptographic techniques and security protocols. It exposes the various protocols and cryptographic functions to estimate the strength of security using advance encryption/decryption algorithm. It also discusses the security enhancement techniques such as symmetric and asymmetric encryption and key exchange management. In addition, it investigates the various complex security issues and develops a high level security mechanism in contemporary networked computer systems.

The laboratory portion implements the complex level conversion of plain text to cipher text using RSA algorithm, Diffie-Hellman-Key-Exchange algorithm and Stream Cipher Technique to embed security in Java. In addition it identifies the suitable cryptographic algorithms for a given problem to resolve security issues.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT736 AD	*Database Management Systems 2*	**2**	**2**	**3**
This course covers advanced and critical issues of database management systems. Topics Include query processing and query optimization, concurrency control, and client-server architecture, data warehouse, data mining, emerging database technologies. The laboratory focuses on training the students with hands-on experience with advanced PL/SQL using Oracle. Moreover it focuses on administrative level commands				

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT736 CS	*Introduction to Digital Forensics*	**3**	**0**	**3**
This course provides a comprehensive overview of incident response & computer forensics. It addresses incident detection, response, and those aspects of computer forensics pertinent to the investigation of trade secret theft, economic espionage, copyright infringement, piracy, and fraud. It discusses the procedures for gathering, preserving, and analyzing forensic evidence and its application to both computer and network incident response forensics.				

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT736 DA	*Database Management Systems 2*	2	2	3
This course covers advanced and critical issues of database management systems. Topics Include query processing and query optimization, concurrency control, and client-server architecture, data warehouse, data mining, emerging database technologies. The laboratory focuses on training the students with hands-on experience with advanced PL/SQL using Oracle. Moreover it focuses on administrative level commands				

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT811	Software Design and Development	**2**	**2**	**3**
This course demonstrates the advanced concepts in software design paradigms; identify software requirements and use Computer Aided Software Engineering in designing and developing efficient software application. The course covers an in-depth survey of software process, project management, project metrics, project scheduling, risk management, software testing and software quality assurance. The course also covers the implementation of the proposed system using structured programming, software reviews, software testing techniques and strategies, software maintenance. The laboratory focuses on providing students with hands-on experience using different tools to design a mini project such as Microsoft Visio, Visual Studio and others.				

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT812	Human Computer Interactions	3	0	3
This course discusses advanced theories and techniques in Human-Computer Interaction (HCI) systems with variety of methods to evaluate computational abilities. It includes interface evaluation techniques, human-				

centered software evaluation and development, graphical user interface (GUI), Models of the systems, HCI aspects of multimedia systems, implementation and evaluations of HCI Models and groupware systems.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT813	Information Security and Governance	2	2	3

This course provides a discussion of the importance of information security and support to protect the information resources of an organization as well as the fundamentals of security in the networked environment. Topics include information security (IS) issues; coverage of risks and vulnerabilities; detection of and reaction to threats to information resources; encryption and authentication technologies such as classical cipher design and analysis, modern private key block cipher design, details, public key encryption algorithms, digital signatures and hash functions, key management, X.509 certificates and certificate authorities; Point-to-Point Protocol (PPP): Password Authentication Protocol (PAP) and Challenge Handshake Authentication Protocol (CHAP).

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT814 AD	*Python Programming*	2	2	3

This course discusses core programming concepts like data structures, conditionals, loops, variables, functions, object-oriented programming and graphical user interface-driven applications. It also includes an overview of the various tools available for writing and running Python, and gets students coding quickly.
The laboratory focuses on training the students with hands-on coding exercises using commonly used data structures, writing custom functions, and reading and writing to files.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT814 DA	*Data Integration*	2	2	3

This course covers the impact data integration has on data analytics and how that impact is managed across the spectrum of data management and data analytics. Learners research technologies common to the IT industry that are used to integrate data from multiple resources. Learners gain an understanding of those data integration tools and techniques and apply them to data analysis.
The laboratory focuses on training the students with hands-on experience on several open-source software tools, including Apache Hadoop.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT814 CS	Network Security	2	2	3

