ISLAMIC UNIVERSITY IN UGANDA

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

PROGRAM SPECIFICATION

FOR

BACHELOR OF SCIENCE IN COMPUTER SCIENCE (3 YEARS)

PROGRAM CODE: 063061

2016

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1.0 BACKGROUND ON INSTITUTION

The Islamic University in Uganda (IUIU) has established itself as an educational beacon for people from all across Africa, with its graduates reaching high academic levels and serving at prominent positions around the globe. Financed by the Organization of Islamic Cooperation (OIC), the university was established in 1988 to serve the English-Speaking Sub Saharan Africa. But since then the mission has expanded as the institution has continued to welcome students from across the continent and beyond. The university which began with only 80 students, two faculties; the Faculty of Education and the Faculty of Islamic Studies and Arabic Language and only one campus located at Nkoma Mbale, Eastern Uganda, now accommodates over 7000 students with six faculties and four campuses spread across the country. The university has graduated more than 10000 students in different disciplines including Islamic studies, Arabic Language, Law, Science, Liberal Arts and Social Sciences.

Success Recipe

The passion for learning under a multicultural environment which emphasizes the observance of Islamic morals and principles are the basis for the university's success recipe.

Fact sheet

Since its inception, the University has so far had 19 Graduation ceremonies. The university has 4 campuses spread across the country with the main campus located in Mbale, Eastern Uganda. Other campuses are; Kampala Campus, located at Kibuli Hill, East of Kampala Capital City, The Females' campus, West of Kampala Capital City and Arua campus in West Nile Region, Northern Uganda.

The University runs over 56 academic programmes under 7 faculties namely;

1. The Faculty of Islamic Studies and Arabic Language
2. The Faculty of Arts and Social Sciences
3. The Faculty of Management Studies
4. The Faculty of Education
5. The Faculty of Science
6. The Faculty of Law
7. The Faculty of Health Sciences

Mission

The Islamic University in Uganda aspires to function as a highly academic and cultural institution based on Islam and love of the country. It aims at promoting and enhancing the civilization and scientific influence of Islam and physical world to produce well-cultured, morally-upright graduates of sound character, equipped with useful skills and knowledge, to enable them participate positively in the development process of their countries. The University aims at achieving these goals through the pursuit of teaching, learning, research, scholarship, good governance and service to humanity.

VISION

The University's Vision is to be a Centre of excellence in the production and dissemination of knowledge that contribute to relevant skills as well as appropriate training necessary for production of an all-round believing individual capable of participating fully in her/his society.

Core Values

The University's Vision and Mission are supported by the following core values;

1. Freedom of thought and expression within the boundaries of Islam – as the primary pre-condition for the growth of academic excellence.
2. Tolerance of contrary views and ideas – to enable the University to exist and operate in a heterogeneous society.
3. Research as the major basis for building the knowledge productive capacity of a University institution.
4. Attraction and retention of brilliant staff who are the core of academic excellence.
5. Enrolment of enthusiastic, well-behaved and studious students
6. Promotion of merit, sincerity, honesty and truthfulness in all academic and life pursuits.
7. Promotion, protection and dissemination of Islamic ideals and values.

2.0 PROGRAMME NAME AND DURATION

Programme Name	:	Bachelor of Science-Computer Science
Managing Faculty	:	SCIENCE
Managing Department	:	Department of Computer Science
CODE AND Abbreviated Title	**:**	063061 (BSC.CS)
Total Credit Points Required	**:**	145
Duration of Study (Years)	**:**	3 years FT, 4 years PT
Study Mode and Location	**:**	On-campus (MC, FC, KC, and AC)

3.0 PROGRAMME DESCRIPTION

The Bachelor of Science - Computer Science (BSCS) programme focuses on both practical and theoretical skills and concepts to explore the conceptual underpinnings of Computer Science in relation to solving real life day today problems. Graduate from this programme will graduate with excellent skills that will enable them solve real life problems using computational solutions, programming skills and be capable of designing, implementing and maintaining complex software systems.

4.0 PROGRAMME RATIONALE/ JUSTIFICATION

This programme was reviewed with an intention of making it more competitive while maintaining the high standard of the program and adhere to the emerging new technologies in the field of computer science. With the Courses introduced and others revised, the graduates will become highly competitive in the job market and at the same time prepare them in becoming independent in making choices of career and self-employment. Students are trained not only in the technical areas of specialization but also in personal development, communication skills and entrepreneurship.

5.0 PROGRAMME OBJECTIVES

The objectives of this programme are based on four main objectives

5.1 To realize the mission of the University such that the vision is realized and these are: -

1. To Aspires to function as a highly academic and cultural institution based on Islam and love of the country (patriotism)
2. To promote and enhance the civilization and scientific influence of Islam and physical world to produce well-cultured morally-upright graduates of sound character
3. To equip leaners with useful skills and knowledge, that will enable them to participate positively in the development process of their countries

5.2 To produce professionals with theoretical and cognitive abilities that will enable them to solve real world problem with computational solutions and make decisions scientifically, this will be achieved through the following *Learning outcomes:* -

1. Learn Theories of computing and computational problem solving
2. Application mathematical theories in decision making and solving practical computational problems.
3. Analysis of the ably computational real world problem and design appropriate computing solutions
4. Evaluate existing computing solutions to assess their competence and relevance
5. In-depth understanding of tools and languages for specification, design evaluation and deployment of software
6. Present precise logical reasoning of a problem solution orally, electronically and/or in writing.

5.3. To produce professionals with practical skills needed to link up the Computer Science sector with Government and Industry under the broader perspective of Information and Communication Technology (ICT) through Learning outcomes: -

1. Effectively utilize the available tools to construct, network and document computing solutions in a secure environment

2. Develop and create computer and mobile solutions in an innovative manner
3. Effective understanding of computer systems and equipment
4. Effective Technopreneurship skills that will enable graduates to sell the products they have created.

5.4 To inculcate learners with relevant business, communication and life key skills.

1. Communication skills
2. Business, Management and administrative skills.
3. Entrepreneurship skills
4. Understand what team work and roles of members in a team is all about.

6.0 PROGRAMME LEARNING OUTCOMES

Students will accomplish this programme with abilities and skills to:

1. Apply knowledge of computing and mathematics appropriate to the discipline.
2. Analyze a problem and identify and define the computing requirements to solution.
3. Design, implement and evaluate a computer-based system, process, component or program to meet desired needs.
4. Function effectively on teams to accomplish a common goal.
5. Implement and understand professional, ethical, security, and social issues and responsibilities.
6. Communicate effectively with a range of audiences.
7. Analyze the local and global impact of computing on individuals, organizations and society.
8. Recognize the need for and having the ability to engage in continuing professional development.
9. Use current techniques, skills, and tools necessary for computing practice.
10. Apply mathematical foundations, arithmetical principles, and computer science theory in the modeling and design of computer-based systems that demonstrates trade-offs involved in design choices.
11. Apply design and development principles in the construction of software systems of varying complexity.

7.0 ENTRY /ADMISSION REQUIREMENTS

To be admitted to the Bsc.Cs (Computer Science) program, a candidate must satisfy the general admission requirements for National Council for Higher Education (NCHE) and the Islamic University in Uganda. In addition, the following regulations shall hold:

7.0.1 Direct Entry

Candidates seeking admission through this avenue must have obtained: -

- At least two Principle passes in any subject; one of them being in Mathematics or Physics at the Uganda Advanced Certificate of Education (UACE) or its equivalent. Candidates with C3 in sub-mathematics at A'Level shall also be considered for this programme.
- The Uganda Certificate of Education (UCE) or its equivalent, with a minimum of five passes.

7.0.2 Diploma holders

1. Candidates with a diploma in computer science from IUIU or any recognized institution by the National Council for Higher Education (NCHE) and a minimum of **class two** diploma will be admitted directly into first semester of second year of this programme.
2. Other candidates to be admitted via the diploma scheme who do not qualify as (1) above states with the following qualifications will be admitted into first semester of first year of the programme: -
   - Have at least 5 passes obtained at the same sitting of Uganda Certificate of Education(UCE) or its equivalent
   - Have at least 1 principle pass and 2 subsidiary passes from the same sitting of the Uganda Advanced Certificate of Education (UACE) or its equivalent

8.0 RESOURCES AVAILABLE TO FACILITATE LEARNING

8.1 Human Resource

The Table 1.0 below shows members of staff available at the department who will facilitate the running of this programme.

Table 1.0: Members of staff in the department with their qualifications and specialization

No.	Staff Name	Qualifications	Area of Specialization	Status
1.	Golooba Moses	BIT(IUIU), MIT(IIUM), PhD.IT(IIUM)	Information Systems and Databases	Lecturer, FT
2.	Adam Alli	Bsc. CS(IUIU), Msc. SC, PGDIMATHE, CCNA, PhD in CS in Progress	Computer Science and Embedded Systems	Lecturer, FT
3.	Dragule Swaib	Bsc. CS(IUIU), Msc.CS, CCNA-Instructors, PhD in CS (in Progress)	Computer Science and Computer Vision	Lecturer, FT
4	Bwambale Rashid Ramadhan	Bsc. CS(IUA), Msc. CS(UTM), PGDIMATHE(IUIU), CCNA-Instructor, CSW(MAK)	Computer Science and Network and Information Security	Lecturer, FT
5	Chemisto Musa	DCIT, Bsc.CS, MSC CS &IT, PhD. CS	Computer Science and Networks	Lecturer, FT
6	Umar Yahya	HDCE(IUT), Bsc.CS(IUT), Msc.CS(IUT), PhD.CS(DSU)	Computer Science and Artificial Intelligence	Lecturer, FT
6.	Wahab Ismael	Msc. Comp. SC, Higher Dip-S/WARE Eng, BSC. Educ, Dip Educ.	Software Engineering and Visual Programming	Lecturer, FT
7.	Omujal George Martin	Msc. Comp. SC & Applns(Shanghai Univ), BSC. Maths(ECNU-Shanghai), Dip Educ(NTC-Ngetta-	Computer Science, Information systems and Education	Lecturer, FT

		Lira).		
8.	Samira Tariq	Bsc. Hons(IUIU), Msc.IS(MAK)	Information systems and biotechnology	Lecturer, FT
9.	Sekalema Hamza	Bsc. Survey, Msc IT Application (IUT)	Mobile computing and Web development	Lecturer, FT
10.	Isa Abdallah Semakula	BIT(IUIU), MIT(IIUM) CSW(MAK)	Databases Management Systems and Software Engineering	Lecturer, FT
11.	Nassanga Jalia	BSc. CS (IUIU)	Computer Science	TA, FT
12	Bogere Ayub	BIT(IUIU), Msc. Tech Educ(IUT)	Information technology and technical education	Lecturer, FT
11	Kasagga Usama	Bsc.CS(IUIU), Msc. TechEduc(CS), PGDIMATHE, IT Essentials - Instructor.	Computer science and Technical Education	Lecturer, FT
12	Sseguya Asadu	Bsc.CS(IUIU), Msc. Tech Educ, PGDIMATHE	Computer science and Technical Education	Lecturer, FT
13.	Kasule Moses	BIT, Msc. CS	Data Structures and Algorithms and computer science	Lecturer, FT
14.	Baguma Asumani	BIT(IUIU), Msc. Tech Educ(CS)	Information technology and technical education	Lecturer, FT
15.	Walusimbi Hakim	BIT(IUIU), Msc. Tech Educ(CS)	Information technology and technical education	Lecturer, FT
16.	Nakkazi Rukia	BIT(IUIU), Msc.IT(IIUM)	Information technology and Data mining	Lecturer, FT
17.	Taban Habib	Bsc.Cs(IUIU), Msc. Tech Educ(CS)	Computer science and	Lecturer, FT

			Technical Education	
18.	Farida Kyambadde	BIS, Msc. IS	Information Systems and Research design and implementation	Lecturer, FT
19.	Namuyiga Nawal	BIT(IUIU), MIT	Information technology and data mining	Lecturer, FT
20.	Kasule Abdallah	Bsc.Educ, Msc. CS and PhD. CS (In Progress)	Knowledge Base Systems and Education	Lecturer, FT
21.	Muhammad Sumare	Bsc.IT, Msc. CS, CISCO Instructor	Project Planning and management, Information Systems	Lecturer, FT
22.	Walid Kasima	BEEE(MUK), Msc Tech Education Electrical Engineering	Electrical Engineering and Education	Lecturer, PT
23.	Tweheyo Abubakar	BSc. CS (IUIU)	Computer Science	TA, FT

Key: FT=Full Time, PT=Part Time and TA=Teaching Assistant

8.2 Infrastructure

Table 2.0, Below shows infrastructural facilities available to help the running of this programme

Table 2.0: Facilities available at the institution

S/N	Facility	Number	Capacity
1	Lecture Rooms	6 Rooms for Computer Science	60 Students
2	Computer Labs	14 Labs in the Institution	40 Computers (Average)
3	Library	4 Libraries in the Institution	400 Students 600 Computer Science books 1000 e-Books 100 Computers

9.0 PROGRAMME REGULATIONS

9.1 Grading System

The programme shall be graded in accordance with the gazette NCHE grading system based on statutory Instrument No 35.

