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جامعة شقراء
Shaqra University

Bachelor of Computer Science (BCS)
Program Handbook - V5

Computer Science Department (CSD)

College of Computing and Information Technology (CCIT)

Shaqra University (SU)

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The field of Computing is one of the most advanced scientific fields that has influenced all aspects of modern life. Continuous development has become one of the most important features of this field in which all scientific and applied efforts are focused. As the computer stands at the top of the knowledge pyramid in this age due to the rapid technological development, it becomes important for all the institutes to adapt to this particular curriculum. Therefore, the College of Computing and Information Technology (CCIT) in Shaqra University (SU) intends through the available programs and disciplines to meet the increasing needs of requirements in the field of computer science and information technology by graduating their students with good knowledge in the field of computer science. The main emphasis is given on providing theoretical and practical knowledge to compete in the labor market in light of the strong competition and rapid development witnessed by Saudi Arabia and the world at a major level. The CCIT also seeks to qualify graduates to complete their higher studies and join the elite researchers interested in the field of technology and computer science. As a newly established college, the prime focus is to identify the potential of the organization. In order to achieve this, we are working on the continuous development of the science curriculum and developing students' learning skills and attracting outstanding faculty members so that we can move towards achieving the goals of the College at a confident pace.

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Technology is a real force of change that stands behind most of the rapid developments in all aspects of life. As a result, the demand for highly skilled graduates has increased. To meet these requirements, the Agency for Educational Affairs at the College of Computing and Information Technology (CCIT) at Shaqra University seeks to provide modern, effective and sophisticated curriculum similar to those offered by other major educational institutions around the world who are able to keep pace with the rapid development of information technology. Currently, the CCIT offers a bachelor's degree in computer science, computer and network Engineering and information systems. The College's Educational Affairs Agency is also on the way to complete the requirements of local academic accreditation by the National Center for Assessment and Accreditation (NCAAA) and international academic accreditation by the Engineering Accreditation Council (ABET). In order to improve the educational process and provide it in an organized manner and based on high-quality international standards the educational affairs are trying hard to acquire such international level certificates. Thus, we can ensure that the college student shall be of immense importance. The College also strives to promote scientific research at the College, where we work to achieve leadership and excellence in both quantitative and qualitative terms, and to encourage joint research work and promote the exchange of scientific expertise and research among faculty members at the College. In view of the university's tendency to encourage graduate studies and scientific research, the college is in the process of opening two master's programs in cybersecurity and assurance, and in data science and artificial intelligence, and shall be applying for the opening of a doctoral program.

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No one can imagine living today without computers. It dominates all of our daily activities, starting from very simple to very complicated activities. The need for computer scientists appears clearly in all fields including artificial intelligence and software development projects. The contribution of computer scientists can also be seen in the development web and mobile applications, artificial intelligence solutions, game design, and so on. Indeed, it is very rare today to see a device or a piece of equipment that is not entirely or at least partially designed by computer scientists. In the Kingdom of Saudi Arabia, most of the various infrastructure projects have been developed during the last three decades. Computer scientists have been part of executing these projects. However, there is still a lack of computer scientists to contribute and push the wheel of development in the Kingdom of Saudi Arabia. Since the establishment of the Computer Science at Shaqra University, the department has been/will be committed to providing qualified computer scientist with valuable skills that should participate in the attainment of the vision of the Kingdom of Saudi Arabia 2030.

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BCS Program

The College of Computing and Information Technology (CCIT) has been established in 1434 H (2014 G), and in turn, it emphasizes the provision of the best means of education and research that serve the community and become an effective partner in the industry. The Bachelor of Computer Science (BCS) program was implemented since the establishment of the college. Since then, seven batches of students have graduated from the program during the academic years (1438 H, 1439 H, 1440 H, 1441 H, 1442 H, 1444 H, 1445 H), given that admission to new students is only given at the first semester of the academic year. In terms of education, the program provides a broad knowledge in the field of different computer science branches such as artificial intelligence and software development sectors. The College and the Computer Science department aim to establish a close relationship between professors and students and provide a university atmosphere that helps creativity, performance, acquisition of advanced knowledge, and practical skills in many important computer science fields. Through the program with a team of highly experienced instructors (i.e., associate professors, assistant professors, and lecturers) and qualified students, the college seeks to play an active role in the community and serve the national vision of Saudi Arabia (Vision 2030) as we believe that the graduates of the computer science field will play a leading role in many aspects of the vision. Furthermore, the program graduates are expected to acquire the knowledge and skills that enable them to effectively perform in the technical fields of computer science whether in governmental organizations or private sectors.

CCIT Vision

“To be a nationally distinguished college in the fields of computing, scientific research, and community service”.

CCIT Mission

“Preparing distinguished cadres to keep pace with the requirements of the job market through competitive programs in the fields of computing through an environment that encourages scientific research and community service”.

BCS Program Vision

“To be a leading program nationally and internationally in the fields of education, scientific research, and community service in computer science specialization”.

BCS Program Mission

“Preparing qualified scientific cadres in the various fields of computer science through innovative education and scientific research, which develops creative and analytical abilities that can serve the community”.

CCIT Strategic Goals

	CCIT Goals
1	Develop the college's organizational structure and academic programs.
2	Raise the efficiency of the college's academic and administrative human resources.
3	Achieve competitive educational outcomes for academic programs in keeping with job market changes.
4	Provide scientific research in the fields of computing in line with development and societal priorities.
5	Strengthen partnership with the community and effectively contributing to its development and service in the fields of computing.
6	Provide an enticing educational environment and improve teaching and learning methods.

BCS Program Strategic Goals

	BCS Program Goals
1	Graduate competent professionals to meet the growing needs for a well-qualified workforce specialized in computer science.
2	Provide program staff with opportunities for professional development.
3	Contribute significantly to scientific research and discovery of new knowledge and methods in computer science.
4	Provide a safe, healthy and enticing educational environment.
5	Offer computing consultations and community services to those in need of such services.
6	Provide students with life-long learning capabilities to adapt to rapidly changing technologies in computer science.

BCS Program Learning Outcomes (PLOs)

The BCS program has an approved and announced set of program learning outcomes (PLOs) that support its goals. The attainment of these outcomes prepares graduates to enter the professional practice in the field of computer science.

Learning Domains	BCS Program Learning Outcomes (PLOs)	
Knowledge & Understanding	**K1**	Demonstrate the knowledge of mathematics and natural sciences related to computer science.
	K2	Recognize the fundamental concepts within the body of knowledge in computer science.
Skills	**S1**	Analyze a complex computing problem and apply principles of computing (and other relevant disciplines) to identify solutions.
	S2	Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
	S3	Apply computer science theory and software development fundamentals to produce computing-based solutions.
	S4	Communicate effectively in a variety of professional contexts.
Values	**V1**	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
	V2	Function effectively as a member or leader of a team engaged in activities appropriate to the computer science discipline.