This course covers discusses the advanced and essentials concepts of security in the networked environment. It includes compliance and operational security, threats and vulnerabilities, controls and protection methods, and encryption and authentication technologies in order to attain secured working environment.
In laboratory part, Cisco networking simulation tools are used to simulate, configure and apply Cisco compatible authentication protocols on the simulated networks

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT815 AD	Database Administration	2	2	3
This course focuses on the roles and responsibilities of database administrators and explores how they contribute to data management. Learners determine how database design, administration, regulations, and standards impact effective data management processes. Learners also explore the tools and strategies that allow a database administrator to support data management. Topics include Oracle Database Architecture, Database Installation, Creating Database Using DBCA, Database Instances, ASM Instances, Network Environment, Storage Structures, User Security, Concurrency Control Mechanisms, Database Auditing and Maintenance, Performance Management, Backup and Recovery Concepts, Moving Data, Database Restart. Whole content will be explained in Oracle environment			
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**
CSIT815 DA	Database Administration	2	2	3
This course focuses on the roles and responsibilities of database administrators and explores how they contribute to data management. Learners determine how database design, administration, regulations, and standards impact effective data management processes. Learners also explore the tools and strategies that allow a database administrator to support data management. Topics include Oracle Database Architecture, Database Installation, Creating Database Using DBCA, Database Instances, ASM Instances, Network Environment, Storage Structures, User Security, Concurrency Control Mechanisms, Database Auditing and Maintenance, Performance Management, Backup and Recovery Concepts, Moving Data, Database Restart. Whole content will be explained in Oracle environment			
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**
CSIT815 CS	Security Methods and Practices	3	0	3
This course provides the foundation for understanding the key issues associated with protecting information assets, determining the levels of protection and response to security incidents, and designing a consistent, reasonable information security system, with appropriate intrusion detection and reporting features. The purpose of the course is to provide the student with an overview of the field of information security and assurance. Students will be exposed to the spectrum of security activities, methods, methodologies, and procedures. Coverage will include inspection and protection of information assets, detection of and reaction to threats to information assets, and examination of pre- and post-incident procedures, technical and managerial responses, and an overview of the information security planning and staffing functions.			
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**
CSIT816 AD	Agile Project Management	3	0	3
This course focuses on the core components of Agile project management, examining how it is distinct from traditional project management and equipping course participants with strategies and techniques for successful Agile project implementation. Students will practice the role of a project manager facilitating Agile practices towards achieving desired outcomes, as well as take a more in-depth look at the fundamental Agile concepts of adaptive planning, customer collaboration, and value-driven delivery in dynamic and often highly constrained environments			
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**

CSIT816 – DA	*Data Mining and Analysis in Information Technology*	2	2	3

This course explores how the advanced and complex data mining interdisciplinary field brings together techniques from databases, statistics, machine learning, and information retrieval. It covers the field of data mining and includes the topics data preprocessing, predictive modeling, model evaluation techniques, and clustering, classification, and association analysis and anomaly detection.

The Laboratory session discusses Weka, data mining tool and using that perform pre- processing, classifications and clustering based on real word data sets.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT816 – CS	*Ethical Hacking*	2	2	***3***

This course will explore the various means that an intruder possesses to gain access to computer resources. We will investigate weaknesses by discussing the theoretical background behind, and whenever possible, actually performing the attack. We will then discuss methods to prevent/reduce the vulnerability

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT821	System Integration	3	0	3

This course focuses on the information systems in organizations, the process by which different computing systems and software applications are linked together physically or functionally. It examines the strategies and methods for blending a set of interdependent systems into a functioning or unified whole, thereby enabling two or more applications to interact and exchange data seamlessly. The course will explore tools and techniques for systems integration as well as proven management practices for integration projects.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT822	Embedded System	3	0	3

This course will cover the basics of embedded system organization, system on programmable-chip technologies and real-time systems. It provides the advance knowledge required for embedded computer design and development as well as real-time operating systems. Students are introduced to software development concepts applicable to real time and embedded systems

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT823	Mobile Programming	2	2	3

This course provides a systematic explanation of advanced concepts in mobile programming and provide an in depth coverage of mobile systems and it application development. It includes the mobile user interface, application development standards and the mobile technology. Moreover, it covers various mobile computing applications using common paradigms in mobile application frameworks and development environments.