Table 3.0 shows the details of the grading for individual scores and Table 4.0 shows classification of award for the programme:

Table 3.0: Grading of Individual Course Score

Mark Range	Grade	Grade Point
80 - 100	A	5.0
75 - 79	B+	4.5

70 - 74	B	4.0
65 - 69	C+	3.5
60 - 64	C	3.0
55 - 59	D+	2.5
50 - 54	D	2.0
0 - 49	F	0.0

Table 4.0: Shows Classification of Award Degree

CGPA RANGE	CLASS OF AWARD
4.40-5.00	FIRST CLASS (HONOURS)
3.60-4.39	SECOND CLASS (HONOURS) UPPER DIVISION
2.80-3.59	SECOND CLASS (HONOURS) LOWER DIVISION
2.00-2.79	PASS

9.3 Cumulative CGPA

Computation of grade point Average (GPA) and Cumulative Grade Point Averages (CGPA) is based on the scores per course, a weighted average is computed per semester (GPA) and for the entire programme (CGPA) for a specific student. The formula is as follows:

$$GPA = \frac{\text{SUM (Grade Point Scored X Credit Unit)}}{\text{SUM (Credit Unit)}}$$

Applied to a single Semester

$$CGPA = \frac{\text{SUM (Grade Point Scored X Credit Unit)}}{\text{SUM (Credit Unit)}}$$

Applied to all courses attended

9.4 Progression

A student's progress shall be categorized as follows, based on the individual course and overall aggregate performance:

Normal Progress

A student shall be under normal progress if they score a mark greater that the pass mark (50%) in all courses done, a grade point average above 2.0 in a semester and a Cumulative Grade Point Average above 2.0 overall.

Probation

A student shall be under probation if they score a grade point average less than 2.0 in a semester or a Cumulative Grade Point Average less than 2.0 overall.

Retake

A student shall retake a course the next time it's offered if they score a mark less than the pass mark (50%). Such courses may be undertaken in a specially organized recess period or in the normal semester study period.

Halted Progress

Any student that shall accumulate a total of 6 or more pending courses (Retakes) shall be halted from any further taking of regular courses until the load is reduced to less than or equal to 5. In case the retake load is reduced, the student will then be permitted to proceed from the last point of study before the halt, that it in case the halt was effected in Year 2 Semester 1, then the resumption shall be in Year 2 semester 2.

Discontinuation

A student shall be discontinued from the programme under the following conditions:

(a) Failing a course for 3 times.

(b) Accumulating 3 consecutive probations on the basis of cumulative Grade Point Average

9.5 Graduation Requirements

A student to graduate from this programme must have done four levels of CCNA and accumulated 141 CU, attended industrial training, done a project and defended it with 50% mark and with a minimum of 2.00 CGPA.

10.0 PROGRAMME STRUCTURE FOR BACHELOR OF SCIENCE IN COMPUTER SCIENCE (BSC.CSC)

10.1 Year One (First Semester)

S/No.			Teaching Schedule			
	Course Code	**Course Name**	**LH**	**PH**	**CH**	**CU**
1	COS 1101	Computer Application	30	30	45	3
2	CSC1106	Introduction to Programming and Problems Solving	30	60	60	4
3	CSC 1107	Discrete Mathematics	30	60	60	4
4	CSC 1103	Introduction to Computing	30	30	45	3
5	IOF 1201	Introduction to Islam	35	20	45	3
6	ELS 1107	Communication Skills	35	20	45	3
7	CSC 1105	Computer Systems	30	60	60	4
8	CSC 1106	Digital Logic	30	60	60	4
9	IOF 1201	Introduction to Islam	45	0	45	3
10	IQR 1101	Quran Recitation	45	0	45	3
					Total Credit Units	**34**

10.2 Year One (Second Semester)

S/No.			Teaching Schedule			
	Course Code	**Course Name**	**LH**	**PH**	**CH**	**CU**
1	MAT 1208	Probability and Data analysis	35	20	45	3
2	CSC1203	Structured Programming	30	60	60	4
3	CSC 1212	Computer Care & Maintenance	30	60	60	4
4	AOF 1101	Introductory Arabic	35	20	45	3
5	FOS 1108	Islam & Science	35	20	45	3
6	CSC1210	Electrical Installation	30	60	60	4
7	ACC 1212	Fundamentals of Computerized Accounting	30	30	45	3
					Total Credit Units	**24**

10.3 Year Two (First Semester)

S/No.			Teaching Schedule			
	Course Code	**Course Name**	**LH**	**PH**	**CH**	**CU**
1	CSC 2113	Operating System Concepts	40	40	60	4
2	CSC 2101	Object Oriented Programming	30	60	60	4
3	CSC 2102	Database Systems	30	60	60	4
4	GMT 1103	Principles of Management	30	30	45	3
5	CSC 2107	Numerical Methods	30	60	60	4
6	CSC 2110	Systems Analysis & Design	30	60	60	4
7	CSC 2215	Language Theory and Automata	30	60	60	4
					Total Credit Units	**27**

10.4 YEAR TWO (Second Semester)

			Teaching Schedule			
S/No.	**Course Code**	**Course Name**	**LH**	**PH**	**CH**	**CU**
1	BIT 2202	IT Project Management	30	30	45	3
2	CSC 2211	Data structures and Algorithms	30	60	60	4
3	FOS 2201	Research Methods	30	30	45	3
4	CSC 2216	Signals and Communication Systems	30	30	60	3
5	CSC 2210	Cryptography and Network Security	30	60	60	4
6	CSC 2209	Database Programming	25	70	60	4
7	CAN 2201	Data Communication 3	22.5	22.5	45	3
8	CSC 2208	Applied Computer Graphics and Multimedia	25	70	60	4
					Total Credit Units	**28**
RECESS						
1	FOS 2205	Industrial Training	**0**	**90**	**45**	**4**
					Total Credit Units	**28**

10.5 YEAR THREE (First Semester)

			Teaching Schedule			
S/No	**Course Code**	**Course Name**	**LP**	**PH**	**CH**	**CU**
1	CSC 3105	Computer Organization & Architecture	30	30	45	3
2	CSC 3109	Mobile Application Development	30	60	60	4
3	BIT 3107	Human Computer Interaction	30	60	60	4
4	BIT 3104	IT ethics and professionalism	30	30	45	3
5	CAN 3101	Data Communication level 4	30	60	45	4
6	CSC 3109	Software Engineering	30	30	45	3
7	CSC 3108	Business Intelligence & Data Warehousing	30	60	60	4
		Total Credit Units				**25**
		ELECTIVES				
8	BIT 3103	Web Programming	30	60	60	4
9	BIT 3106	Business Application Programming	30	60	60	4
		Total Credit Units				**04**

10.6 YEAR THREE (Second Semester)

			Teaching Schedule			
S/No.	**Course code**	**Course Name**	**LH**	**PH**	**CH**	**CU**
1	GMT 3205	Technopreneurship	30	30	45	3
2	BIT 3205	Systems & Network Administration	30	60	60	4
3	CSC 3205	Artificial Intelligence and Expert Systems	30	30	60	4
4	CSC 3205	Concepts of Cloud Computing	30	60	60	4
5	FOS 3201	Research project	20	140	90	6
		Total Credit Units				**21**

10.7 CISCO Course distribution

	First Year Second Semester		LH	PH	CH	CU
1	CAN 1201	CCNA Routing & Switching I	30	30	45	3
	Second Year First Semester					
7	CAN 2101	CCNA Routing & Switching II	30	30	45	3
	Second Year Second Semester					
6	CAN 2201	CCNA Routing & Switching III	30	30	45	3
	Third Year First Semester					
8	CAN 3101	CCNA Routing & Switching III	30	30	45	3
		Total Credit Units				12

11.0 ELECTIVE COURSES

The papers below have been included for approval so that they can be introduced into the curriculum as electives.

S.No	Course Code	Course Name	LH	PH	CH	CU
1		Logic Programming	30	60	60	4
2		Image Processing	30	60	60	4
3		Robotics	30	60	60	4
5		Network Programming	30	60	60	4
6		Bioinformatics	30	60	60	4
7		Operational Research in Computing	30	30	60	4
9		Computer Graphics	30	60	60	4
10		Graph Theory	30	60	60	4

12.0 Courses Verses Objective Matrix

12.1 First Semester (Year One)

		Learning Outcomes										
Course Code	**Course Name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
COS 1101	Computer Application		✓		✓				✓	✓		
CSC1106	Introduction to Programming and Problems Solving	✓	✓						✓	✓	✓	✓
CSC 1107	Discrete Mathematics	✓	✓								✓	✓
CSC 1103	Introduction to Computing	✓	✓	✓		✓		✓	✓			
IOF 1201	Introduction to Islam				✓	✓	✓					
ELS 1107	Communication Skills				✓	✓	✓	✓	✓			
CSC 1105	Computer Systems		✓	✓		✓			✓	✓		
CSC 1106	Digital Logic	✓	✓	✓							✓	✓

12.2 Second Semester (First Year)

		Learning Outcomes										
Course Code	**Course Name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
MAT 1208	Probability and Data analysis	✓	✓		✓			✓		✓		
CSC1209	Structured Programming	✓	✓	✓						✓		✓
CSC 1212	Computer Care & Maintenance	✓	✓						✓	✓	✓	✓
AOF 1101	Introductory Arabic				✓	✓	✓					

FOS 1108	Islam & Science				✓	✓	✓					
CSC 1210	Electrical Installation				✓	✓	✓	✓	✓			
ACC 1212	Fundamentals of Computerized Accounting		✓	✓		✓			✓	✓		

12.3 First Semester (Second Year)

		Learning Outcomes										
Course Code	**Course Name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
CSC 2113	Operating System Concepts		✓	✓	✓			✓		✓	✓	
CSC 2101	Object Oriented Programming	✓	✓	✓						✓	✓	✓
CSC 2102	Database Systems	✓	✓	✓					✓	✓	✓	✓
GMT 1103	Principles of Management		✓		✓	✓	✓	✓				
CSC 2107	Numerical Methods	✓	✓	✓						✓	✓	✓
CSC 2110	Systems Analysis & Design				✓	✓	✓	✓	✓		✓	✓
CSC 2115	Language Theory and Automata	✓	✓	✓		✓			✓	✓	✓	✓

12.4 Second Semester (Year Two)

		Learning Outcomes										
Course Code	**Course Name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
BIT 2202	IT Project Management		✓	✓	✓	✓		✓				✓
CSC 2211	Data structures and Algorithms	✓	✓	✓						✓	✓	✓
FOS 2201	Research Methods		✓	✓	✓				✓	✓		✓
CSC 2216	Signals and Communication Systems		✓	✓	✓	✓		✓				

CSC 2210	Cryptography and Network Security		✓	✓						✓	✓	✓
CSC 2209	Database Programming		✓	✓	✓				✓		✓	✓
CSC 2208	Applied Computer Graphics and Multimedia	✓	✓	✓					✓	✓	✓	✓

12.5 First Semester (Third Year)

		Learning Outcomes										
Course Code	**Course Name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
CSC 3105	Computer Organization & Architecture		✓	✓	✓	✓		✓				✓
CSC 3109	Mobile Application Development	✓	✓	✓						✓	✓	✓
BIT 3107	Human Computer Interaction		✓	✓	✓				✓	✓		✓
BIT 3104	IT ethics and professionalism		✓	✓	✓	✓		✓				
CSC 3110	Computer Networks and data Communication		✓	✓						✓	✓	✓
CSC 3109	Software Engineering		✓	✓	✓				✓		✓	✓
CSC 3108	Business Intelligence & Data Warehousing	✓	✓	✓					✓	✓	✓	✓
	ELECTIVES	✓	✓	✓					✓	✓	✓	✓
BIT 3103	Web Programming		✓	✓					✓	✓	✓	✓
BIT 3106	Business Application Programming	✓	✓	✓					✓	✓	✓	✓

12.6 Second Semester (Third Year)

		Learning Outcomes										
Course Code	**Course Name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**

GMT 3205	Technopreneurship		✓	✓	✓			✓		✓	✓	
BIT 3205	Systems & Network Administration	✓	✓	✓						✓	✓	✓
CSC 3205	Artificial Intelligence and Expert Systems	✓	✓	✓					✓	✓	✓	✓
CSC 3205	Concepts of Cloud Computing		✓		✓	✓	✓	✓				
FOS 3201	Research project	✓	✓	✓						✓	✓	✓

13.0 TEACHING, LEARNING AND ASSESSMENT STRATEGIES (COMPETENCES)

- Cognitive abilities are taught through a mixture of formal lectures, guided reading and tutorial groups supported by practical work.
- Practical abilities are developed mostly through the software project courses which commence in the first year of study with small individual exercises, continue through second year and are completed in the final year with an 8 credit individual project.
- The teaching and learning of key (transferable) skills is integrated with course throughout the program.
- Courses in the Computer Science programs are assessed by Examination and continuous assessment. Strategies like assignments and tests.
- Cognitive abilities are assessed by a combination of traditional written examinations and continuous assessment, including marked essays, class tests and computer programming problems.
- Practical abilities are assessed mostly by continuous assessment
- Key skills are mostly assessed in conjunction with the group and final year project elements of the program, and the practical work included in most courses.