Admission and Registration Rules

1. Student Admissions

1a. Admission of Fresh students

The general requirements for admission to Shaqra University can be listed as below:

- The new student should be a holder of a secondary school certificate or its equivalent from withinthe Saudi Arabia or from outside it.
- He/She should not have obtained a high school or equivalent for more than five years. While, theuniversity council may exempt from this condition if there are convincing reasons.
- He/She should have a good behavior registry.
- He/She should successfully pass any personal interview or test that the University Councilrequires.
- He/She should be medically fit.
- He/She should obtain his approval for study if he works in any governmental or private organization.
- He/she should meet any other conditions determined by the University Council at the time of admission.

According to the admission of freshmen, the University Council determines on the proposal of the College Council the number of students who can be admitted in the next academic year. If there is anexcess in the applicant number, the selection is done according to their grades in the general secondary certificate, personal interview, and admission tests (if found). In addition, the result of the general capabilities test, which is a prerequisite for all applicants, is considered. The ratio of each applicant is calculated as follows: 40% of the general cumulative average for the second year, 30% for the general capabilities test, and 30% for the acquisition test score. It is worth mentioning that the specialization in the College of Computing and Information Technology (CCIT), Shaqra University requires that the student passes successfully all the courses of the curriculum for the full preparatory year with a rate as mentioned in the following link: https://su.edu.sa/ar/deanships/deanship-admission-and-registration/allocation-criteria-after-passing-preparatory-year

1b. Admission of International Students

The admission process for international students is somewhat as same as national ones with alladdition of the following:

- To pass the required scores of both capabilities and acquisition tests.
- The equivalent cumulative ratio (40% secondary - 30% capabilities - 30% acquisition) should bea total higher than 85 degrees.
- Not to exceed 25 years of age.
- The student must be a regular resident of Saudi Arabia.

2. Transfer of Students

2a. Transfer from Other Universities

The student may, upon the approval of the head of the department and the dean of the collegein Shaqra University, accept his transfer from outside the university according to the following rules:

- The student has studied at a recognized college or university.
- The student should not be separated from the University for Disciplinary Reasons.
- The student has spent at least two semesters at the university from which he wishes to transfer, provided that the number of study credit hours recorded in his academic record is not less than (24) hours.
- The student should study at Shaqra University at least 60% of the graduation requirements.
- The student must apply for transfer before the beginning of the semester at least five weeks.

2b. Transfer from College to Other within the University

After the approval of the head of the department and the dean of the college in Shaqra University,accept his transfer from according to the following rules:

- The student must have spent at least one semester in the college that he wants to transfer from with at least (14) credit hours.
- The student should not be interrupted, delayed or apologized for the study from the college from which he wishes to transfer.
- His cumulative average should not be less than the limit determined by the College Council and should not be less than (2 of 5).
- Transfers between university faculties are permitted only twice during the entire period of university study.

2c. Transfer from One Specialization to Another within the College

After the approval of the Dean of the College, the student may transfer from one specialization toanother within the College according to the following rules:

- Completion of entry requirements for the specialization to be transferred to.
- Not violating the capacity of the department.
- The student has spent at least one semester in the specialization in which he wishes totransfer with 14 credit hours.
- The student should not be interrupted, delayed or apologized for the study from thespecialization in which he wishes to transfer.

3. Transfer of Courses

The College Council should compare the courses studied by the student outside the university onthe recommendation of the departments that provide these courses. The student's academic record should be confirmed in the student's academic records, and should not be included in the calculationof his cumulative average according to the following rules:

- The student has studied at a recognized college or university.
- The number of hours studied by the student in the course he wants to equal should be equalto or more than the number of hours spent at Shaqra University. This rule may be to considerexceptions by a maximum of one hour.
- The content of the material studied by the student must be identical to the content of the material in the Shaqra University by not less than (70%).

4. Visiting Students

Additionally, the transfer courses can be done for the visiting students. The visiting student isdefined as the student who is studying some courses in another university or in a branch of the university to which he belongs without transferring him. His credit hours can be calculatedaccording to the following rules:

- The acceptance of the department, the faculty and the grant acceptance and registration toallow the student to study as a visiting student.
- To be studied at a recognized college or university.
- The course topics being taught by the student outside the college are equivalent to the coursetopics in his college by 70% or more.
- The maximum number of academic credit hours outside the university is 25% of the totalnumber of credit hours required to graduate from Shaqra University.
- The number of credit hours for the course which the student has studied outside theuniversity should be equal to or more than the number of credit hours in Shaqra University.

5. Attendance and Apology from Study

5a. Attendance Rules

- The regular student must attend lectures and practical lessons. He is prohibited from entering the final exam if his attendance is less than the percentage determined by the university council,but not less than (75%) of the lectures and practical lessons specified for each course during thesemester.
- A student who has been prohibited from entering the final exam, is considered to be failing in the course and his final degree will be denied (DN)
- The College Council or its authorized representative may exclude the prohibition and allow thestudent to enter the test. But the student must present an excuse accepted by the Council. The University Council shall determine the attendance rate, not less than (50%) of the lectures and practical courses specified for the course.
- The student who misses the final test is zero in that test. His final result is calculated from his quarterly work degrees.

5b. Apology Rules

- A student may withdraw with the excuse of one or more courses during the semester with thefollowing rules;
- The number of remaining credit hours shall not be less than 12 hours. If he presents an acceptable excuse to the Dean of the College at least three weeks before the start of the final tests.
- A student may apologize for continuing to study a semester without being considered a failingstudent if he presents an acceptable excuse to the body determined by the university council.His final grade will be (W). The apology semesters must not exceed two consecutive semestersor three non-consecutive semesters.

6. Withdrawal from University

The student may withdraw from the university after completion of the procedures of removingthe university from the university and return the university card and bring his identity papers to return the original file. The withdrawal from the university shall entail the following:

- The period during which the student withdraws from the university shall be calculated as ifhe were not studying.
- The rewards of the withdrawn student shall be suspended from the semester until he registers for another semester.
- The student must be evacuated from the residence, the library and other university facilities.
- The student is considered to be withdrawn from the university and he has the right to re- enroll if he required in a period not exceeding four semesters or two academic years.
- The student may apply for postponement of the study for an excuse acceptable to the body determined by the University Council, provided that the postponement does not exceed twoconsecutive or three semesters.

7. Graduation Requirements

The Admission and Registration Deanship Office of the University is responsible for ensuringthat graduating students have met all graduation requirements which can be classified as below:

7a. First Year

The preparatory year aims at enhancing the skills of the student through intense English courses andcourses that improve their communication and computer skills. The preparatory year is 32 credit hours.