The Lab component of the course includes developing apps based on UI widgets, custom views and layouts, notification, toast, menus, dialog, list and data storage using Java and XML in Android Studio.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units

CSIT824 – AD	*C# Programming and Application Development*	*2*	*2*	***3***

This course is an introduction to computer programming for Windows. Emphasis will be on the fundamentals of structured design, development, testing, and implementation, and documentation, including language syntax, data and file structures, input/output devices, files, and databases. The following C# topics will be covered: C# syntax, basics of C# classes, interfaces, exception handling,
The laboratory focuses on training the students with hands-on coding exercises using commonly used data structures, writing custom functions, and reading and writing to files.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT824 – DA	*Web Mining and Information Retrieval*	2	2	***3***

The primary focus of this course is on Web mining and its applications to e-commerce and business intelligence. Specifically, we will consider techniques from machine learning, data mining, text mining, and databases to extract useful knowledge from Web data which could be used for site management, automatic personalization, recommendation, and user profiling. The first half of the course will be focused on a detailed overview of the data mining process and techniques, specifically those that are most relevant to Web mining. The second half will concentrate on the applications of these techniques to Web and e-commerce data, and their use in Web analytics, user profiling and personalization.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT824 – CS	*Wireless Networks*	2	2	***3***

This course introduces the students to the applied topic of Wireless Networks, focusing on applied methods, tools and technologies, as well as practical experience in designing and implementing wireless networks. Topics include hardware, software, data, applications, communication, design and installation of wireless networks, together with the implementation, performance, security and limitations of such systems.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT825 – AD	*Mobile Application Development*	*2*	*2*	***3***

The course focuses on developing mobile applications. It introduces the advance concepts of mobile programming under Android platform. Topics will include introduction to Android, MVC architecture for Android, Android Software Development Kit and Compatibility, creating user interface with layer and widgets, intents and activities, etc.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT825 – DA	*Big Data Analytics in Business Intelligence*	2	2	***3***

This course covers key aspects related to the use of business intelligence (BI) systems in organizations to support business strategy. Topics include data warehousing, predictive analytics, text/web analytics, data visualization, data-mining. A mix of theory and practice with real-world cases will be used to demonstrate key principles of BI and to help students develop analytical and problem-solving skills related to BI solutions

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT825 – CS	*System and Security Administration*	2	2	***3***

This course covers the installation and configuration of mainstream operating systems, important network services, disaster recovery procedures, and techniques for ensuring the security of the system. Students develop a complete understanding of enterprise networking and how different network technologies (such as Windows, Unix based) work together to form a network. It enables the students to design, build, implement, manage, configure and troubleshoot typical enterprise-wide computer networks.

The laboratory part makes use of Packet Tracer and GNS3 to allow students to implement static routing and analyze networks. These simulators will allow them to build simple networks, use appropriate devices and IP addresses, and perform basic configurations.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT826 – AD	*Computer Graphics and Applications*	*2*	*2*	***3***

This course covers the advanced technologies underlying the generation and display of images using computer graphics algorithms. Topics include: conversion of geometric primitives, 2D and 3D geometric transformations, clipping and windowing, hidden surface and hidden line elimination, line drawing, shading, half-toning, scene modeling and animation.
The Laboratory focus on providing practical experience by using OpenGL to understand, realize and implement the concepts, theories and models learnt in the lectures. Moreover it uses MAYA for practicing on animation

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT826 – DA	*Big Data Architecture and Design*	2	2	***3***