14.0 COURSE DETAILS

14.1 Year One Semester 1

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE	
Faculty	Sciences
Department	Computer Science
Course Title	Computer Applications
Year of Study	I
Course Code	COS 1101
Credit Hours	3
Contact Hours	45
Mode of Delivery	Lectures and Practicals

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	In this course, students are to learn about the basic organization, concepts and terminologies in a computerized environment. They are also to get an in depth understanding of common computer applications. The course will cover concepts related to basic IT concepts; windows desktop environment; history of computers; computer components; word processor applications and use of electronic devices in teaching.
Course Objectives	The objectives of this course are to enable a student: 1. Describe the different parts of a computer; 2. Describe the historical evolution of computers; 3. Classify computers and their functionalities 4. Competently use the common word processor applications 5. Use the various electronic devices to deliver learning experiences

Learning Outcomes	By the end of the course, students will be able to: 1. Describe the different parts of a computer; 2. Describe the historical evolution of computers; 3. Classify computers and their functionalities 4. Competently use the common word processor applications 5. Use the various electronic devices to deliver learning experiences	
Teaching and Learning	The class will meet for three hours each week. Class time will be used for a combination of lectures, Tutorials & Practical Sessions.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**Introduction** • Define Basic IT concepts • Explain the Functions and characteristics of computers • Describe how Data is presented (Input-Process & output) and measured in computers • Good practice in the use and care of computers • Dangers and health risks	**5 Hours**
2.	**History of computers** • Trace the historical trends in computing • Describe Computer generations • Discuss Computers today	**10 Hours**
3.	Microsoft Word	**10 Hours**
4.	Microsoft PowerPoint	**8 hours**
5.	Microsoft Excel	**12 Hours**
Total Contact Hours		**45 Hours**

References

1. Alexis Leon & Mathews Leon. (1999). Fundamentals of Information Technology. Leon Vikas Press. New Delhi.

2. Brendan, M & Holder, P. (2002). ECDL: The complete course book for Microsoft Office. Pearson Education Limited.
3. Curtin, P.D; Foley K; Kunal, S & Cathleen, M. (1999). Information Technology Wave. McGraw Hill, New Delhi.
4. Rajaraman, V. (2003). Introduction to Information Technology. PHI Learning Private Ltd. New Delhi.
5. Sanjay, S. (2009). Introduction to Information Technology. Vikas Publishing House Limited. New Delhi.
6. Norton, P.(6th Edition).Introduction to Computers. McGraw Hill Internal Edition.
7. Greg Pery. Teach Yourself Microsoft Office 2007.

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science

Department	Computer Science
Course Title	Introduction to Programming and Problem Solving
Year of Study	I
Course Code	CSC 1108
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures, Tutorials & Practical Sessions

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	The course provides a strong base in the principles and practice of computer programming. It introduces students to the basic concepts of programming and is programming language independent. Real life scenarios and situations are used to explain the principles of programming and provide students with hands on practical skills. Areas covered include computer programming basics and terminologies, programming languages, syntactical and semantic rules, programming language types and operations and operators in programming as well as computer program components.
Course Objectives	The course aims to provide students with: • Knowledge about the basic programming concepts • Knowledge in basic programming terminologies • Comprehensive knowledge about computer programming • Techniques of evaluating syntactic and semantic correctness of a computer program
Learning Outcomes	Upon Completion of the course, the students should be able to: • Explain the key differences between the various programming languages

	• Demonstrate understanding about the basic programming concepts • Build pseudo code using a programming language independent method Plan and organize a programming project	
Teaching and Learning	The class will meet for three hours each week. Class time will be used for a combination of lectures, Tutorials & Practical Sessions.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	Definition of Computer Programming, its importance and implication	**2 Hours**
2.	Computer Programming Languages (Types of languages: Machine, High-level, Assembly)	**2 hours**
3.	Computer programming language evolution/Generations of Computer Programming Languages	**2 hours**
4.	Analogy between Computer Programming languages and human languages	**2 hours**
5.	Programming Paradigms (Structured, Object-oriented, Aspect-oriented, Component-oriented)	**2 hours**
6.	High-level programming languages(C, COBOL, PASCAL, JAVA, C#, VISUAL BASIC, PYTHON)	**2 hours**
7.	Keywords and vocabulary, syntax and grammar, syntax rules and grammatical rules	**2 hours**
8.	Computer programming character sets	**2 hours**
9.	Computer memory organization and addressing	**2 hours**
10.	Computer memory organization and addressing	**2 hours**
11.	Bits, characters and computer character sets (ASCII, EBCDIC, UNICODE)	**2 hours**

12.	Bytes, Words, Instructions, and Instruction sets	**2 hours**
13.	Bitwise operators and operations	**2 hours**
14.	Computer program types of errors (Syntax and logical errors)	**2 hours**
15.	Problem solving with Flow charts	**4 hours**
16.	Basics of Instruction writing both in real world and computer programs	**2 hours**
17.	Principles of computer instruction writing	**2 hours**
18.	Decisions and Program Decision Making	**2 hours**
19.	Performing tasks repetitively; basics of loops	**2 hours**
20.	• Computer program pseudo code • Compilers basics and compilation • Bit composition of data types • Data types and data types size in terms of bits • Basic mathematical operations and operators • Program design guidelines that show the reader how to analyze a problem statement; how to formulate concise goals; how to make up examples; how to develop an outline of the solution, based on the analysis; how to finish the program; and how to test. The logical and physical structure of programs and data. • Lab practical	**2 hours** **2 hours** **2 hours** **2 hours** **2 hours** **4 hours** **10 hours**
Total Contact Hours		**60 Hours**

References

1. Maureen Sprankle, Jim Hubbard, *Problem Solving and Programming Concepts*, 9th Edition, 2011
2. Dieter Fensel, *Problem-Solving Methods: Understanding, Description, Development, and Reuse*, 2010

3. David H. Jonassen, *Learning to Solve Problems: A Handbook for Designing Problem-Solving Learning Environments*, 2010

ISLAMIC UNIVERSITY IN UGANDA **COURSE OUTLINE**	
Faculty	Science
Department	Computer Science
Course Title	**COMMUNICATION SKILLS**
Year of Study	I
Course Code	ELS 1107

Credit Hours	3	
Contact Hours	45	
Mode of Delivery	Lectures, Tutorials & Practical Sessions	
Mode of Assessment		**Weight%**
Course Work Final Examination		30% 70%
Total		**100%**
Course Instructor(s)		
Course Description	This course provides students with enhanced skills to effectively communicate with their peers, subordinates and superiors. These skills include verbal, written, and non-verbal gestures. It gives emphasis on improving their command of the English language in the areas of reasoning, writing and other expressions.	
Course Objectives	This course aims at equipping students with the following skills: 1. Reading, writing and disseminating of information; 2. Collecting and synthesizing information; 3. Critical thinking and problem solving; 4. Utilizing the library and other educational resources.	
Learning Outcomes	Upon Completion of the course, the students should be able to: 1. Read, write and disseminate information; 2. Collect and synthesize information; 3. Generate solutions using critical thinking and problem solving skills; 4. Utilize the library and other educational resources.	
Teaching and learning	The class will meet for three hours each week. Class time will be used for a combination of lectures, Tutorials & Practical Sessions.	
No.	**Detailed Course Outline**	**Allocated Time**

1.	**Introduction** Interpersonal Skills: interactions, team work, office dynamics, meetings, etiquette, emotional intelligence.	**6 Hours**
2.	Writing Skills: grammar and sentence construction, writing notes, minutes and agenda, formal documentations (technical, academic, CVs, e.t.c), referencing, informal documentations (blogs, websites).	**9 hours**
3.	Reading Skills: critical reading, interpretations, making summaries, indexing, map reading, library skills.	**6 hours**
4.	Oral presentations: Visual and multimedia presentations, speaking and listening Skills, making speeches, non-verbal communication, art of persuasion, interviews, public speaking.	**6 hours**
5.	Examination Skills: preparing for examinations, writing examinations (question/answer approaches).	**3 hours**
6.	• Case studies / Peer Discussions & Role plays (30 hours)	**15 hours**
Total Contact Hours		**45 Hours**

References

1. Alan Barker (2001), Improve Your Communication Skills Revised 2nd Edition
2. *Kellie Sullivan* (2005) Emotional Intelligence: 50 Effective Ways To Improve Communication Skills,EQ And Mastering Your Emotions (emotional intelligence, interpersonal skills, people skills, interpersonal communication)

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE	
Faculty	Science
Department	Computer Science
Course Title	Discrete Mathematics
Year of Study	I
Course Code	CSC 1107
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures, Tutorials & Practical Sessions

Mode of Assessment	Weight%
Course Work Final Examination	30% 70%
Total	**100%**

Course Instructor(s)	
Course Description	Discrete Mathematics introduces students to ideas and techniques from discrete mathematics that are widely used in Computer Science. The course aims to present these ideas "in action"; each topic will be geared towards a specific significant application
Course Objectives	The course aims to provide students with: Acquire the skills of discrete mathematics needed to analyze, model and solve problems in computer science and technology
Learning Outcomes	Upon Completion of the course, the students should be able to:
Teaching and learning	The class will meet for three hours each week. Class time will be used for a combination of lectures, Tutorials & Practical Sessions.

No.	Detailed Course Outline	Allocated Time
1.	**Introduction to discrete Math** • Introduce students to ideas and techniques from discrete mathematics.	6 **Hours**
2.	**Indices and logarithms** • Transform expressions with indices and logarithmic expressions into forms which are more manageable. • Represent graphically the basic expressions involving indices and logarithms.	**6 Hours**

3.	**Sets** • Illustrate properties of set algebra using Venn-diagrams. • Prove various useful results of set algebra.	**3 Hours**
4.	**Logic** • Grasp the language of mathematical logic starting from the language of sets. • Construct Propositions and to evaluate truth values. • Use quantifiers. • Identify appropriate methods and applying them in the proof of mathematical statements.	9 **Hours**
5.	**Relations and Function** • Define and work with functions and relations	**3Hours**
6.	**Probability** • Solve typical probabilistic problems. • Explain the basic concept of probability.	7 **Hours**
7.	**Techniques of Counting** • Count the number of elements in certain mathematically defined sets where ordinary methods of counting are tedious.	6 **Hours**
8.	**Boolean Algebra** • Work with Boolean expressions.	**6 Hours**
Total Contact Hours		**45 Hours**

References

1. Schaum's Outline series: Discrete Mathematics, 2nd Edition by Seymour Lipshutz & Marc Lipson, Tata McGraw-Hill India, 2003.
2. Discrete Mathematics by Olympia Nicodemi, CBS publishers and Distributors India, 2001

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE	
Faculty	Science
Department	Computer Science
Course Title	Introduction to Computing
Year of Study	I
Course Code	CSC 1103
Credit Hours	3
Contact Hours	45
Mode of Delivery	Lectures, Tutorials & Practical Sessions

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%

Total	**100%**
Course Instructor(s)	
Course Description	This course is an introductory course to computing (IT & COMPUTER SCIENCE). It provides an overview of the major topics and expectations of a computing graduate. It builds a foundation of digital literacy skills that are necessary in a computing driven society
Course Objectives	The course aims to provide students with: • Relating the academic discipline of Information technology with Computer Science discipline. • Describing the major areas or topics that comprise the IT & COMPUTER SCIENCE discipline. • Describing ICTs including their components, the environment and the people involved. • Explaining the impact of Computing on individuals, organizations and society. • Using of common ICTs like using computers, telephones, televisions, radios etc.
Learning Outcomes	Upon Completion of the course, the students should be able to: • Differentiate between the academic disciplines of IT & COMPUTER SCIENCE. • Explain the major areas or topics that comprise the IT & COMPUTER SCIENCE disciplines • Explain ICTs including their components, the environment and the people involved. • Understand the impact of Computing on individuals, organizations and society. • Demonstrate an ability to use of common ICTs like using computers, telephones, televisions, radios etc.

Teaching and learning	The class will meet for three hours each week. Class time will be used for a combination of Lectures, Practical, peer discussions, demonstrations	
No.	**Detailed Course Outline**	**Allocated Time**
1.	Introduction: data, information, information technology, Computer Science, IT & COMPUTER SCIENCE Systems model	**3 hours**
2.	IT & COMPUTER SCIENCE and its related disciplines: Information Systems, Computer Science, Computer Engineering, Software Engineering	**3 hours**
3.	Computer components: hardware, software, people, processes, environment, policy and legal framework	**3 hours**
4.	Information and Communication Technologies: emails, computers, telephones, radio, television, social networks	**3hours**
5.	Overview of important topics in IT & COMPUTER SCIENCE: Human- computer interaction, information management, networking, platform technologies, programming, web systems, databases, computer security	6 **hours**
6.	Applications: Politics, health, agriculture, law, business, education.	**3 hours**
7.	Social issues: job expectations from an IT & COMPUTER SCIENCE graduate, Professionalism, social challenges that can be solved using IT & COMPUTER SCIENCE, their impacts and ICTS on society	**3 hours**
8.	Office applications: word processors, spreadsheets, browsers, desktop publishing	**6 hours**
9.	Practical	**30 hours**
Total Contact Hours		**45 Hours**

References

1. Kant, K., & Srinivasan, M. M. (1992). *Introduction to computer system performance evaluation*.

McGraw-Hill College.
2. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.
3. Markus, M. L., & Robey, D. (1988). Information technology and organizational change: causal structure in theory and research. *Management science*, *34*(5), 583-598.
4. Holtshouse, D. K. (2013). *Information technology for knowledge management*. U. M. Borghoff, & R. Pareschi (Eds.). Springer Science & Business Media.