7b. Course Requirements

After successfully passing the preparatory year (32 credit hours) and to complete the graduation requirements for a B.S. in Computer Science, the students are required to successfully pass a total of 162 credit hours.

7c. Graduation Project Requirements

According to the graduation project requirements, the project is divided into two parts (3 credit hours each). The student is eligible to register for the Graduation Project (1) if the student completes successfully at least 130 credit hours including preparatory year. Graduation Project (1) and (2) can be taken during the first and second semesters only (not during summer semester).

7d. Field Training Requirements

Prior to graduation, after completion of at least 110 credit hours, each Computer Science majormust complete an approved Computer Science Field Training Program. Field training extends overat least 36 credit hours, and must be undertaken in companies or establishments accepted by the college.

BCS Program Curriculum Structure

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Institution Requirements	Required	6	12	7.40%
	Elective	--	--	--
College Requirements	Required	14	42	25.93%
	Elective	--	--	--
Program Requirements	Required	20	60	37.04%
	Elective	3	9	5.56%
Capstone Course/Project	Required	2	6	3.70%
Field Training/ Internship	Required	1	1	0.62%
Residency year	-	-	-	
Others (Preparatory Year)	-	10	32	19.75%
Total		56	162	100%

BCS Program Study Plan

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution,
Level 3	CSC 230	Physics for Computer Science	Required	PHYS 107	3	College
	CSC 202	Basics of Programming and Algorithms	Required	CIT 130	3	College
	CIT 201	Introduction to Database Systems	Required	CIT 130	3	College
	MATH 221	Calculus	Required	MATH 135	3	College
	ARAB 101	Linguistic Skills	Required	-	2	Institution
	ISLM 101	Entry to Islamic Culture	Required	-	2	Institution
Level 4	CIT 202	Computer Networks (1)	Required	CIT 130	3	College
	MATH 210	Principles of Probabilities & Statistics	Required	MATH 135	3	College
	CSC 212	Programming language (1)	Required	CSC 202	3	College
	CIS 221	System Analysis & Design	Required	CIT 201, CSC 202	3	College
	ARAB 103	Arabic Editing	Required	-	2	Institution
	ISLM 102	Islam and Building Society	Required	-	2	Institution

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution,
Level 5	CSC 213	Programming language (2)	Required	CSC 212	3	College
	CIS 307	Data Structure	Required	CSC 212	3	College
	MATH 207	Discrete Mathematics	Required	MATH 135	3	College
	CNE 306	Digital logic Design	Required	MATH 135	3	College
	CIT 407	Wireless & Mobile Networks	Required	CIT 202	3	Department
	ISLM 103	Economic System in Islam	Required	-	2	Institution
Level 6	CSC 302	Design and Analysis of Algorithms	Required	CIS 307	3	Department
	CSC 304	Web Programming	Required	CSC 213, CIT 202	3	Department
	CSC 306	Biology for Computer Science	Required	-	3	Department
	CNE 401	Computer Architecture and Organization	Required	CNE 306	3	College
	MATH 246	Linear Algebra	Required	MATH 207	3	Department
	ISLM 104	Principles of the Political System in Islam	Required	-	2	Institution

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution,
Level 7	CSC 417	Numerical Analysis	Required	MATH 246	3	Department
	CSC 403	Artificial Intelligence	Required	CSC 302	3	Department
	CSC 353	Computer Graphics	Required	CSC 213, MATH 246	3	Department
	CSC 407	Software Engineering	Required	CIS 221	3	Department
	CSC 409	Principles of Bioinformatics	Required	CSC 306	3	Department
	CIT 403	Operating Systems	Required	CNE 401	3	College
Level 8	CSC 418	Machine Learning	Required	CSC 302	3	Department
	CSC 420	Modelling and Simulation	Required	CSC 213, MATH 207	3	Department
	CSC 4XX	Elective course (1)	Elective	Achieving 110+ Credit Hours	3	Program
	CSC 593	Field Training	Required	Achieving 110+ Credit Hours	1	Program
	CIT 303	Advanced Database Systems	Required	CIT 201	3	Program
	CIS 306	Information Security	Required	CIT 202	3	Program

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution,
Level 9	CSC 501	Cryptography	Required	CIS 306	3	Program
	CSC 503	Theory of Computation	Required	MATH 207	3	Program
	CSC 505	Parallel and Distributed Computing	Required	CSC 302, CSC 213	3	Program
	CSC 5XX	Elective course (2)	Elective	CSC 4XX	3	Program
	CSC 591	Graduation Project (1)	Required	Achieving 130+ Credit Hours	3	Program
Level 10	CSC 502	Natural Language Processing	Required	CSC 418	3	Program
	CSC 506	Compiler Design	Required	CSC 503	3	Program
	CSC 5XX	Elective course (3)	Elective	CSC 5XX	3	Program
	CSC 592	Graduation Project (2)	Required	CSC 591	3	Program
	CIT 506	Computer Ethics	Required	-	3	Program

Elective Courses:

Course Code	Course Title	Pre-Requisite Courses	Credit Hours
CSC 406	Deep Learning	CSC 403	3
CSC 507	Image Processing	CSC 406	3
CSC 508	Speech Processing	CSC 507	3
CSC 510	Computer Vision	CSC 507	3
CSC 408	Software Design Patterns	CSC 407	3
CSC434	Applied Coding for Game Designers	CSC 353	3
CSC 509	Mobile Computing	CSC 408	3
CSC 511	Computer Animation for Games	CSC 434	3
CSC512	Automated Software Testing	CSC 509	3
CSC514	Computational Geometry	CSC 509	3
CSC 516	Digital Painting for Games	CSC 511	3
CSC 518	Advanced Game Animation	CSC 511	3

BCS Course Description

1. Level 3

Subject Code	CIT 1301
Course Title	Physics for Computer Science
Credit hours	3 (2,0,2)
Level	3
Pre-Requisite	PHYS 107 - Introduction to Physics-1
Co-Requisite	None
Catalogue Description	This course teaches the students practical skills needed for solving the modern physics problems by means of computation. Topics included, Introduction: Computation and Science Software Basics and Errors/Uncertainties, Basic Numerical Tools-Python, Matrix Computation, Numerical Integration and Differentiation, Interpolation, Extrapolation, Searching and Fitting, Classical physical systems to quantum systems, Introduction to parallel computing and visualization techniques.