This course provides an overview of approaches facilitating data analytics on huge datasets. Different strategies are presented including sampling to make classical analytics tools amenable for big datasets, analytics tools that can be applied in the batch or the speed layer of a lambda architecture, stream analytics, and commercial attempts to make big data manageable in massively distributed or in-memory databases. Learners will be able to realistically assess the application of big data analytics technologies for different usage scenarios and start with their own experiments.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT826 – CS	*Intrusion Detection and Prevention Systems*	2	2	***3***

This course will deal with methods that ID systems use to detect attacks against Information Networks. These methods will include auditing systems, monitoring techniques, and various Intrusion Detection Processes and technologies that can be used for discovery of Hackers and Attacks that could threaten the Confidentiality, Integrity, or Availability of an Information System. The two basic types of Intrusion Detection: Anomaly and Misuse detection will be discussed.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT832	Practicum in IT	0	12	6

This course provides the students with an opportunity to be immersed in the actual work environment along their specialization. The students are required to complete 240 hours on-site training to get hands on experience of working in the industry.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT833	Software Project A	3	0	3

This course provides guideline that will enable the students to effectively prepare a research project in relation to their field of specialization. It deals with the development of the essential ideas, concepts, principles, tools, and skills needed for developing a research project. It includes Research issues, System Analysis, System Design, Project tracking and control of a research project. It make the research proposal, problem statement, literature survey, research methodology of a research project.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT834 – A	Parallel and Distributed Computing	2	2	3

This course provides an overview of distributed and parallel systems, with special emphasis on cloud-based implementations. Topics include distributed systems and models, computer clusters for scalable parallel computing, virtual machines, cloud platform architecture, service-oriented architectures, grid computing, and peer-to-peer computing.
The Laboratory exercises will be used to demonstrate various aspects of parallel and distributed computing in NetBeans with various simulation tools like Vmware, Hadoop, CloudSIM and IBM's Bluemix.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT834 – B	Enterprise Resource Planning	2	2	3

This course serves as an introduction to Enterprise Resource Planning and also provides a solid foundation for many disciplines in common business modern information systems. Students examine how and why an ERP system is implemented and how it is integrated with existing business processes. Students examine the impact of ERP on the organization and how change can be managed. The laboratory focuses on training the students with hands-on experience using SAP

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT834 - C	Compiler Construction	2	2	3

This course covers the issues that arise in the design and construction of translators for programming languages. The topics covered include structure of one-pass and multiple-pass compilers; symbol table management; lexical analysis; traditional and automated parsing techniques, including recursive descent and LR parsing; syntax-directed translation and semantic analysis; run-time storage management; intermediate code generation; introduction to optimization; and code generation.

In the laboratory part some of the theories, methods and principles treated in the theory part are illustrated and practically applied and the laboratory focuses on training the students with hands-on experience on GCC/ANTLR.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT835 – AD	*Cloud Computing*	*3*	*0*	***3***

This course covers concepts required to build a cloud infrastructure based on a cloud computing reference model. The reference model includes five fundamental layers, namely, physical, virtual, control, and service

and three cross-layer functions, namely business continuity, security, and service management for building a Cloud infrastructure. Furthermore additional topics included Cloud infrastructure reference model, resource management, programming models, application models, system characterizations, and implementations, deployment of Cloud computing systems. Moreover this course takes an open approach to describe concepts and technologies.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT835 – DA	*Cloud -based Data Distribution and Virtualization*	3	0	***3***

This course covers concepts required to build a cloud infrastructure based on a cloud computing reference model. The reference model includes five fundamental layers, namely, physical, virtual, control, and service and three cross-layer functions, namely business continuity, security, and service management for building a Cloud infrastructure. Furthermore additional topics included Cloud infrastructure reference model, resource management, programming models, application models, system characterizations, and implementations, deployment of Cloud computing systems. Moreover this course takes an open approach to describe concepts and technologies.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT835 – CS	*Cloud Computing*	3	0	***3***