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science	
Department	Computer Science	
Course Title	INTRODUCTION TO ISLAM	
Year of Study	***[FOR ALL FIRST YEAR STUDENTS POSTGRADUATE AND UNDERGRADUATE STUDIES]***	
Course Code	IOF 1207	
Credit Hours	4	
Contact Hours	60	
Mode of Delivery	Lectures, Tutorials & Practical Sessions	
Mode of Assessment		**Weight%**
Course Work		30%
Final Examination		70%
Total		**100%**
Course Instructor(s)		

Course Description	
Course Objectives	➢ -To expose to students the fundamental teachings of Islam ➢ -To give students awareness of the spiritual, moral, social and economic values of Islam ➢ -To enable students appreciate and accept Islam as a religion, which respects other faiths ➢ -To answer relevant questions misunderstood by both Muslims and non-Muslims about Islam and Muslims ➢ -To introduce to students some Islamic concepts and phrases which are used in everyday life of a Muslim
SECTION A: **Islamic History-**	**(i) PRE-ISLAMIC ARABIA (JAHLIYYAH PERIOD)** In this introductory approach, students will be exposed to the social, religious, economic and political setup of the Arabian Peninsula, with particular emphasis to the area of Hijaaz (Makkah, Madinna, Taif) where Islam was born, then spread to the rest of the Peninsula. This is also the region the Prophet of Islam, Muhammad (S), was born. This will be done in such a manner that students will appreciate the message and way of life that existed before the advent of Islam in the region.
	(ii) PRE-ISLAMIC ARABIA (JAHLIYYAH PERIOD) In this introductory approach, students will be exposed to the social, religious, economic and political setup of the Arabian Peninsula, with particular emphasis to the area of Hijaaz (Makkah, Madinna, Taif) where Islam was born, then spread to the rest of the Peninsula. This is also the region the Prophet of Islam, Muhammad (S), was born. This will be done in such a manner that students will appreciate the message and way of life that existed before the advent of Islam in the region.

	(iii) THE LIFE HISTORY OF PROPHET MUHAMMAD (S) In this section a brief study of the Prophet's lifehistory (Seera) will be covered. His challenges and achievements will be looked at. From this study, a student will emerge to appreciate the life-changing effect the religion of Islam brought not only to the Arab world, but also to the entire humanity. The era of the four rightly-guided Caliphs: will be mentioned and their importance emphasized to the history of Islam. The following topics will be essential:	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**The early life of Muhammad** Topics to be covered in a brief manner include. 1. The birth of Muhammad in Makkah 2. The upbringing of Muhammad 3. The social and economic life of Muhammad as a youth 4. The marriage of Muhammad to his first wife, Khadijah	**6 Hours**
2.	**The life of Muhammad (S) after the first heavenly message (The Quran)** 1. The first message Muhammad (S) received from Allah and its content 2. The reaction of his wife, relatives and people of Makkah. 3. The migration of Muslims to Abyssinia and Madina 4. The establishment of the first Islamic state in Madina and its impact 5. The return and conquer of Makkah by Muslims 6. The Four-Rightly guided Caliphs (632-660): Abubakar, Umar, Uthman and Ali.	7 **Hours**

3.	**SECTION B: Aqiidah** TAWHEED: THE PILLARS OF ISLAM Introduction to the meaning of Quran and Sunnah/Hadith in the Muslim's life. The birds' eye view of the five fundamental pillars of Islam: their meaning, importance, pre-requisites, prescription, spiritual and physical values, classifications, performance and impact on a Muslim as an individual and society at large.	**3 Hours**
	The pillars are: 1. The shahada/kalimat or testimony 2. The salat or prayer: its prerequisites, nullifiers and schedules and its importance to man kind. 3. The Zakat or alms due: Difinition, its importance , those who pay it, recipients, its time and amount in which it is due, problems of zaka collection and zaka disrtibution in Uganda. 4. Sawm or fasting: Difinition, its historical back ground, its importance, types of fasting, obligation, nullification 5. Hajj or pilgrimage to Makkah: its time, who should perform it, place and origin.	**9 Hours**

4.	**SECTION C: The Family Structure In Islam** This will cover three areas viz.: 1. The concept of marriage in Islam: the importance of marriage, its impact to upbring a complex free society. 2. The issue of polygamy and its application in Islam 3. Divorce and its application in Islam. 4. The concept of family planning in Islam:	**3 Hours**
5.	**SECTION D: Islamic Morals** 1. Foods and drinks: the wisdom behind the prohibition of certain foods and drinks in Islam 2. The values of adhering to the recommended code of dress in Islam, with particular emphasis to Hijaab.	**3 Hours**
6	**SECTION E: The Meaning of Jihad In Islam** Discussion of this topic will be centered on the meaning, importance and types of Jihad in Islam as compared to the prevailing perception in both some Muslim and many non-Muslim areas of this term. Emphasis will be put on what the Prophet termed as the "greater" and the "lesser" Jihads	**6 Hours**
Total Contact Hours		**60 Hours**

References READING LIST

- Mawdudi, Sayyid A. *Let us be Muslims*, Delhi 1989
- Mawdudi Sayyid A. *Towards understanding Islam*, Riyadh 1997
- Sheikh Abdulwahab M. *Three Essays on Tawhid*, Riyadh 1979
- Al-faruq, Ismail R. *Islam*, U.S.A. 1979
- Phillips, Abu Ameenah Bilal, *The Fundamentals of Tawhid*
- Dr. Hamidullah, Muhammad, *Introduction to Islam*, New Delhi 1992
- Haifa, Manzoor Ahmad, *A Survey of Muslim Institutions and Culture*, New Delhi 1992
- Dr. Khan, Muhammad, *Muhammad the Final Messenger,* New Delhi, 1981
- Quraishy, M.A. *Textbo ok of Islam*, Books 1 and 2, Nairobi, 1987
- Khurshid, Ahmad, Islam – *Its meaning and Message*, London, 1988
- Abdallati, Hammudah, *The family Structure in Islam*, Lagos, 1982

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE		
Faculty	**Science**	
Department	Computer Science	
Course Title	Computer Systems	
Year of Study	I	
Subject	CSC 1105	
Credit Hours	4	
Contact Hours	60	
Mode of Delivery	Lectures and Discussions	
Lecturer :		
Prerequisite	None	
Mode of Assessment		**Weight %**
Course Work		30%
Final Examination		70%
Total		100%
Course Description	This course introduces students to; the basic components of computer systems, a computer's physical and logical architecture (Detailed description of hardware & Software), the concepts of data representation, digital logic gates, memory, storage and file systems, Transistors, vacuum tubes and integrated circuits IC's. Practical sessions in the paper a based on the computer system lectures.	
Learning Objectives	The objectives of this course are to enable a student: 1. Describe the different parts of a computer and their functionalities 2. Describe the historical evolution of computers 3. Classify computers and their functionalities 4. Equip the students with knowledge about ◦ Basic components of the computer system ◦ How they work ◦ Software, and hardware installation ◦ How to solve basic component problems (Diagnosis of Hardware and Software Problems)	

	● Equip students with basic computer Network care and maintenance ○ NIC and wireless interface cards ● Equip students with details of computer System Architecture, how the Processor, Storage organs, Input/output devices works. ● Equip students with knowledge and understanding of transistors, digital logic and data representation details of computer. Practical sessions in the paper a based on the computer system.	
Learning Outcome	At the completion of the paper, a student will have acquired general knowledge about the whole computer system and how the different components work and achieve the goals of a computer system. Such knowledge helps a student to be a good user of the computer and therefore be able to troubleshoot computing systems.	
	Detailed Course Outline	**Allocated Time**
1.	**Introduction to Computer Systems** • Introduction to Computer Systems Concepts • Hardware • Identifications of different Hardware Devices and peripherals • Input, Output, Processing and storage devices • Software • Different descriptions/ classification of software • Operating systems software and Application software • Historical Software evolution era's • S/W installations i.e. OS, applications etc. • S/W Utilities we can use for proper PC management • Classification of computers	**4 Hours**
3.	**Architecture of the Computer system** • Logical Architecture of the Computer systems • Von Neumann and other computers systems architectures	**4 Hours**

	• A Micro Computer System • Generations of languages (high-level, low-level and machine programming language) • Program Translators	
4	**Central Processing Unit** • General description of the components parts of the computer systems from Von Neumann Architecture The Central Processing Unit and Its organization • Control Unit, Registers, Arithmetic Logic Unit • Processor-Memory Interconnection • Buses • Fetching Instructions • Instruction Format • Executing Instructions • The Fetch and Execute Cycle • CISC Characteristics • RISC Architectures • Pipelining	**6 Hours**
6	**Memory and Storage** • Primary Memory and Secondary Storage Memory and Memory Management • Representing Memory • Memory Vs Storage • Memory Hierarchy • Semiconductor Technology • Processor - Memory Bus • RAM and varieties: Dynamic (DRAM), Synchronous (SDRAM), Static (SRAM)- Cache Memory, Chips (SIMM and DIMM) • ROM (PROM, EPROM, EEPROM)	**10 Hours**

	• CACHE Memory Secondary Storage Devices • Descriptions of storage locations like Hard disks, flash disks, floppy disks, solid state devices, memory cards, Magnetic tapes etc. • RAID's • Types of file systems and their Operating systems (FAT, NTFS etc.) • Data Storage Management Techniques	
8	**Input and Output Systems** Description of the Input and Output system Input-Output system • Types of interface • Parallel IO • Serial IO • IO Addressing • Modes of IO transfer	**6 Hours**
9	**Transistors and ICs** • Introduction to Transistors, vacuum tubes and Integrated Circuits (IC) • Computers systems and Vacuum tubes • Evolvement of Transistors into computer systems • Impact of transistor evolution on computers • Integrated Circuits	**6 Hours**
10.	**Data Representations** Data Representation and Computer Arithmetic • Bits, Bytes and Words • Binary Codes • Number Systems • Negative Numbers	**10 Hours**

	• Binary Arithmetic • Binary Coded Decimal • Floating Point Representation	
7	**Digital Logic Gates** Digital Logic Circuits • Boolean algebra • Logic gates • Combinatorial Logic Circuits • Sequential Logic Circuits	**8 Hours**
8	**Computer Networks and Computer Security** Introduction to Computer Networks and Computer Security	**6 Hours**
Total Contact Hours		**60 Hours**

Reference

1) Steven, C.C. & Raymond, P.C., *"Numerical Methods for Engineers"*, 4th Edition, McGraw-Hill**,** 2003
2) Shelly, Cashman, Vermat, Discovering Computers, Course Technology, 1999.
3) Logic, B., Maps, K., & Logic, P. (2015). ECE 221: Introduction to Digital and Computer Systems Fall 2015.

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science

Department	Computer Science
Course Title	Digital Logic
Year of Study	I
Course Code	CSC 1106
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures and Seminar/ Tutorial Presentations

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	100%

Course Instructor(s)	
Course Description	This course is intended to equip students with techniques of Binary systems and Digital systems as Computer components as digital components
Course Objectives	The objectives of this course are to: Enable students distinguish between binary systems and digital systems.
Learning Outcomes	By the end of the course, students will be able to: Students should able to distinguish between binary systems and digital systems. Computer components as digital components
Teaching and learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & presentations/discussions.

No.	**Detailed Course Outline**	**Allocated Time**
1	**Introduction** Digital logic Digital systems Binary digit (bit)	**4 Hours**

2	**Number Systems** • Conversion of numbers from binary to decimal, octal and hexadecimal • Complements: r's complement and (r-1)'s complement. • Binary logic: basic logic operations and logic gates	**4 Hours**
3	**Boolean Logic and Circuit fundamentals** • Definition of Boolean algebra • Laws of Boolean algebra • Digital System basic building blocks Fixed and Floating Point Binary Arithmetic	**8 Hours**
4	**Propositions and predicates** • Two variable case • Three variable case • Four variable case	**8 hours**
5	**Karnaugh Map** • Two variable case • Three variable case • Four variable case	**8 Hours**
6	**Combination logic Circuits** • Introduction • Design Procedure • Adders	**8 Hours**
7	**Sequential Circuits** • Introduction • Flip Flops	**12 Hours**
8	**Computer Architecture** Introduction to Digital Computer Architecture	**8 Hours**

Total Contact Hours		**60 Hours**

References

1. Pang, J. (2015). Active Learning in the Introduction to Digital Logic Design Laboratory Course.
2. Rhyne, V.T.: Fundamentals of Digital Systems Design Englewood Cliffs, n>j Prentice Hall Inc 1973
3. Nagle H.T. Jr. B.A Carol and JD Irwin **:** Introduction to Computer Logic
4. M. Moris Mano: Digital Logic and Computer Design. 3rd Edition Englewood Cliffs, N.J. Prentice Hall Inc 1979
5. Nicholas Carter: Computer Architecture McGraw – Hill Edition 2002 Stephen D. Burd: Systems Architecture Thomsom Asia Pte Ltd 2002 Other Internet sources.
6. M. Moris Mano: Digital Logic and Computer Design. 2004.
7. Nicholas Carter: Computer Architecture. Schaum's Outline. 2nd Edition 2002.