Subject Code	CSC 202
Course Title	Basics of Programming and Algorithms
Credit hours	3 (2,0,2)
Level	3
Pre-Requisite	CIT 130 - Computer Skills
Co-Requisite	None
Catalogue Description	This course helps the students understand how to develop algorithmic solutions for simple problems and represent them formally. It also introduces the students to high-level languages programming (using Python). Topics included, Introduction to programming and algorithms Algorithms, flowcharts and pseudocode, Variables and datatypes, Structural programing (sequence, selection, and repetition), Python: variables, expressions and statements, Python: conditionals, Python: repetitions, Python: data structures (strings, lists, dictionaries, … etc.), Python: functions, Python: modules, Python: searching and sorting algorithms.

Subject Code	CIT 201
Course Title	Introduction to Database Systems
Credit hours	3 (2,2,0)
Level	3
Pre-Requisite	None
Co-Requisite	None
Catalogue Description	This course covers a wide array of topics such as characteristics and advantages of the database management systems (DBMS), concepts of database and its architecture. Topics included, Introduction and Overview, Centralized and client/server Architecture for DBMS, The Relational Data Model and Relational Database Constraints, Introduction to Structured Query Language (SQL), Formal Relational Query Language (Relational Algebra & Relational Calculus), Conceptual Modeling and Database Design, SQL: Intersect expressions, Union and except expressions, Serious quantification lacking, Disk Storage, Basic File Structures Normalization, group discussion

Subject Code	MATH 221
Course Title	Calculus
Credit hours	3(2,2,0)
Level	3
Pre-Requisite	MATH 135 – Math-2
Co-Requisite	None
Catalogue Description	This course introduces the basic concepts of mathematical analysis used in science and engineering. Topics included, Introduction: Basic Concepts of mathematical Analysis, Solving, Equations using derivatives and limits, Differential Calculus, Derivatives, Differentiation Rules, Integral Calculus, Partial Fraction and Newton's Method

2. Level 4

Subject Code	CIT 202
Course Title	Computer Networks (1)
Credit hours	3 (2,0,2)
Level	4
Pre-Requisite	CIT 130 – Computer Skills
Co-Requisite	None
Catalogue Description	This course presents an overview of computer networks (types, layered standard models, and protocols). Topics included, Overview of data communications and networking (Introduction / Overview of data communications / Network models), Physical layer of the internet model TCP/IP (Signals/Digital Transmission/Analog Transmission / Transmission media), Data link layer of the internet model TCP/IP (Framing /Data link control protocols / Multiple access control protocols / Wired LANs : Ethernet) , Network layer of the internet model TCP/IP (Logical addressing / IP Protocol / Address Mapping Protocols / Forwarding and Routing, Transport Layer of the Internet model TCP/IP (client/server model , transport protocols (TCP & UDP services, operations , and applications)), Application Layer of the Internet model TCP/IP (Application layer services , Domain Name System (DNS) , Hypertext Transfer Protocol (HTTP))

Subject Code	MATH 210
Course Title	Principles of Probabilities & Statistics
Credit hours	3 (2,2,0)
Level	4
Pre-Requisite	
Co-Requisite	None
Catalogue Description	This course gives an introduction to the statistics, data, population, meaning of quantitative variables, levels of measures and sampling methods. Topics included, Introduction to Probability and Random events, calculating probability using Venn diagram, Probability rules, Baye's Theorem, Mean and Standard Deviation of a Discrete Random Variable, Application to the Random Variables., Mean and Standard Deviation of a Continuous Random Variable, Application to the Continues Random Variables, The mean and The Standard deviation of a Binomial Distribution, The Standard Normal Distribution, Concepts of simple linear correlation and linear regression.

Subject Code	CSC 212
Course Title	Programming language (1)
Credit hours	3 (2,0,2)
Level	4
Pre-Requisite	CSC 202 - Basics of Programming and Algorithms
Co-Requisite	None
Catalogue Description	This course is an introduction to programming, emphasizing understanding and implementation of applications using object-oriented techniques. Topics included, Introduction to Python, Lists & Tuples, Dictionaries & sets, Strings, Functions, Lambdas functions, Higher order functions, Object oriented programming.

Subject Code	CIS 221
Course Title	System Analysis & Design
Credit hours	3(2,0,2)
Level	4
Pre-Requisite	CSC 202 - Basics of Programming & Algorithms CIT 201 - Introduction to Database Systems
Co-Requisite	None
Catalogue Description	System analysis and design courses deal with planning the development of information systems through understanding and specifying in detail what a system should do and how the components of the system should be implemented and work together. Topics included, Introduction to the Systems Development Life Cycle (SDLC), Project Managements and Scheduling, Requirements Determination, Functional Modelling and Use Cases, Design and implementation, Data Modeling, System Design, Class and Method Design, Database Design, User Interface Design, Architecture Design.

3. Level 5

Subject Code	CSC 213
Course Title	Programming language (2)
Credit hours	3 (2,0,2)
Level	5
Pre-Requisite	CSC 212 - Programming Language (1)
Co-Requisite	None
Catalogue Description	This course focuses on advanced programming concepts and skills. The main topics focus on advanced Python modules such as Regular expressions, Exception handling, File Handling, Multithreading, Database handling, GUI, NumPy and Data Visualization. Topics included, Review of object-oriented programming, Exception Handling in Python, Regular Expressions in Python, File Handling in Python, Database manipulation using MySQLConnector, Multithreading in Python, Graphical User Interface design using Tkinter, Data Analysis using NumPy, Data visualization using Matplotlib

Subject Code	CIS 307
Course Title	Data Structure
Credit hours	3 (2,0,2)
Level	5
Pre-Requisite	CSC 212 - Programming I
Co-Requisite	None
Catalogue Description	The main objective of this course is to provide students with the basics of data structures. Topics included, Introduction and Overview, Basic of Python Review, Arrays and Lists, Searching (Linear and Binary), Sorting – I (Bubble sort, Merge sort), Sorting – II (Selection Sort, Insertion Sort), Sorting – III (Quick Sort, Heapsort), Stacks and Queues, Linked Lists, Trees and Graphs, Inbuilt Data Structure in Python.

Subject Code	MATH 207
Course Title	Discrete Mathematics
Credit hours	3 (2,2,0)
Level	5
Pre-Requisite	MATH 135 – Mathematics (2)
Co-Requisite	None
Catalogue Description	This course aims at introducing the students to the field of Discrete Mathematics. It teaches them how to apply discrete math's in the applications in basic real-world problems. Topics included, Fundamentals of Mathematical Logic, Prepositional Logic, Counting, Permutations and Combinations, Number Theory, Recursion and Recurrences, Linear Programming, Graphs and Trees.