This course covers concepts required to build a cloud infrastructure based on a cloud computing reference model. The reference model includes five fundamental layers, namely, physical, virtual, control, and service and three cross-layer functions, namely business continuity, security, and service management for building a Cloud infrastructure. Furthermore additional topics included cloud infrastructure reference model, resource management, programming models, application models, system characterizations, and implementations, deployment of Cloud computing systems. Moreover this course takes an open approach to describe concepts and technologies.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT836 – AD	*Server Side Programming*	*2*	*2*	***3***

This course provides the knowledge necessary to design and develop dynamic, database-driven Web pages. This course introduces the PHP framework and syntax and covers in depth the most important techniques used to build dynamic Web sites. Students learn how to connect to any modern database, and perform hands on practice with a MySQL database to create database-driven HTML forms and reports.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT836 – DA	*Principles of Data Science and Visualization*	2	2	***3***

This course discusses the core programming concepts of MATLAB which is used for data visualization. It focuses on exploratory and statistical data analysis, data and information visualization, and the presentation and communication of analysis results.
The laboratory focuses on training the students with hands-on coding experience for data visualization using MATLAB Software

Course Code	Course Title	Lec Hrs	Lab Hrs	Units

CSIT836 – CS	Applied Cyber Security	3	0	***3***

Cyber security is a very large subject, and therefore this course is only intended to cover the current leading and pressing cyber security topics. Cyber security topics include cryptography, computer forensics, malware, networking, software development, as well as investigating the increasingly important legal and ethical issues in cyber security.
This is an applied course, which mixes theoretical skills with practical work in the lab to give hands-on experience.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT841	Internet of Things	3	0	3

This course discusses the current and leading IoT technologies for building IoT solutions for Smart Homes, Smart Campus etc., using IoT sensor, actuators and devices. It covers key concepts of IoT (Internet of Things) and challenges related to digital transformation, security and privacy. The course examines the evolution of the Internet and how the interconnection of people, processes, data, and things are transforming every industry.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT842	Research Project B	0	6	3

This course provides opportunity to students to integrate their knowledge by implementing a significant software system as part of a systems development project including proper documentation in a real-world environment

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT843 – A	Artificial Intelligence and Machine Learning	2	2	3

This course covers advanced theories and state-of-the-art techniques of artificial intelligence. Artificial intelligence (AI) is a research field that studies how to realize the intelligent human behaviors on computers. The AI is to make a computer that can learn, plan, and solve problems autonomously. The topics includes: AI methodology and fundamentals; intelligent agents; search algorithms; game playing; supervised and unsupervised learning; decision tree learning; uncertainty and probabilistic reasoning in AI; Bayesian networks; statistical learning; fuzzy logic and natural language processing

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT843 - B	Expert Systems	2	2	3

Techniques for the construction of expert systems including computer inference and knowledge acquisition; knowledge representation schemes; conceptual date analysis; plausible reasoning techniques; validation and measurement methods; production-rule programming

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT843 - C	Principles of Data Science	2	2	3

This course utilizes several open-source tools to address big data challenges, taking an "Open" or technology-neutral approach. It covers concepts, and techniques needed to deal with various aspects of data science practice, including data collection, cleansing, mangling, and integration, exploratory data analysis, predictive modeling, descriptive modeling, data product creation, machine learning algorithms, evaluation, effective communication and data visualization.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT844 – AD	Software Quality Assurance	*3*	*0*	***3***

This course discusses advanced concepts of software quality and techniques in software quality assurance, particularly software testing and validation. It presents the indepth interplay between testing, quality assurance and quality engineering to ensure the quality of the software. This course covers software quality and assurance framework, testing concepts and issues, verification and validation, inspection, software reliability, quality models and measurement and formal methods.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT844 – DA	Computational Thinking with Python	2	2	***3***

This course discusses the core programming concepts like data structures, conditionals, loops, variables, functions, object-oriented programming and graphical user interface-driven applications. It also includes an overview of the various tools available for writing and running Python, and gets students coding quickly.
The laboratory focuses on training the students with hands-on coding exercises using commonly used data structures, writing custom functions, and reading and writing to files.