14.2 Year One - Semester Two

ISLAMIC UNIVERSITY IN UGANDA **COURSE OUTLINE**	
Faculty	Science
Department	Computer Science
Course Title	Computer Care & Maintenance

Year of Study	I
Course Code	CSC 1212
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures and Seminar/ Tutorial Presentations

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	This course introduces students to; the basic components of computer systems, a computer's physical and logical architecture (Detailed description of hardware & Software). ● Equip the students with knowledge about ○ Basic components of the Computer /Mobile Devices How they work ○ Preventive measures to keep computers working efficiently ○ Corrective measures on how to solve computer effects ○ How to solve basic component problems (Diagnosis of Hardware and Software Problems) **Computer / Mobile Device Network Maintenance** ● Basic computer Network care and maintenance ○ NIC and wireless interface cards o Details of how to improve/ enhance the Speed and Performance of Computer / Mobile Device Maintenance
Course Objectives	The objectives of this course are to: ● Equip the students with knowledge about ○ Basic components of the computer system

	◦ How they work ◦ Preventive measures to keep computers working efficiently ◦ Corrective measures on how to solve computer effects ◦ How to solve basic component problems (Diagnosis of Hardware and Software Problems) ● Equip students with basic computer Network care and maintenance ◦ NIC and wireless interface cards ● Equip students with details of how to improve/ enhance the Speed and Performance of your computer System Practical sessions in the paper a based on the computer care and maintenance lectures.	
Learning Outcomes	At the completion of the paper, a student will have acquired general knowledge about the whole computer system and how the different components work and also be able to repair and maintain Computer / Mobile Devices/ systems. This knowledge helps a student to be a good user, maintainer and repairer of the computers and therefore be able to troubleshoot the said computing systems.	
Teaching and Learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & practical sessions/discussions.	
Topic.	**Detailed Course Outline**	**Allocated Time**

1.	**Introduction to Computer Systems Concepts** Introduction to Computer Systems. • Hardware • Identifications of different Hardware Devices and peripherals • Input, Output, Processing and storage devices • Software • Different descriptions/ classification of software • Operating systems software and Application software • Historical Software evolution era's • S/W installations i.e. OS, applications etc. • S/W Utilities we can use for proper PC management • Classification of computers	**10 Hours**

2.	**Computer/Mobile Device Maintenance** Computer / Mobile Regular Management Tips: Software for Computer System management Computer Maintenance: Preventive Maintenance o Maintenance Schedule for the computer System o Preventive Maintenance procedures for o System Casing o Motherboard o Monitor o Processor o Keyboard and Mouse o Printers o Power Unit o Any Other Peripheral Devices Diagnostic and Corrective Maintenance ✓ Taking and Diagnosis of a Computer Problems ✓ Common Computer System Problems and Their respective measures taken to solve them. ✓ Recovery Measures Computer Regular Management Tips Software for Computer System management	**20 Hours**

3.	**Practical-Sessions** **Basic Computer / Mobile Devices Network and Maintenance** Basic Computer Network Care and Maintenance • Connectivity Problems/ Network Errors • Network Server Problems • Network Operating System Problems • NIC Identifications including Wireless Interface Cards	**15 Hours**
4.	**Data Management** • Categories of Data Risks • Types of data security • Data Backup • Computer Viruses	**8 hours**
5.	**Measures taken to improve Computer performance** • Defragmentation • Check disks for errors • Scandisk • Disk Cleanup	**7 Hours**
Total Contact Hours		**60 Hours**

References

1. A+ Certification Training Kit Second Edition (With CD-ROM)
   Copyright© 2000 by Microsoft Corporation (Hard Cover-March 7, 2001)
   Avg. Customer Review: ISBN 073561265X
2. Upgrading and Repairing PCs: A+ Certification Study Guide (2nd Edition)
   By Mark Edward Soper, Scot Mueller (Paperback-March 2001) Avg. Customer Review: ISBN:
3. A+ Complete Study Guide, Deluxe Edition
   By David Groth, Dan Newland (HardCover-November15, 2001)

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science
Department	Computer Science
Course Title	Structured Programming
Year of Study	I
Course Code	CSC 1209
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures and Seminar/ Tutorial Presentations

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	The course provides a strong base in the principles and practice of structured programming. A high level programming language such as C is used to explain the principles of programming and provide students with hands on practical skills. Areas covered include program structure, data structures, syntactical and semantic correctness, planning and segmentation in programming as well as working with data files.
Course Objectives	The course aims to provide students with: • Knowledge about the various programming languages • Knowledge in basic programming concepts • Comprehensive knowledge about structured programming • Skills in planning and organization of programming projects • Techniques of evaluating syntactic and semantic correctness of a computer program

	• Strong practical foundation in programming
Learning Outcomes	Upon Completion of the course, the students should be able to: • Explain the key differences between the various programming languages • Demonstrate understanding about the basic programming concepts • Build software using a functional programming language such as C • Plan and organize a programming project • Evaluate a computer program for syntactic and semantic correctness
Teaching and Learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & practical sessions/discussions.

No.	**Detailed Course Outline**	**Allocated Time**
1.	Introduction ✓ Program structure in C language	2 hours
2.	✓ Variables, Identifiers, Names and Operators	4 hours
3.	✓ Conditional Statements (for and switch statements)	4 hours
4.	✓ Loops (for, while and do…while)	4 hours
5.	✓ Logical thinking with flow charts	4 hours
6	✓ Arrays and Strings	4 hours
7	✓ Functions	4 hours
8	✓ Structures	4 hours
9	✓ Pointers	4 hours
10	✓ Advanced data types	4 hours
11	✓ Dynamic memory allocation and dynamic structures	4 hours
12	✓ Working with files	4 hours

13	✓ Lab Practical and Tutorials	14 hours
Total Contact Hours		**60 Hours**

References

1. Chlipala, A. (2013, September). The Bedrock structured programming system: Combining generative metaprogramming and Hoare logic in an extensible program verifier. In *ACM SIGPLAN Notices* (Vol. 48, No. 9, pp. 391-402). ACM.
2. McCool, M. D., Robison, A. D., & Reinders, J. (2012). *Structured parallel programming: patterns for efficient computation*. Elsevier.
3. Kernighan, B. W., & Ritchie, D. M. (2006). The C programming language.
4. Velleman, D. J. (2006). *How to prove it: A structured approach*. Cambridge University Press.

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science
Department	Computer Science
Course Title	Electrical Installation
Year of Study	I
Course Code	CSC 1210
Credit Hours	3
Contact Hours	45
Mode of Delivery	Lectures and discussions

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	This course introduces the basic skills required for electrical/electronic technicians. Topics include soldering/de_soldering, safety and sustainability practices, test equipment, scientific calculators, the resistor color code, electronic devices, problem solving, and use of hand tools. Upon completion, students should be able to solder/de_solder, operate test equipment, apply problem-solving techniques, and use a scientific calculator
Course Objectives	This course introduces the basic skills required for electrical/electronic technicians.
Learning Outcomes	By the end of the course, students should be able to: • Identify electronic components. • Identify and select wire. • Identify, select, handle, and store cleaning materials. • Apply soldering techniques for electronic assembly. • Select, care for, and operate hand tools.

	• Maintain a clean and organized work environment. • Interpret and apply safety codes and procedures. • Solve basic math problems • Evaluate environment to detect hazardous conditions. • Convert between English and metric measurement systems. • Apply and use number representations: scientific, engineering, and power of ten. • Use basic electronic formulas. • Follow lab and shop safety rules. • Calculate area and volume. • Apply basic trigonometric functions for solving problems. • Follow standard lab procedures for data collection and presentation.	
Teaching and learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & presentations/discussions.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**CIRCUIT FUNDAMENTALS** • Basic Mathematics • Current, Voltage, and Resistance • Characteristics of Conductors • Series Resistive Circuits • Parallel Resistive Circuits • Series-Parallel Resistive Circuits • Work, Energy, Power and Efficiency • Edison 3-Wire Distribution Systems	**25 Hours**
2.	**EMF SOURCES** • Methods of Producing EMF • Cells and Batteries • Magnetism • Electromagnetism and Electromagnetic Induction • Generators	**15 Hours**

3.	**LAB FUNDAMENTALS** • Safety • Meters • Conductors • Splicing and Terminating (Low Voltage) • Resistors • Switching Circuits • Basic Circuits Using Buzzers and Chimes • Relays and Controls • Low Voltage Switching • Residential Alarm Systems and Smoke Alarms	**20 Hours**
Total Contact Hours		**60 Hours**

References

1. Boylestard, Introductory circuit analysis 10th edition
2. Alexander sadiku: Fundamentals of electric circuit
3. Hayles, N. K. (2008). Electronic literature: new horizons for the literary. University of Notre Dame Press.
4. Panoiu, M., Panoiu, C., Osaci, M., & Muscalagiu, I. (2008). Simulation result about harmonics filtering using measurement of some electrical items in electrical installation on UHP EAF. WSEAS Transactions on Circuits and Systems, 7(1), 22-31.

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science	
Department	Computer Science	
Course Title	Fundamentals of Computerized Accounting	
Year of Study	I	
Course Code	ACC 1212	
Credit Hours	3	
Contact Hours	45	
Mode of Delivery	Lectures, Practical, peer discussions, demonstrations	
Mode of Assessment		**Weight%**
Course Work		30%
Final Examination		70%
Total		**100%**
Course Instructor(s)		
Course Description	The course introduces students to the principles of accounting, computerized accounting packages, their general structures and practical application in business information management.	
Course Objectives	The Course is intended to: 1. Introduce students to concepts of accounting and professional financial reporting. 2. Introduce students to the accounting cycle from transactions through to trial balance, period-end adjustments and the preparation of the financial statements. 3. Introduce students to the main accounting packages, their general structures and applications and benefits. 4. Enable students to identify key components of customized accounting systems and their underlying structures.	
Learning Outcomes	By the end of the course students should be able to:	

	1. Understand fundamental accounting concepts, including the definitions of the elements of financial statements: assets; liabilities, equity; revenues and expenses. 2. Comprehend the accounting cycle, from transactions through to trial balance, period-end adjustments and the preparation of the financial statements 3. Identify computerized accounting packages, their general structures and applications and benefits. 4. Identify the basic components of a custom computerized accounting package and its underlying structure	
Teaching and Learning	The class will meet for three hours each week. Class time will be used for a combination of lectures & presentations/discussions.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	The distinction between cash accounting and accrual accounting, the accounting cycle	**3 Hours**
2.	Deriving the accounting equation and the use of the debit-credit notation	**2 Hours**
3.	Preparation of the income statement, balance sheet and statement of cash flows	**5 Hours**
4.	Completing an accounting practice set using a commercial computerized accounting package	**30 hours**
5.	Custom Computerized Accounting system components (Ledgers, Transaction Posting, Report generation – Demonstrated using MS Excel)	**5 Hours**
Total Contact Hours		**45 Hours**

References

1. Basics of Accounting and Information Processing: The Accounting Cycle, Larry M Walther, 2010
2. Tally ERP 9 Fundamentals, Tally Solutions pvt, 2012 Online: http://assets.cacharya.com/Fundamentals-of-Tally-ERP9-UDTSTK8S.pdf?1440223327

3. Tally ERP 9 at a glance, Tally Solutions pvt, 2009: Online: www.infinsys.com/v1/downloads/**tally_erp_9_**doc.**pdf**
4. *Quick Books, Small Business Accounting User Guide, Intuit Inc, 2012 Online:* http://support.quickbooks.intuit.com/opencms/sites/default/qbsupportsite/PDFs/2013Guides/2013_pro_premier_user_guide.pdf

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE		
Faculty	Science	
Department	Computer Science	
Course Title	INTRODUCTORY ARABIC	
Year of Study	ONE (1): ALL COURSES	
Course Code	AOF 1101	
Credit Hours	4	
Contact Hours	60	
Mode of Delivery	The methods will entail; Lecture, Case discussions and Class presentations.	
Mode of Assessment		**Weight%**
Course Work		30%
Oral Examination		20%
Final Examination		50%
Total		**100%**
Course Instructor(s)		
Course Description		
Course Objectives	**OBJECTIVES** At the end of the course, the students should be able: • To gain and be familiar with the commonly used concepts (simple sentences and common words) of Arabic Language. • To construct simple sentences in Arabic Language. • To correctly pronounce Arabic Language sounds.	
Learning Outcomes/Goal	The overall goal of the course is to introduce to the students the basics of Arabic Language.	
Teaching and learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & presentations/discussions.	
No.	**Detailed Course Outline**	**Allocated Time**

	1. Greetings (salutations) 2. Simple vocabularies used in daily life. 3. Counting numbers from 1 – 20 then 10, 20, 30 …. Etc. / knowing time (by clock). 4. Constructing of simple sentences. 5. Names of days of the week. 6. Arabic Sounds (alphabets) 7. Writing (joining letters into words) 8. Interrogation and response (where, when, Is he, what….etc) 9. Pronouns e.g. he, she, you, me them … etc. 10. Conjugation of verbs. 11. Prepositions (to in on from etc.) and adjectives (colours and size) 12. Tenses (past, present and future with س) 13. Possessive pronouns. 14. Relative pronouns (demonstrative pronouns) i.e this هذا/هذه with an emphasis on the feminity and masculinity of words	**60 Hours**
Total Contact Hours		**60 Hours**

REFERENCES

1. Dr. Muhammad Ismael, Naasef Mustafah Abdu-Aziz, nad Mukhatar Tahir Hussein, *Al-Arabbiyatu li-nnashe'en vol. One* first edition Visarat Al-ma'arif 1983.
2. Jamu'ayyat Addawat Al-isalaamiyyat, *s*. Tripoli

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science
Department	Computer Science
Course Title	Islam and Science
Year of Study	I
Course Code	FOS 1108
Credit Hours	3
Contact Hours	45
Mode of Delivery	Lectures

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	This course is intended cover Islamic beliefs and practices, comparison of Science and religion, Islamic view on evolution, need of Religion in the 21st century, Scientific facts and Miracles in the Quran and Sunnah, Muslim contributions to the development of modern Science and Technology, propagation of Islam after the Development of Science and sexuality In Islam
Course Objectives	• Intends to equip science students with knowledge about science with in Islamic teachings and principles. • The paper endeavors to expose general contributions of early Muslims to the field of science, scientific expositions explained in the Quran and challenges found in today's scientific experience. • It looks at the general view of Islam with the current scientific trend and experience. • It also look at whether Islam has as a religion has texts and solutions to related to today's modern scientific world.