Subject Code	CNE 306
Course Title	Digital logic Design
Credit hours	3 (3, 1, 0)
Level	5
Pre-Requisite	MATH 135 - Math-2
Co-Requisite	None
Catalogue Description	This course covers the foundations of the digital logic design process. Topics included, Number Systems, Operations, and Codes, Logic Gates, Boolean Algebra and Logic Simplification, Combinational Logic Analysis and Implementation, Functions of Combinational Logic, Latches and Flip-Flops, Registers and Counters, Memory and Storage.

Subject Code	CIT 407
Course Title	Wireless & Mobile Networks
Credit hours	3 (2, 0, 2)
Level	5
Pre-Requisite	CIT 202 - Computer Networks (1)
Co-Requisite	None
Catalogue Description	This course aims at introducing the students to the field of wireless and mobile networks. Topics included, Introduction to Wireless and Mobile Networks, Mobile Networks and Generations, Long-Term Evolution (LTE), LTE Advanced, 5G Networks, Wireless LAN and WiFi, WMAN and WiMAX, Ad hoc Networks, Wireless Sensor Networks, Wireless Sensor Networks & Internet of Things (IoT)

4. Level 6

Subject Code	CSC 302
Course Title	Design and Analysis of Algorithms
Credit hours	3(2,0,2)
Level	6
Pre-Requisite	CIS 307 - Data Structures
Co-Requisite	None
Catalogue Description	This course is continuing to provide students with the ability to select algorithms appropriate to particular purpose and to apply them, recognizing the possibility that no suitable algorithm may exist. Topics included, Introduction, Mathematical Background, Sorting Algorithms, Searching Algorithms, Greedy Approach, Dynamic Programming.

Subject Code	CSC 304
Course Title	Web Programming
Credit hours	3(2,0,2)
Level	6
Pre-Requisite	CIT 202 – Computer Networks (1) CSC 213 – Programming Language (1)
Co-Requisite	None
Catalogue Description	This course provides an introduction of web-development techniques that use HTML, CSS and JavaScript as web development essentials. Topics included, Introduction to course and Visual Studio Code, Introduction to Word Wide Web, Website Development Process, Introduction to HTML-I, Introduction to HTML-II, HTML Tables and Form, Introduction to CSS – I, Introduction to CSS – II, Introduction to Box Model and Page Layout, Introduction to JavaScript – I, Introduction to JavaScript – II, JavaScript and HTML Documents, Introduction to Web Servers and Configurations, Developing a HTML Application, Deployment of the Web Application and hosting, Git-hub and version control for HTML Websites. Use of Git-hub and Firebase for NoSQL web applications

Subject Code	CSC 306
Course Title	Biology for Computer Science
Credit hours	3 (2+1)
Level	6
Pre-Requisite	None
Co-Requisite	None
Catalogue Description	Biology for computer science course covers the fundamental principles of biochemistry, genetics, molecular biology, recombinant DNA technologies, and cell biology. Topics included, Introduction and history of cell biology, Cell diversity and Classification, Structure and functions of cell organelles, Structure of Amino Acids, Peptides, and Proteins, Amino Acids, Nucleotides and Nucleic Acids , Genes and Chromosomes, DNA Metabolism, RNA Metabolism, RNA-Dependent Synthesis of RNA and DNA, Protein Metabolism, The Genetic Code, Regulation of Gene Expression, Principles of Gene Regulation, Structure and functions of cell organelles, DNA Supercoiling, The Structure of Chromosomes, DNA Repair, DNA Recombination, Principles of Gene Regulation, Regulation of Gene Expression in Prokaryotes, Regulation of Gene Expression in Eukaryotes, DNA Cloning: The Basics, Molecular Genetics, Recombinant DNA, & Genomic Technology.

Subject Code	CNE 401
Course Title	Computer Architecture and Organization
Credit hours	3 (2,0,2)
Level	6
Pre-Requisite	CNE 306 - Digital Logic Design
Co-Requisite	None
Catalogue Description	This course covers the following topics: computer architecture vs. organization, computer function vs. structure, computer performance etc. Topics included, Basic concepts and computer performance, Top level view of computer function and interconnection, Memory (cache, internal, and external), Input/Output (programmed, interrupt driven, DMA), Instruction sets, Instruction Pipelining, Superscalar processor, Parallel Processing and Multicore.

Subject Code	MATH 246
Course Title	Linear Algebra
Credit hours	3(3,1,0)
Level	6
Pre-Requisite	MATH 207 - Discrete Mathematics
Co-Requisite	None
Catalogue Description	This course introduces: Matrices and their operations., types of matrices. Elementary transformations. Determinants, elementary properties. Inverse of a matrix. Topics included, Matrices and their operations, Types of matrices, Elementary transformations., Determinants-elementary properties of determinants, System of Liner Equations. Vector spaces, Linear independence, Finite dimensional spaces, Linear subspaces. Inner product spaces. Linear transformations, Kernel and image of a linear transformation, Eigen values and Eigen vectors of a matrix and of a linear operator mapping.

5. Level 7

Subject Code	CSC 417
Course Title	Numerical Analysis
Credit hours	3 (2, 1, 0)
Level	7
Pre-Requisite	Math 241-linear algebra
Co-Requisite	None
Catalogue Description	This course is continuing to provide students with the introduction to Preliminaries of Computing, Numerical solution of Nonlinear Equations, . Interpolation and Polynomial Approximation, Numerical integration and differentiation and Applied Linear Algebra. Topics included, Studying Bisection method, fixed-point iteration, Newton's method. Study Error analysis for Iterative Methods, Computing roots of polynomials, Interpolation and Polynomial Approximation.

Subject Code	CSC 403
Course Title	Artificial Intelligence
Credit hours	3 (2, 0, 2)
Level	7
Pre-Requisite	CSC 302 - Design and Analysis of Algorithms
Co-Requisite	None
Catalogue Description	The main objectives of this course is to teach students the main artificial intelligence methodologies such as uniformed search methods, informed search methods, adversarial methods, expectimax methods etc. Topics included, Introduction to AI, Uninformed Search Methods, Informed Search Methods, Adversarial Search, Expectimax Search and utilities, Constraint Satisfaction Problems, Markov decision Process, Reinforcement learning, Swarm Intelligence

Subject Code	CSC 353
Course Title	Computer Graphics
Credit hours	3(2,0,2)
Level	7
Pre-Requisite	CSC 213 – Programming Language (2)
Co-Requisite	None
Catalogue Description	This course primarily contributes to Computer Science program outcomes that develop student abilities to Compare various computer graphics hardware & software tools and to Compare different drawing algorithms. Topics included, Introduction Computer Graphics and Primitive Algorithms, Mathematics Concept for Computer Graphics, Scan-Conversion of graphics primitives, Two Dimensional Transformation, Three-dimensional transformations, Viewing and Solid Area Scan-Conversion, Introduction to curves,, Object Rendering, Introduction to animation.