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT844 – CS	Advanced Cryptographic Algorithms	2	2	***3***

This course investigates advanced topics in cryptography. It begins with an overview of necessary background in algebra and number theory, private- and public-key cryptosystems, and basic signature schemes. The course will cover number theory and basic theory of Galois fields used in cryptography; history of primality algorithms and the polynomial-time test of primality; discrete logarithm based cryptosystems including those based on elliptic curves; interactive protocols including the role of zero-knowledge proofs in authentication; construction of untraceable electronic cash on the net; and quantum cryptography, and one or more of digital watermarking, fingerprinting and steganography. Programming will be required

Course Code	Course Title	Lec Hrs	Lab Hrs	Units
CSIT845 – AD	*.Net Technologies*	*2*	*2*	***3***

This course discusses advanced skills needed for software development using Visual Programming tools. It also includes on overview of the basic structure of a VB.NET application. It also introduces the programming skills required using VB.NE and to integration of web pages using ADO.NET
The laboratory focuses on training the students with hands-on experience on Visual Studio. The students will gain skills on Visual programming and ASP.NET using the Integrated Development Environment (IDE) Visual Studio

Course Code	Course Title	Lec Hrs	Lab Hrs	Units

CSIT845 – DA	*Data Interpretation and Statistical Analysis in Information Technology*	3	0	***3***
This course is designed to introduce basic principles of statistical methods and procedures used for data analysis. It also covers the crucial topics in statistics including - data gathering, summarizing data using descriptive statistics, displaying and visualizing data, examining relationships between variables, probability distributions, expected values, hypothesis testing, introduction to ANOVA (analysis of variance), regression and correlation analysis				
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**
CSIT845 – CS	*TCP/IP and Routing*	2	2	***3***
This course presents basic networking technology and terminology, including the ISO/OSI Network Reference Model, DoD networking model, IP addressing and name resolution, and other concepts and information relevant to setting up and using TCP/IP-based networks. The course demonstrates the use of Ethereal, an open source protocol analyzer, to help readers understand how those protocols and services work, while also exploring the operation and message sequences for all key data-link, network, and transport layer protocols. In addition, students learn how to use a protocol analyzer and common IP software tools to document and troubleshoot a TCP/IP network, including basic addressing and setup, connectivity and communications, name resolution, and fundamental network services. Coverage of network security includes explanations of key exploits and vulnerabilities and how potential problems may be remedied or worked around. The course surveys real-time IP-based protocols and services including Voice over IP (VoIP) and Instant Messaging (IM) applications, with an overview of the protocols, services, and common message sequences involved.				
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**
CSIT846 – AD	*Software Testing Tools*	*2*	*2*	***3***
This course covers the aspects of software development besides programming, such as diagnosing bugs, testing, and debugging, comprise over 50% of the cost of software development. Furthermore topics covered include software maintenance tasks such as debugging, maintaining and testing. Many diverse techniques exist with their own strengths and limitations. Those Techniques as well as imparts hands-on experience with applying them to automate testing, debugging, and finding bugs in complex real-world programs.				
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**
CSIT846 – DA	*Database-Driven Web Applications*	2	2	***3***
This course focuses in the development of Web-based database applications, with an emphasis on sound database design. This course provides the concepts and skills necessary to design and develop web-based database applications. Students build a working database application using PHP and MySQL. Through hands-on projects, students will build, populate, query, and write transactions for a relational database using SQL and then develop a client application to access their database.				
Course Code	**Course Title**	**Lec Hrs**	**Lab Hrs**	**Units**

CSIT846 – CS	*Mobile Internet Technology*	2	2	***3***
This course examines the characteristics of mobile and wireless networks and the impact of these technologies on the development of software and supporting protocols. Topics covered include: mobile and wireless application design and development environments, middleware support, protocol requirements for ad-hoc and sensor networks, wireless & mobile security vulnerabilities and standards, supporting reliable communication in lossy and intermittently connected networks; challenges and architectures for wireless mobility - 4G networks, Wi-Fi, Wi-Max, Bluetooth, Mobile IP, convergence of voice and data networks.				