	○ Appreciation of Islam as a religion that is concerned with solving man's current challenges in this new technological world (Modern)	
Learning Outcomes	By the end of the course students should be able to: • Compare and contrast the Islamic belief and scientific principles. • Justify the need of religion in the modern world. • Identify modern scientific discoveries that are inferred in the Quran and the Sunnah. • Compare and contrast the Darwin's theory and Islamic teachings on evolution • Identify modern methods of Islamic Propagation in the face of modern science and Technology. • Discuss the Muslim contributors and contributions to development of Modern Science and Technology. • Provide Islamic solution to modern sexuality problems and challenges	
Teaching and learning	The class will meet for three hours each week. Class time will be used for a combination of lectures & presentations/discussions.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**Science and Religion** Why science and religion Contradict, Scientist belief about God, case against Darwinism, evidence for the soul and its links to God, Difficult questions and answers about God, Darwin's theory of evolution, three main beliefs about evolution, Islamic view on evolution, Islam's explanation of fossil bones of our ancestors.	**8 Hours**
2.	**Need of religion in Modern World** Islam between east and west, Islam the misunderstood religion, scientific facts unexplained by science	**5 Hours**

3.	**Scientific facts and Miracles in the Quran and Sunnah.** Human embryonic development, Mountains, origin of the Universe, Cerebrum, Seas and rivers, deep seas and internal waves, clouds and scientists comments on the scientific miracles in the Quran, shaking of soil particle e.t.c	**15 Hours**
4.	**Islam and Muslim Contributors and Contributions to modern Science and Technology** Muslim and Islam contribution to Physics, Chemistry, Biology, Mathematics, Medicine telecommunications etc. sample Muslim personalities in the development of science and technology, Propagation of Islam in the modern World of science and technology.	**12 hours**
5.	**Sexuality in Islam** Teaching of Islam on the different forms of sex, artificial insemination of human beings, cloning of human beings and Family planning, contraception and abortion, male circumcision, modernity sex revolution, Sexually transmitted diseases etc.	**5 Hours**
Total Contact Hours		**45 Hours**

References

1. Odingo A.M.Y (2005). Islam and Science: Conflicting or Conciliating, Abu Aisha Stores, Nairobi
2. Ibrahiim A.I (1997). A Brief Illustration to Understanding Islam, Darussalam Publishers and
3. Mehdi, Golshani Dr. The Holy Quran and Sciences of nature, 1986

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science
Department	Computer Science
Course Title	Probability and Data Analysis
Year of Study	I
Course Code	MAT 1208
Credit Hours	3
Contact Hours	45
Mode of Delivery	Lectures, Practical Computation and Discussions

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	This course introduces students to the basic concepts and logic of statistical reasoning and gives the students introductory-level practical ability to choose, generate, and properly interpret appropriate descriptive and inferential methods. In addition, the course helps students gain an appreciation for the diverse applications of statistics and its relevance to their lives and fields of study. The course does not assume any prior knowledge in statistics and its only prerequisite is basic algebra.
Course Objectives	The course is intended to:- • explain to students the importance and application of probability and statistics in computing and research • demonstrate the skills in presenting quantitative data using appropriate diagrams, tabulations and summaries

	• describe appropriate statistical methods in the analysis of simple datasets	
Learning Outcomes	Upon successful completion of the course, participants should be able to: • Explain the importance and application of probability and statistics in computing and research • Demonstrate skills in presenting quantitative data using appropriate diagrams, tabulations and summaries • Be able to use and apply appropriate statistical methods in the analysis of simple datasets • Be able to interpret and clearly present output from statistical analyses in a clear concise and understandable manner.	
Teaching and learning	The class will meet for three hours each week. Class time will be used for a combination of lectures & discussions.	
No.	**Detailed Course Outline**	**Allocated Time**
1	**Introduction** Importance of probability and statistics in computing	**3 Hours**
2	**Types of data** Qualitative, Discrete and continuous data	**9 Hours**
3	**Summary diagrams and charts** Types of charts, frequency tables, histograms, Time series	**6 Hours**
4	**Models** Descriptive, inferential statistics and statistical models	**6 hours**
5	**Data analysis** Data analysis and interpretation using spreadsheet software	**3 Hours**
6	**Elementary Statistics** Population and Sample, raw data, classification	**6 Hours**
7	**Tabulation** Principles of data tabulation and graphical representation	
8	**Fundamental statistical measures** Average, median, mode, mean absolute deviation, variance, standard deviation	**3 Hours**

9	**Probability** Basic Concepts: Permutation, Combination, Sample spaces and events, Conditional probability, Probability trees	**5 Hours**
10	**Random variables and their distributions** Binomial, Poisson, exponential, normal; Hypothesis testing: Null and Alternate, test procedure, hypothesis tests, Type I and Type II errors, Regression and correlation; Markov and Chebychev inequalities	**4 Hours**
Total Contact Hours		**45 Hours**

References

1.Probability and Statistics, 4th Edition Morris H. DeGroot Mark J. Schervish, Carnegie-Mellon University ©2012| Pearson

2. Probability and Statistics for Engineers and Scientists, 9th Edition Ronald E. Walpole, Raymond H. Myers, Virginia Polytechnic Institute, Sharon L. Myers Keying E. Ye, Virginia Polytechnic Institute & State University ©2012

14.3 Year Two - Semester One

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE	
Faculty	Science
Department	Computer Science
Course Title	Object Oriented Programming
Year of Study	II
Course Code	CSC 2101
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures and Practical sessions

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	The object oriented programming paradigm has been used in many projects to build complex software systems. This course provides students with the opportunity to acquire skills for building software based on the object oriented programming paradigm. C++ and/or Java are some of the languages used in this course.
Course Objectives	1. To learn the concepts of object oriented, event driven programming (OOP/EDP) 2. To learn aspects of the programming and problem solving process, including problem specification & organization, algorithms, coding, testing, debugging, documentation, and maintenance. 3. To learn what constitutes good programming style and how to produce a high quality product. 4. To learn the syntax and develop skills in programming in a current

	popular programming language such as C++, Visual Basic, Java or Delphi. 5. Understand and use the Object Orientation Paradigm for software development 6. Develop software using a programming language like C++ and/or Java 7. Understand the use of basic object-orient programming language features in a working program 8. Understand the use of the following advanced features of inheritance, encapsulation, overloading, polymorphism, abstract classes and interfaces in a program	
Learning Outcomes:	By the end of the course, students should be able to: • Demonstrate the understanding and application of Object oriented design techniques for software development using a programming language like C++ and/ or Java • Correctly use the basic features in a working program: objects, classes, methods, IO handling, decisions and iterations • Apply and interpret the following advanced features in a working program: inheritance, encapsulation, overloading, polymorphism, abstract classes and interfaces	
Teaching and Learning	The class will meet for three hours each week. Class time will be used for a combination of lectures & projections.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**Introduction Language study: Java/C#** Introduction to object oriented programming, paradigm theory, advantages and disadvantages. • it's need and requirements, • general object oriented philosophy, • Software usability, code sharing, rapid prototyping, information hiding.	**5 Hours**

2.	**Classes and Objects** • data types, • attributes, • methods, • encapsulation, • constructors	**7 Hours**
3.	**Inheritance** • super and subclasses, • method overloading • and overriding	**6 Hours**
4.	**Polymorphism** • abstract classes, • abstract methods • static & dynamic binding,	**4 Hours**
5.	**Exception Handling** Exception Handling	**3 Hours**
6.	Project Practical	**20 Hours**
Total Contact Hours		**60 Hours**

References

1) Object Oriented Programming: Fundamentals & Applications by Probal Sengupta and Bidyut baran Chaudhuri 4th edition, Prentice-Hall of India, Private Limited, New Dehli, 1998
2) Programming in C++: by Stephen C. Dewhurst and Kathy T. Stark 2nd edition, Prentice-Hall of India, Private Limited, New Dehli, 1995
3) Java How to Program by H. M. Deitel, Nineth Edition, Prentice Hall, 2012

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science

Department	Computer Science
Course Title	System Analysis & Design
Year of Study	II
Course Code	CSC 2110
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures, Case studies, Tutorials, Seminars, Group work

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	The course uses structured and object-oriented analysis and design techniques to explore techniques of analyzing, specifying, developing and deploying computerized information systems. It focuses on the tools and techniques used to analyze and design systems so as to meet the needs of the organization.
Course Objectives	The course aims to provide students with understanding and skills on: • The systems concepts and the system development life cycle • The role of the system analyst in the systems development life cycle • The techniques of requirements elicitation, specification, and analysis of information systems • Data and process modeling in information systems development
Learning Outcomes	By the end of the course, students should be able to: • Explain the systems theoretical concepts and the system development life cycle • Explain the role of the System Analyst in the systems development life cycle • Describe and apply the techniques of requirements elicitation,

	specification, and analysis to information systems development • Create a data model for an information systems development project • Create a process model for an information systems development project • Explain how Information system construction and maintenance is done	
Teaching and Learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & presentations/discussions.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**Concepts**: • Importance of SAD, stakeholders in ISD, role of the systems analyst, systems theory	**2 Hours**
2.	**The systems development life cycle models** • The systems development life cycle models	**3 Hours**
3.	**Analysis**: • Requirements discovery, requirements analysis, process analysis	**6 Hours**
4.	**Structured Modeling**: • Data flow diagrams, entity relationship diagrams, flow charts, decision tables, process specification	**6 hours**
5.	**Object-Oriented Modelling**: • Rational Unified Process, UML diagrams	**6 Hours**
6.	**Systems Design**: • Design guidelines, input design, output design, user interface design, database design, program models	**4 Hours**
7.	**Systems Implementation** • System construction, testing, Implementation, and maintenance	**4 Hours**
8.	**Case study**	**14 Hours**
Total Contact Hours		**45 Hours**
References 1. Systems Analysis and Design in a Changing World, Satzinger, Jackson and Burd - Thomson		

Learning/Course Technology, (2000).

2. Software Engineering - A Practitioner's Approach 5/e, Roger S. Pressman - McGraw-Hill International Edition (2001).

3. Systems Analysis and Design Methods, Whitten and Bentley - Tata McGraw Hill (1998).

4. Systems Analysis and Design with UML Version 2.0 – An Object-Oriented Approach, Alan Dennis, Barbara Harley Wixom, David Tegarden (2009), Wiley and Sons.

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science

Department	Computer Science
Course Title	Database Systems
Year of Study	II
Course Code	CSC 2102
Credit Hours	4
Contact Hours	45
Mode of Delivery	Lectures and practical sessions

Mode of Assessment	**Weight%**
Assignment	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	This course introduces the basic theoretical and practical concepts of a database, its setup, implementation, use and maintenance in a typical business organization.
Course Objectives	1. To appreciate the importance of Database Systems 2. To introduce database developments and Database Management Systems 3. To understand database administration 4. To gain practical skills in the development and implementation of databases. 5. To get familiar with the basic concepts of database systems and data modeling. 6. To develop relational databases that are secure. 7. To formulate queries in databases and to use at least one DBMS. 8. To be able to import and export data to and from different applications.
Learning Outcome	By the end of the course, students should be able to: • Articulate the basic concepts of database systems and data modeling • Develop relational databases that are secure.

	• Formulate queries in databases and to use at least one DBMS • Import and export data to and from different applications	
Teaching and Learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & practical sessions.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**Introduction** • Overview: definitions, file-Based Systems versus database systems, data, storage, data structures, transactions, constraints.	**2 Hours**
2.	**Architecture:** • Architecture: centralized, decentralized, client-server, file-server, multi-tier, types of models	**2 Hours**
3.	• The Database development lifecycle, fact-finding techniques	**2 Hours**
4.	**Relational Model** • Relational model: terminology, integrity constraints, views, relational algebra.	4 **Hours**
5.	**Normalization** • Normalization (1NF, 2NF, 3NF), E-R modeling, EER modeling, relational algebra, schemas, conceptual models, logical and physical models	**6 Hours**
6.	**SQL** • SQL: data definition, data types, views, data manipulation queries	**6 Hours**
7.	**Security** • Security: threats and counter measures, Data Integrity, data backup and recovery, user management, encryption.	**4 Hours**
8.	**Advanced Concept** • Advanced concepts: transactions, query processing, distributed databases.	**4 Hours**

9.	• Practical	**15 Hours**
Total Contact Hours		**45 Hours**

References

1. Database Management and Design by G.W. Hansen and J.V. Hansen, 2nd edition, Prentice-Hallof India, Eastern Economy Edition, 1999

2. Fundamentals of Database Systems by R. Elmasri and S.B. Navathe, 4th edition, Addison-Wesley, Low Priced Edition, 2004.