Subject Code	CSC 407
Course Title	Software Engineering
Credit hours	3(2, 0, 2
Level	7
Pre-Requisite	CIS 221 System Analysis and Design
Co-Requisite	None
Catalogue Description	This course covers the fundamentals of software engineering, including understanding system requirements, finding appropriate engineering compromises, effective methods of design, coding, and testing, team software development, and the application of engineering tools. Topics included, Introduction to Software Engineering and the Software Development Lifecycle, Project planning and management, Requirements Engineering, Software Architecture design, Software Design, Software implementation, Verification / Validation and Testing, Software Maintenance, Configuration and changing Management, Software Quality and Software Metrics.

Subject Code	CSC 409
Course Title	Principles of Bioinformatics
Credit hours	3(2,0,2
Level	7
Pre-Requisite	None
Co-Requisite	None
Catalogue Description	This course presents an overview of important applications of computers to solve problems in biology. The aim of the course is to introduce CS students to modern computational practices in bioinformatics. Topics included, Introduction to bioinformatics basics, Bioinformatics databases, Pair-Wise Sequence Alignments and Database Search, Basic concepts biomolecular SIMULATIONS, Conformational sampling, Solvation, Advanced Techniques: Replica exchange simulations, Restraint potential, Free energy calculations, Membrane simulations, Protein structure and design, Experimental methods for protein structure determination Protein Interaction, Protein quaternary structure modeling, Designing protein-protein interfaces.

Subject Code	CIT 403
Course Title	Operating Systems
Credit hours	3 (2,0,2)
Level	7
Pre-Requisite	CNE 401 Computer Architecture and Organization
Co-Requisite	None
Catalogue Description	This course aims at describing the general operating system architecture of computers, comparing among differing structures of the operating systems, such as Unix, MS Windows and Linux. Topics included, Introduction to operating systems, Operating system structures Processes, Threads, Process synchronization, CPU scheduling, Memory management, Mass storage structure, File system, I/O systems.

6. Level 8

Subject Code	CSC 418
Course Title	Machine Learning
Credit hours	3 (2, 0, 2)
Level	8
Pre-Requisite	CSC 302 - Algorithm Analysis and Design
Co-Requisite	None
Catalogue Description	This course introduces a set of intelligent algorithms applied in modern computing, showing how these algorithms can be used in problem-solving environments and understand their properties and limitations and gain experience while working with these algorithms. Topics included, Introduction to machine learning, Data Preparation, Data Preprocessing, Feature, Selection, Data Balancing, Evaluation Techniques, Regression Methods, Support Vector, Machines, Decision Trees, Clustering Methods, Principle Component Analysis, Ensemble Learning.

Subject Code	CSC 420
Course Title	Modelling and Simulation
Credit hours	3 (2,0,2)
Level	8
Pre-Requisite	MATH 207 – Discrete Mathematics
Co-Requisite	None
Catalogue Description	This course aims to introduce the students to the field of Modeling and Simulation. It teaches them how to model and simulate the applications which are the basic samples of real-world problems. Topics included, Introduction to modelling and simulation, System analysis, classification of systems, System theory basics, its relation to simulation, Model classification: conceptual, abstract, and simulation models Identification, Probability in Simulation, Models queuing systems, Discrete simulation models, Model time, simulation experiment control, Continuous systems modelling, Numerical methods used for continuous simulation, Simulation for Aircraft Model, Queuing System based Simulation, Combined simulation, Cost Effectiveness Based Model.

Subject Code	CSC 593
Course Title	Field Training
Credit hours	1 (0, 2, 0)
Level	8
Pre-Requisite	Achieving at least 110 credit hours
Co-Requisite	None
Catalogue Description	Field training is a practical component designed to give students real-world experience in applying theoretical knowledge acquired in the classroom. During field training, students might be involved in activities like software development, testing, network management, database administration, and cybersecurity practices, depending on their area of specialization. This experience helps them develop critical skills such as teamwork, problem-solving, project management, and communication, which are essential for success in tech careers. Additionally, it provides insights into current industry tools, frameworks, and workflows, and often helps students build a professional network that can be valuable for future job placements.

Subject Code	CIT 303
Course Title	Advanced Database Systems
Credit hours	3 (2, 0, 2)
Level	8
Pre-Requisite	CIT 201 - Introduction to Database Systems
Co-Requisite	None
Catalogue Description	This course covers a wide array of topics such as database concepts and database management components and their functions. Topics included, Introduction and Overview, Database System Architecture, The Relational Data Model and Relational Database constraints, More SQL: Complex Queries, Triggers, Views, and Schema Modification, Index Definition in SQL, Transactions, Authorization, The Enhanced Entity Relationship (EER) Model Features Object, Object Relational, and XML: Concepts, Models, Languages, and Standards, Data Storage Structures- Indexing, Query Processing and Optimization, and Database Tuning, Transaction Management, Parallel And Distributed Databases, Big Data Analytics, Presentation & Revision for Final Exam

Subject Code	CIS 306
Course Title	Information Security
Credit hours	3 (2,0,2)
Level	8
Pre-Requisite	CIT 202 – Computer Networks 1
Co-Requisite	None
Catalogue Description	This course consists of an introduction to information security, types of major computer malware programs and cybersecurity attacks and their impacts, the general prevention mechanisms from the cyberattacks. Topics included, What is Information Security, Identification and Authentication, Authorization and Access Control, Auditing and, Accountability, Cryptography I, Cryptography II, Operations Security, Human Element Security, Physical Security, Network Security, Operating System Security, Application Security, Laws and Regulations, Information Security Policies

7. Level 9

Subject Code	CSC 501
Course Title	Cryptography
Credit hours	(3 (2,0,2)
Level	9
Pre-Requisite	CIS 306 - Information Security
Co-Requisite	None
Catalogue Description	This course provides an introduction to the basic theory and practice of cryptographic techniques used in computer security. Topics included, Introduction, Classical Cryptography, Stream Ciphers, Data Encryption Standard, Advanced Encryption Standard, Modes of Operation, Public Key Cryptography I, Public Key Cryptography II, Hash Functions, Digital Signatures, Identification, Key Establishment, Public Key Infrastructure (PKI).

Subject Code	CSC 503
Course Title	Theory of Computation
Credit hours	3 (2,1,0)
Level	9
Pre-Requisite	MATH 207 – Discrete Mathematics
Co-Requisite	None
Catalogue Description	This course is an introduction to the theory of computational complexity and standard complexity classes. Topics include languages, finite and non-deterministic finite automata, Context Free Grammar, Turing Machines, Computability, Computational Complexity, Formal logic, and computational logic. Topics included, Introduction to Automata, Regular Expressions, Finite Automata & NFA, DFA & Its Examples, Transition Graph, Union of NFA & DFA, Intersection of DFA, Closure of NFA & DFA, MyHillNerode Theorem, Conversion of, FA to Regular, Expression by State Elimination Technique, Pumping Lemma for Regular Languages, Pumping Lemma for Non-Regular Languages.