3. Database Systems by Thomas M. Connolly And Connolly E.Begg, 3rd edition, Low Price Edition, 2004.

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science
Department	Computer Science
Course Title	Numerical Methods
Year of Study	II
Course Code	CSC 2107

Credit Hours	4	
Contact Hours	60	
Mode of Delivery	Lectures and Practicals	
Mode of Assessment		**Weight%**
Course Work Final Examination		30% 70%
Total		**100%**
Course Instructor(s)		
Course Description	The course introduces to students to some numerical techniques in solving problems that could not be solved analytically. Students will be exposed to numerical solutions linear and non-liner equations. Students will learn about interpolation, numerical differentiation, and numerical solutions for initial value problem of linear ordinary deferential equation. The accuracy and algorithmic computation time shall be computed.	
Course Objectives	1. To learn or review the basic concepts of numerical methods 2. To learn the role of numerical method in computing 3. To develop skills in solving ordinary deferential equation problems using Euler's Heun's and Runge Kutta methods.	
Learning Outcomes	By the end of course, student should be able to: i) Recognize the difference between analytical and numerical solutions ii) Use bracketing and methods to solving roots of equation iii) Gauss-Jordan elimination, LU Decomposition, And Gauss method of solving simultaneous equations (Covered in Numerical algebra and optimization) iv) Differentiate the fundamental between regression and interpolation and be able the numerical method problems v) Solve numerical differentiation problems using suitable numerical differentiation formulas vi) Use formula and error equations for trapezoidal and Simpson's rule to evaluate the numerical methods integral	

Teaching and Learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & practical sessions.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**Introduction** • Computer and numerical methods • Advantages and disadvantages • Role of numerical method in computing • Recognize the difference between analytical and numerical solution • Describe how conservative laws are employed to develop math models for physical system • Identify advantage and disadvantage of learning numerical	**8 Hours**
2.	**Approximation and Errors** • Recall concepts of significant figures accuracy and precision • Differentiate between absolute, relative and percentage errors • Round off errors and truncation error	**8 Hours**
3.	**Roots of Equation** • Definition of Root of Equations • Bisection Method • False Position Method • One-Point Iteration Method • Newton-Raphson Iteration Method • Secant Method • Applications in Computing • Recognize what is the root of equation • Use bracketing and open methods for root location • Clarify the concept of convergence and divergence	**16 hours**

4.	**Numerical Differentiation**
	• Definition of differentiation
	• First order differential equation
	• Two-point method and algorithm
	• Three-point method and algorithm
	  • Differentiate from first principals
	  • Derive two-point formula
	  • Derive three-point formula
	  • Use the formulas to solve mathematically problems
	  • Develop algorithms solutions using the above formulas
	• Second order differentiation equations (2 weeks)
		8 Hours

5.	**Numerical Integration** • Trapezoidal Rules • Simpson's Rules • Integration With Unequal Segments • Application in computing	**10 Hours**
6.	**Ordinary Differential Equations** • Euler's Method and Modifications • Runge-Kutta Methods • Systems Of Equation Problem Solving • Heun's Method Application in computing	**10 Hours**
Total Contact Hours		**60 Hours**

References

1. Steven, C.C. & Raymond, P.C., "*Numerical Methods for Engineers*", 4th Edition, McGraw-Hill**,** 2003 (text book)
2. Carnahan, B, Luther, H.A. & Wilker, J.O., "*Applied Numerical Methods*", John-Wiley, 1969
3. Akai,T., "*Applied Numerical Methods for Engineers*", John-Wiley, 1993
4. Richard, L.B. & Douglas, J.F., "*Numerical Analysis"*, 3rd Edition, Prondle, Weber & Schmidt, 1981

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE	
Faculty	Science
Department	Computer Science
Course Title	Operating Systems Concepts
Year of Study	II
Course Code	CSC 2201
Credit Hours	3
Contact Hours	45
Mode of Delivery	Lectures & discussions
Mode of Assessment	**Weight%**

Course Work Final Examination		30% 70%
Total		**100%**
Course Instructor(s)		
Course Description	This course introduces the services and workings of operating systems. It covers how an operating system controls all the processes of a computer system including those of peripheral devices.	
Course Objectives	1. To learn the underlying fundamentals concepts of operating system concepts. 2. To understand why operating systems exist, what goals they are intended to accomplish, and how they are related to user programs. 3. To examine the variety of computer resources that operating systems make available to users such as storage management, distributed systems, protection and security. 4. To understand the difference between command-based operating systems and the more recent operating systems using graphical user interfaces(GUI). 5. To attain general understanding of structure of modern computers, purpose, structure and functions of operating systems 6. To illustrate key OS aspects by example	
Teaching and Learning	The class will meet for three hours each week. Class time will be used for a combination of lectures & discussions.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**History of operating systems** • Early batch systems, multiprogramming, timesharing, distributed O.S and multiprocessor O.S. • Basic concepts: Processes, files, system calls, shell, layered structure v/s monolithic structure of O.S.	**6 Hours**

2.	**Processes Management** • Process model, process states, process hierarchies, implementation of processes, data structures used such as process table, PCB, creation of processes, context switching, exit of processes. • Inter-process communication: Race conditions, critical sections, problems of mutual exclusion, Peterson's solutions, producer-consumer problem, semaphores, every counters, monitors, message passing. • Process scheduling: Objectives, preemptives v/s non-preemptives scheduling, comparative assessment of different algorithms such as round robin, priority based scheduling, FCFS, SJF, multiple queues with feedback.	**10 Hours**
3.	**Deadlocks** • Conditions, modeling, detection and recovery, • deadlock avoidance, Deadlock presentation	**6 Hours**
4.	**Threads** Introduction, Types, Benefits, Creation, manipulation and synchronization, User and kernel threads, Multithreading	**6 Hours**
5.	**Storage Management** **Memory Management** • Multiprogramming with fixed partition, variable partitions, virtual memory, paging, demand paging, design and implementation issues in paging such as page tables, inverted page tables, page replacement algorithms, page fault handling, • Working set model, local v/s global allocation, page size, segmentation, segmentation with paging.	**10 hours**

6.	**File systems** • File types, attributes, access and security, file operations, directory structures, path names, directory operations, • Implementation of file systems, implementation of file and file operation calls, implementation of directories, sharing of files, disk space management, block allocation, free space management.	**10 Hours**
7.	**Distributed Systems** **Network structures and distributed Systems** • Introduction to H/W and S/W concepts in distributed systems, • network operating systems and NFS, NFS architecture and protocol, • client-server model, • distributed file systems, • RPC- Basic operations, parameter passing, RPC schematics in presence of failures, • threads and thread packages	**4 Hours**
8.	**Case studies** • UNIX/ LINUX: Implementation of processes, memory model, file systems, deadlock handling, Strategies, scheduling, IPC, system calls. • WINDOWS: Layered structure, interoperability	**8 Hours**
Total Contact Hours		**60 Hours**

References

1. Silberschatz, Abraham, Operating Systems Concepts,(5th Edition) John Wiley & Sons, 1998.
2. William Stallings, Operating Systems: Internals and Design Principles, 6th Ed. 2009
3. Silberschatz et al: Operating Systems Concepts, John Wiley & Sons, 7th Edition, 2004.

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE	
Faculty	Science
Department	Computer Science
Course Title	Language Theory and Automata
Year of Study	II
Course Code	CSC 2115
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures & discussions

Mode of Assessment	**Weight%**
Assignment Final Examination	30% 70%
Total	**100%**

Course Instructor(s)		
Course Description	The course equips the students with the skills to successfully source for, basic language and automata theory, turning machines, undecidability, the Chomsky hierarchy and closure properties of families of languages.	
Course Objectives	The objectives of this course are: 1. To learn the basic languages and understand automata theory 2. To understand turning machines, and undecidability of the halting problem, and undecidable problems about context free languages. 3. To examine Chomsky hierarchies and be able to identify closure properties of family languages.	
Learning Outcomes	By the end of the course, students will be able: 1. To understand the basic languages apply automata theory 2. To apply the techniques for turning machines constructions, and use of undecidability of the halting problem, and undecidable problems about context free languages. 3. To examine and use the Chomsky hierarchies and be able to identify closure properties of family languages.	
Teaching and learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & discussions.	
No.	**Detailed Course Outline**	**Allocated Time**

1.	**Basic Language & Automata Theory** • Review of finite automata, • regular sets, • Context-free grammars & languages, • Moore & Mealy state machines, their capabilities & limitations. • Deterministic & Non-Deterministic FSM's, • Push-down stack & memory machine. (PDM)	**15 Hours**
2.	**Tuning Machines** • Recursive languages, • Turing acceptors, • Techniques for Turing machine construction, • Church's hypothesis, • Turing machines as generators, variations & equivalence of Turing machines	13 **Hours**
3.	**Undecidability** • Universal Turing machines, • Undecidability of the halting problem, and undecidable problems about context free languages.	**10 Hours**
4.	**The Chomsky Herarchy** • Grammars and their relations to automata, • relations between classes of languages, LR(0) and LR(1) grammars , • Parser construction.	**10 hours**
5.	**Closure Properties of families of languages** • Abstract families of languages, • language operations, closure and decidability properties	**12 Hours**
Total Contact Hours		**60 Hours**

References

1. P.A. Goupille, Introduction to Computer Hardware and Data Communications
2. Computer Systems Architecture by M. Morris Mano
3. Structured Computer Organization by Andrew S. Tanenbaum

14.4 Year Two –Semester Two

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE	
Faculty	Science
Department	Computer Science
Course Title	IT Project Management
Year of Study	II
Course Code	BIT 2202

Credit Hours	3
Contact Hours	45
Mode of Delivery	Lectures, discussions, presentation, tutorials, and practicals.

Mode of Assessment	**Weight%**
Course work/Continuous Assessment	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	The course equips the students with the skills to successfully source for, execute and deliver Information Technology projects. They are also exposed to the tools and techniques necessary to measure project progress and to manage risks.
Course Objectives	The objectives of this course are to: 1. Explain how to source for, execute and deliver Information Technology projects 2. Describe how to monitor and evaluate IT projects 3. Identify IT project risks and mitigation strategies.
Learning Outcomes	By the end of the course, students will be able to: 1. Source for, execute and deliver Information Technology projects 2. Monitor and evaluate IT projects 3. Recognize IT project risks and mitigation strategies.
Teaching and learning	The class will meet for three hours each week. Class time will be used for a combination of lectures, Case studies, peer discussions, group work, presentation,

	tutorials, practical sessions.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	• Introduction: overview of the projects, management of projects.	**2 Hours**
2.	• Planning: project sourcing, project feasibility, preparation of formal proposals, assumptions and constraints, scope, scheduling (PERT, critical path analysis, Gantt charts).	**8 Hours**
3.	• Human resource management: team structures, people management, roles and responsibilities, incentives	**3 Hours**
4.	• Soft skills: negotiation, communication, ethics, client responsiveness.	**2 hours**
5.	• Execution: resources, quality assurance, time management, deliverables, sub contraction, outsourcing	**4 hours**
6.	• Financial management: budgeting, cost analysis, procurement, auditing, cash flows, cost estimates	**4 hours**
7.	• Risk Management: risk identification, mitigation, control, managing change, external factors.	**3 hours**
8.	• Monitoring and evaluation: success and failure, tools, techniques, metrics, appraisal, documentation	**4 hours**
9.	• Case studies and tutorials	**15 hours**
Total Contact Hours		**45 Hours**

References

1. Roger Ireland, Brian West, Norman Smith, *Project Management for IT-Related Projects*, 2012
2. Bennet Lientz, Lee Larssen, *Risk Management for IT Projects*, 2011
3. Jeff Morgan, Chris Dale, Managing It Projects for Business Change: From Risk to Success, 2013

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE	
Faculty	Science
Department	Computer Science
Course Title	Data structures and Algorithms
Year of Study	II
Course Code	CSC 2211
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures, and discussions.
Mode of Assessment	**Weight%**

Assignment Final Examination		30% 70%
Total		**100%**
Course Instructor(s)		
Course Description	The course gives students a firm foundation of data structures and algorithms. The course trains students on systematic development and analysis of algorithms. The course will teach students how to design, write, and analyze the performance of different algorithms and data structures. The importance of algorithm complexity on computer performance is emphasized. Typical computational problems and their solutions/analysis are to be covered.	
Course Objectives	The aims of the course are to ▪ Make students appreciate the role of data structures and algorithms in computer programs; ▪ Improve students' problem solving skills by subjecting them to step by step analysis and design of computer algorithms; ▪ Introduce students to concepts Data structures; ▪ Introduce students to concepts of algorithm analysis ▪ To expose students generic algorithmic problems and apply them to other computational scenarios	
Learning outcomes	• Students should be able to write algorithms and identify data structures to use • Students should be able to differentiate between arrays, data structures and linked lists • Students should be able to demonstrate the concepts of trees and graphs and explain the applications	
Teaching and Learning	The teaching pattern is by lecture, practical lab work, group discussion and class presentations.	
No.	**Detailed Course Outline**	**Allocated Time**

1.	**Introduction** Definitions ▪ Data structures and examples ▪ Algorithms and examples ▪ Applications of data Structures ▪ Applications of Algorithms	**4 Hours**
2.	**Abstract Data Types** ▪ Arrays ▪ Stacks	**4 Hours**
3.	**Abstract Data Types** ▪ Queues ▪ Linked Lists	**8 Hours**
4.	**Abstract Data Types** ▪ Trees o Definitions ▪ Binary Trees ▪ The Search Tree ADT–Binary Search Trees o Tree Traversals (Revisited) ▪ B-Trees	**4 Hours**
5.	**Algorithm analysis** ▪ Complexity analysis (Big-O notation, orders of growth, worst case, average case and amortized analysis);	**4 Hours**
6.	**Algorithm Design Techniques** ▪ Divide-and-conquer algorithms ▪ Greedy algorithms ▪ Backtracking Algorithms ▪ Dynamic Programming	**8 Hours**

7.	**Searching Algorithms** ▪ Searching Algorithms – Linear Search – Complexity of Linear searches ▪ Binary search ▪ Complexity of Binary Searching ▪ Implementation of Binary search	**4 Hours**
9.	**Sorting Algorithms** ▪ Sorting Algorithms and their complexity	**8 Hours**
10.	▪ Graph Algorithms	**12 Hours**
Total Contact Hours		**60 Hours**

References

1. Mehlhorn, K. (2013). *Data structures and algorithms 1: Sorting and searching* (Vol. 1). Springer Science & Business Media.
2. Goodrich, M. T., Tamassia, R., & Goldwasser, M. H. (2014). *Data structures and algorithms in Java*. Wiley Publishing.
3. Meinel, C., & Theobald, T. (2012). *Algorithms and Data Structures in VLSI Design: OBDD-foundations and applications*. Springer Science & Business Media.
4. Dasgupta, S., Papadimitriou, C. H., & Vazirani, U. V. (2016). Algorithms.