Subject Code	CSC 505
Course Title	Parallel and Distributed Computing
Credit hours	3 (2,0,2)
Level	9
Pre-Requisite	CSC 213 - Programming Language (2) CSC 302 - Design and Analysis of Algorithms
Co-Requisite	None
Catalogue Description	This course is an introduction to different techniques and procedures of Parallel and Distributed System that enable them to understand in depth knowledge. Topics included, Introduction to Distributed Systems, architectural models, networking and internetworking Application Programming Interface: Inter process communication, RMI, Indirect communication, O.S. Support, Distributed objects and components, Distributed Sorting Algorithms: Clocks, events and process states Synchronizing physical clocks, Logical time and logical clocks, Global states, Security Issues and Internet applications with case studies:, Overview of security techniques, Cryptographic algorithms, Digital, signatures, Cryptography pragmatics, Case study: Kerberos, Traditional Web based systems, Web services,, Communication, Naming,, Replication of Web Applications, Case Study : GOOGLE, Introduction to Parallel Processing: architecture, communication and performance of parallel systems, Parallel Programming Overview: Parallel, Programming Paradigms, Various Methods, Steps for creating parallel programs, Parallel Sorting Algorithms: Partitioning, Divide and Conquer Concept, Parallel Sorting algorithms: Rank Sort, Bubble Sort, Odd-Even, Transposition sort, Shear Sort, Merge Sort, Quick Sort, Odd-even Merge Sort.

Subject Code	CSC 591
Course Title	Graduation Project (1)
Credit hours	3 (0, 0, 6)
Level	9
Pre-Requisite	Senior Standing (Achieving 130+ Credit Hours)
Co-Requisite	None
Catalogue Description	The student proposes a project topic or idea according to his background of specialization with technical merit under supervision of academic members in the college. Topics included, Discussion and explain the ways of choice graduation project with students. Assign references to students to read about the project after determining the subject of the project. Discussion with students the methods to build the project and Identified tasks and a tentative work plan for project. Theoretical explanation about how to build the project and prepare the report Open discussion about what has been accomplished over the previous period with students. Final presentation of the graduation project I. Presentation of the graduation project to the Graduate Projects Arbitration Committee.

8. Level 10

Subject Code	CSC 502
Course Title	Natural Language Processing
Credit hours	3 (2,0,2)
Level	10
Pre-Requisite	CSC 418 Machine Learning
Co-Requisite	None
Catalogue Description	This course is intended as a theoretical and methodological introduction to a the most widely used and effective current techniques, strategies and toolkits for natural language processing. Topics included, Introduction to NLP, Computational morphology, Finite-state machines Language modelling, Syntax and parsing, POS tagging, Lexical semantics, Compositional semantics, Computational discourse, NLP applications, Computational linguistics proper (e.g., historical linguistics, language acquisition), Machine learning for NLP

Subject Code	CSC 506
Course Title	Compiler Design
Credit hours	3 (2,0,2)
Level	10
Pre-Requisite	CSC 503 – Theory of Computation
Co-Requisite	None
Catalogue Description	This course introduces topics including compiler design, lexical analysis, parsing, symbol tables, declaration and storage management, code generation, and optimization techniques. Topics included, Overview of Computer Languages, Overview of Compiler, Lexical Analysis (Scanning), Lexical Analysis (Advance), Context-Free Grammars and Parsing, Top-down Parsing, Bottom-up Parsing, Semantic Analysis, Type Checking, Run-Time Environments. Code Generation. Code Optimization.

Subject Code	CSC 592
Course Title	Graduation Project (2)
Credit hours	3 (0, 0, 6)
Level	10
Pre-Requisite	CSC 591 - Graduation Project (1)
Co-Requisite	None
Catalogue Description	The students show their maturity in handling the graduation project (GP) by making significant progress as planned in the GP (1). By the end of the semester, the students should be able to implement and complete their projects successfully. Then, the students submit the final GP report and present their achievement and contribution to be judged by supervisors and GP committee members. Topics included, Review of Graduation Project 1 design, Project 2 planning and schedule, Programming language review, UI coding review Coding (implementation), best practices, Implementation of the project (and processing requirements), Back-end implementation; testing, Back-end implementation; documentation, Front-end, implementation; testing; documentation, Middle tier implementation; testing; documentation, Function and system testing; documentation, Conclusion and future work , Final report preparation (Including Graduation Project 1) Presentation of the graduation project to the Graduate Projects Arbitration Committee

Subject Code	CIT 506
Course Title	Computer Ethics
Credit hours	3 (2, 0, 2)
Level	10
Pre-Requisite	None
Co-Requisite	None
Catalogue Description	This course introduces topics including Understanding the Need for Computer Ethics Training and Historical Milestones, Defining the Field of Computer Ethics, Developing the Ethical Analysis Skills and Professional Values, Enhance the student research methodology using the research skills. Topics included, Ethics Overview, Ethical Principals, Computer Ethics, Evolution of computer ethics issues, Is computer ethics different from other kinds of ethics, The uniqueness of the computer, Computer ethics as a field of professional ethics, Case, Studies: E-mail & Spam, the Cyber City Network, Intellectual Property and Changing, Technology, Privacy and Computer Technology, Ethical Hacking, Relevant Laws (Computer Crime, IP, Licensing, Privacy).

9. Elective Courses

Subject Code	CSC 406
Course Title	Deep Learning
Credit hours	3 (2, 0, 2)
Level	
Pre-Requisite	CSC 403 - Artificial Intelligence
Co-Requisite	None
Catalogue Description	In this course Students will learn about the basics of deep neural networks, and their applications to various artificial intelligence tasks. Topics included, Introduction to Deep Learning, Neural Network Representation, Learning the Neural Network, Neural Network Optimization, Network Normalization, Regularization, Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN), Attention Models, Generative Adversarial Networks (GAN), Case Studies.

Subject Code	CSC 507
Course Title	Image Processing
Credit hours	3(2,2,0)
Level	
Pre-Requisite	CSC 406 Deep Learning
Co-Requisite	None
Catalogue Description	The course aims are to study the image fundamentals and mathematical transforms necessary for image processing. Topics included, Digital Image Fundamentals, Intensity Transformations and Spatial Filtering, Filtering in the frequency domain, Color Image processing, Introduction to Image compression, Morphological image processing, Image segmentation, Introduction to image representation and description, Introduction to object recognition.

Subject Code	CSC 508
Course Title	Speech Processing
Credit hours	3 (2, 0, 2)
Level	
Pre-Requisite	CSC 507 - Image Processing
Co-Requisite	None
Catalogue Description	This course focuses on methods for recording speech and other vocal signals, for processing and modifying such recordings, and for synthesizing artificial speech. Topics included, Introduction, recording and file I/O, Visualization, Voice detection, Phonetic transcription, Pitch and formant detection, Human Audition, Voice manipulation, Speech and vocalization synthesis, Term project workshop, Term project presentations.

Subject Code	CSC 510
Course Title	Computer Vision
Credit hours	3(2,0,2)
Level	
Pre-Requisite	CSC 507 – Image Processing
Co-Requisite	None
Catalogue Description	This course covers topics such as Introduction to computer vision, image and video processing, motion estimation, face recognition and gesture recognition, computer vision applications. Topics included, Introduction to Computer Vision, Image and Video Processing, Deep Learning for Computer Vision, Recognition, Feature detection and description, Motion, Estimation, Face Recognition and Gesture Recognition, Case Studies.

Subject Code	CSC 408
Course Title	Software Design Patterns
Credit hours	3 (2, 0, 2)
Level	
Pre-Requisite	CSC 353 - Computer Graphics
Co-Requisite	None
Catalogue Description	This course covers basic programming concepts, data structures, and techniques specifically relevant to game design. Topics included, Agile Development, The Payroll Case Study, Singleton and Monostate, Null Object, Packaging the Payroll System, The Weather Station Case Study, Abstract Server, Adapter, and Bridge, Proxy and Stairway to Heaven: Managing Third Party APIs.

Subject Code	CSC 434
Course Title	Applied Coding for game designers
Credit hours	3 (2, 0, 2)
Level	
Pre-Requisite	CSC 353 - Computer Graphics
Co-Requisite	None
Catalogue Description	This course covers basic programming concepts, data structures, and techniques specifically relevant to game design. Topics included, Introduction to game coding, Text Battle, Text Adventure, ASCII Dungeon, animation using sprites and the Simple Direct Media Layer (SDL), Unity 5 Building the Game Programming Foundation with Unity, Unity, Interface/Layout and Creating Scenes/Transitions and Manipulation of Objects, Introduction to JavaScript. Code structure, syntax, terminology, first script; create and manage variables and functions; logistics of methods and statements, Adding interaction with JavaScript: manage collision detection, destroy objects, manage scenes through code, update user interface with scripting, polishing the game, Adding and managing simple Artificial Intelligence; Use AI to, create intelligence; develop program code to execute and manage, Create and publish simple mobile games to the web and mobile devices.

Subject Code	CSC 509
Course Title	Mobile Computing
Credit hours	3 (2, 0, 2)
Level	
Pre-Requisite	CSC 408 – Software Design Patterns
Co-Requisite	None
Catalogue Description	This course covers software mobile application development, its architecture and lifecycle, as well as its inherent design considerations. Topics included, Fundamental of Mobile Computing Infrastructures for Mobile Computing Applications, Mobile Computing Technologies, Mobile Computing Applications, Mobile Device Platforms, Wireless Mobile Internet, Mobility, Management, Location-Based Services, Security of mobile computing.

Subject Code	CSC 511
Course Title	Computer Animation for Games
Credit hours	3 (2, 0, 2)
Level	
Pre-Requisite	CSC 434 - Applied Coding for Game Designers
Co-Requisite	None
Catalogue Description	After completing this course, the students will be able to create games and animations on the PC as well as on Mobile Telephony phones and related devices. Topics included, Computer Gaming Overview, Fundamentals of Animation, Graphics & its Tools, 2D Animation Using Flash, Fundamentals of Game Development, Advanced Visual Graphics, Maya Fundamentals, 3DS Max Fundamentals, Advanced Flash Animation, Scripting for Animation & Games, Web Graphics and Games, Industry of Gaming.

Subject Code	CSC512
Course Title	Automated Software Testing
Credit hours	3 (2, 0, 2)
Level	
Pre-Requisite	CSC 509 - Mobile Computing
Co-Requisite	None
Catalogue Description	This course explains the objectives, advantages, disadvantages, and limitations of test automation. Identify technical success factors of a test automation project. Topics included, Quality Assurance, Software quality factors, Development standards, models and methodologies, Process and product quality assurance. Software reviews and inspections., Verification and validation methods, Software configuration management, Software quality metrics.

Subject Code	CSC 514
Course Title	Computational Geometry
Credit hours	3 (2, 0, 2)
Level	
Pre-Requisite	CSC 509 - Mobile Computing
Co-Requisite	None
Catalogue Description	This course introduces students to the essentials of Computational Geometry and presents an in-depth study of the fundamental geometric structures and techniques used in this field. Topics included, Computational Geometry Overview, Convex Hulls, Line Segment Intersection, Triangulation, Orthogonal Range Searching And Point Location, Voronoi Diagrams, Delaunay Triangulations, Boolean Operations On Polygons, Robot Motion Planning, Visibility Graph, Simplex Range Searching.

Subject Code	CSC 516
Course Title	Digital Painting for Games
Credit hours	3 (2, 0, 2)
Level	
Pre-Requisite	CSC 511 - Computer Animation for Games
Co-Requisite	None
Catalogue Description	This course is designed to introduce individuals to the fundamentals of creating game artwork from an industry perspective. Topics included, Introduction to Digital Painting, Principles and Tools Fundamental tools of image manipulation, Blending and lighting, Brushes/ Materials, Image Creation thru Abstraction, Atmospheric Perspective/Kit bashing, Vector Tools, Concept Art, Design, and apply texture to, a bladed weapon, Simple to Complex Approach to Image Creation.

Subject Code	CSC 518
Course Title	Advanced Game Animation
Credit hours	3 (2, 0, 2)
Level	
Pre-Requisite	CSC 511 - Computer Animation for Games
Co-Requisite	None
Catalogue Description	This course is aimed to provide students an insight into the methods and techniques used within both animation and game design; and examine core concepts/principles and design processes. Topics included, Fundamentals of animation and game development, Understand timing and spacing, Mediums and techniques, Animation showcase, Animation techniques, Using morphing, blending technique in 2D classical animation, Animate a concept, synchronizing with sound effects., Game Design, Debugging Games

BCS Program Laboratories

The BCS program has a total of 11 computer laboratories (5 in the male section and 6 in the female section). Two of the laboratories (one in each section) contain MAC computers running macOS. The rest of the laboratories contain PCs that run Microsoft Windows. The average capacity of the laboratory is 20 students (or PC).

1. Male Branch Laboratories

2. Female Branch Laboratories