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science
Department	Computer Science
Course Title	Research Methods
Year of Study	II
Course Code	FOS 2201
Credit Hours	3
Contact Hours	45

Mode of Delivery	Lectures

Mode of Assessment	**Weight%**
Assignment	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	The main focus of this course is on the planning and implementation of research conducted in Computer Science. Many of the topics considered will entail a critical analysis of research material. Primary and Secondary methods of data analysis will be considered, as will the validity of interpretations of research findings. A major aim of this course is the application of research to issues of current concern in Computer Science and Information Technology. The course is structured to provide a broad understanding of research and research methodologies. .
Course Objectives	This course is intended to:- • To raise student awareness of the various research paradigms • To explore the intricacies of the research process • To establish a strong student understanding of both qualitative and quantitative research approaches • To have students design and articulate an independent research proposal and report • To gain an understanding of what is involved in research, involving Computer Science and Information Technology.
Learning outcomes	By the end of the course, students should have the following knowledge, skills and attitude to • design and articulate an independent research proposal and report • explore the intricacies of the research process • understand what is involved in research; involving Computer Science

	and Information Technology.	
Teaching and Learning	The class will meet for three hours each week. Class time will be used for a combination of lectures & practical sessions.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**What is Research** • A first look at research • The concept of "science" • The role of method and theory • Types of research	**6 Hours**
2.	**Research subject** • Choice of research subject • Identification of central problem • Anticipation of the research plan • Readings and ideas.	**8 Hours**
3.	**The research plan** • Elements of a research plan • Theory driven research designs	**6 Hours**
4.	**Design-Oriented Approaches** • Key elements of research design • The design process • Evaluation	**8 hours**
5.	**Quantitative Data Acquisition Methods** • Survey design • Experiments • Sampling • Quantitative acquisition methods	**6 Hours**
6.	**Qualitative Data Analysis** • The principles of statistics • Overview of statistical methods	**6 Hours**

7.	**The Research report** Organization of the research report	**5 Hours**
Total Contact Hours		**45 Hours**

References

1. Methods and Techniques by C. R. Kothari. New age publishers
2. Research Design for Educational, Daniel K. Schneider, Accessed from: http://tecfa.unige.ch/guides/methodo/edu-technology.

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science
Department	Computer Science
Course Title	Cryptographic and Network Security
Year of Study	II
Course Code	CSC 2210
Credit Hours	3
Contact Hours	45
Mode of Delivery	Lectures & discussions

Mode of Assessment	Weight%
Assignment Final Examination	30% 70%
Total	**100%**

Course Instructor(s)		
Course Description	Cryptographic concepts is a course unit that addresses the principles, means, and methods of disguising information to ensure its integrity, confidentiality and authenticity. It deals with both theoretical and practical aspects of cryptography, to give an insight to the problems that arise in cryptography and the tools used to solve them. It introduces both symmetric key cipher system and public key cryptography, covering methods of obtaining the objectives of security goals (confidentiality, integrity and authenticity).	
Course Objectives	To enable learners to acquire knowledge on how all the security goals can be achieved through the use of cryptographic techniques.	
Learning Outcomes	By the end of the course, students should have the following knowledge, skills and attitude to 1. Illustrate the fundamental concepts in information security. 2. Apply the necessary theory to perform encryption and decryption processes. 3. Differentiate and appreciate different techniques used in cryptography with relation to their function. 4. Recommend tools, techniques and trends in cryptography for data security. 5. Formulate data security strategies using latest cryptography technique.	
Teaching and Learning	The teaching pattern is by lecture, practical lab work, group discussion and class presentations.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**Introduction, Security goals and requirements** It covers description of confidentiality, integrity, authenticity and repudiation.	**4 Hours**

2.	**Evolution of cryptography** • Fundamental understanding to cryptography. • Roles of cryptography in computer and network security.	**4 Hours**
3.	**Fundamental Mathematical Backgrounds** • Number Theory (Euler Theorem, Fermat Theorem, Euclid Algorithm, Chinese Remainder Theorem and Discrete Logarithm) • GCD • Modular Mathematics	**4 Hours**
4.	**Categories of Cryptography** • **Classical Cryptography** Substitution Technique and Transposition Techniques • **Modern Block Ciphers** Substitution Technique and Transposition Techniques	**4 hours**
5.	**Block Ciphers** • Data Encryption Standards • AES • Mode of operations	**4 Hours**
	Stream ciphers • Concept of stream cipher • Advantage and disadvantages of this method in securing information. • The one time pad and pseudo random key streams properties and generation	**4 Hours**
	Asymmetric Cryptography • Diffie Hellman key exchange • One-Way Functions and trapdoors, • RSA, El Gamal cryptosystem	**4 Hours**

	Key Management • Discussion of the importance of good key management and some relevant standards **Public Key Infrastructure** certificates, certification authority	**4 Hours**
	Digital signature & Message Integrity • Method of digital signature • Hash function • Digital Signature Systems	**4 Hours**
	Authentication and Identification Protocols, challenge and response	**4 Hours**
	The Application of Cryptography in modern world • Discuss some issues relating to modern applications • Faster technology • Cryptography Act	**5 Hours**
Total Contact Hours		**45 Hours**

References

1. Behrouz A. Forouzan, Cryptography and Network Security, 2008 (Textbook)
2. Stalling,W., Cryptography and Network Security: Principles and Practice, 5th Ed., Prentice-Hall, 2011.
3. Charles P.Pfleeger, Security In Computing, Prentice Hall, 1997.
4. Bruce Schneier, “Applied Cryptography”, Wiley Publication, 1996.

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE	
Faculty	Science
Department	Computer Science
Course Title	**CSC 2216** Signals and Communication Systems
Year of Study	II
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures, presentation, and discussions

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	This course primarily serves students in the department. The information below

	describes how the course contributes to the undergraduate program objectives. • knowledge in the basic techniques of mathematics and the physical sciences • basic skill in methods of design and analysis across a broad range of electrical and computer engineering areas.
Course Objectives	This course is intended to help students:- 1) Determine properties of a signal: discrete time, continuous time, power, energy, periodic, aperiodic, even, odd 2) Perform operations on signals, alone or in combination 3) Identify and use the following elementary signals: exponentials, sinusoids, complex exponentials, exponentially damped sinusoids step functions, impulses, sifting and time scaling properties of impulses 4) Identify and manipulate series and parallel interconnections of systems 5) Use the commutative, associative, and distributive properties of convolution; the convolution sum and integral given an input and the impulse response(s).
Learning Outcomes	By the end of this course unit, a student will be able to: 1) Determine whether a signal has the following properties: discrete time, continuous time, power, energy, periodic, aperiodic, even, odd 2) Perform the following operations on signals, alone or in combination: amplitude scaling, addition, multiplication, differentiation, integration time scaling, reflection, time shifting 3) Identify and use the following elementary signals: exponentials, sinusoids, complex exponentials, exponentially damped sinusoids step functions, impulses, sifting and time scaling properties of impulses 4) Identify and manipulate series and parallel interconnections of systems 5) Determine whether an input/output description for a system has the following properties: stability, memory, memory-less, causality, invertibility (simple cases), time invariance, linearity 6) Evaluate the convolution sum and integral given an input and the

	impulse response 7) Use the commutative, associative, and distributive properties of convolution	
Teaching and learning	The teaching pattern is by lecture, practical lab work, group discussion and class presentations.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	Introduction Continuous and discrete-time signals Operations on signals Properties of signals Elementary signals Continuous- and discrete-time systems Interconnections of systems System Properties.	**8 Hours**
2.	Time Domain Representations for Linear Time Invariant Systems Convolution Properties of convolution Difference and differential equations - characterizing solutions	**12 Hours**
3.	The Laplace transform Definition Convergence Properties Inversion Solving Differential Equations Transform Analysis of Systems.	**16 Hours**
4.	Fourier Representations of Signals Discrete time periodic signals - the discrete time Fourier series Continuous time periodic signals - the Fourier series Discrete time nonperiodic signals - the discrete time Fourier transform Continuous time nonperiodic signals - the Fourier transform Properties of Fourier representations	**16 hours**
5.	Applications of Fourier Representations Frequency response from time-domain system descriptions Fourier transform representations for periodic signals Convolution and modulation revisited - mixing periodic and nonperiodic signals The Fourier transform representation for discrete-time signals Sampling continuous-time signals Reconstruction of continuous-time signals from samples	**8 Hours**
Total Contact Hours		**60 Hours**
References		

1. A.V. Oppenheim, A.S. Willsky, S.H. Nawab, "Signals and Systems," Second Edition, Prentice-Hall, 1997.
2. S. Haykin and B. Van Veen, Signals and Systems, Wiley 1999
3. Torrieri, D. (2015). *Principles of spread-spectrum communication systems*. Springer.
4. Amiri, I. S., Nikoukar, A., Vahedi, G., Shojaei, A., Ali, J., & Yupapin, P. (2012). Frequency-wavelength trapping by integrated ring resonators for secured network and communication systems. *International Journal of Engineering Research and Technology (IJERT)*, *1*(5).
5. Gilroy, S., Suzuki, N., Miller, G., Choi, W. G., Toyota, M., Devireddy, A. R., & Mittler, R. (2014). A tidal wave of signals: calcium and ROS at the forefront of rapid systemic signaling. *Trends in Plant Science*, *19*(10), 623-630.

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science
Department	Computer Science
Course Title	Database programming
Year of Study	II
Course Code	CSC 3102
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures, discussions and practical sessions

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	

Course Description	The use of databases in business, education and research has resulted in the development of advanced data manipulation and programming systems for today's Database Management systems. • The Procedural Language / Structured Query Language (PL/SQL) combination now provides a nearly limitless environment for developing advanced programs that deal with data management. • Thus, students of Computer Science & Information Technology must receive a proper foundation in database programming using PL/SQL in order to develop business and other software solutions for the ever changing and complex IT environment today.	
Course Objectives	• To write and debug Procedural Language / Structured Query Language (PL/SQL) programs aimed at solving real world problems • To acquire knowledge of the fundamentals of event driven programming using Procedural Language / Structured Query Language (PL/SQL).	
Learning Outcomes	By the end of this course unit, a student will be able to: 1. Use SQL to define database objects and create advanced queries for data analysis. 2. Demonstrate knowledge of key PL/SQL programming rules and structures. 3. Use PL/SQL to develop programs for data manipulation using stored routines (Procedures, Functions, Triggers) 4. Demonstrate knowledge of Transaction management, query optimization techniques to ensure efficient use of processing resources. 5. Develop interfaces for accessing databases using Windows Forms and Web Based systems (PHP or ASP.NET) 6. Develop a full database solution for business, education or research	
Teaching and learning	The teaching pattern is by lecture, practical lab work, group discussion and class presentations.	
No.	**Detailed Course Outline**	**Allocated Time**

1.	**SQL Programming** • Introduction to SQL, • Data definition language constructs (Create, Alter, DROP – Table, Constraint), • Single Table Queries, (Pattern matching using LIKE operator, IN operator, Aggregation (SUM, Average, COUNT etc), the HAVING clause) • Sub Queries, Joins, Unions and Intersections. (Sub queries in the FROM and WHERE clauses, Inner and Outer Joins, Multi table Union Queries)	**12 Hours**
2.	**Stores Routines** • Introduction to Stored Procedures & Functions • PL/SQL program structure, • Conditional statements, Loops (LOOP, WHILE) • Using predefined functions (Date, string, mathematical) • Developing custom functions for data manipulation • Using Database triggers • Error handling.	**12 Hours**
3.	**Transactions, Query optimization and database performance tuning** • Introduction to transactions, transaction initiation, commit and roll back management using save points. • Query optimization (Search optimization).	**16 Hours**
4.	**Database Driven Application Development** • Introduction to Database Programming using **ADO.NET**, • Data access using windows forms, • ASP.NET data Access, using Web Forms • Reporting (Crystal Reports)	**16 hours**

Total Contact Hours		**60 Hours**

References

1. Oracle Database 10g PL/SQL programming, Scott Urman, Oracle Press, 2004
2. MySQL Crash Course, By Ben Forta, SAMS publishing, 2006
3. MySQL Database Design and Tuning
4. Teach Yourself MySQL in 10 minutes, Chris Newman, SAMS publishing, 2006

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science
Department	Computer Science
Course Title	Applied Computer Graphics and Multimedia
Year of Study	II
Course Code	CSC 2208
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures, Discussions and Practicals

Mode of Assessment	**Weight%**
Course work and Projects	30%
Final Examination	70%

Total	**100%**
Course Instructor(s)	
Course Description	This course introduces students to an overview of Computer Programming Languages, Program development life cycle (algorithms), Number Systems and Conversion. The course also introduces students to Computer-based techniques of text, images, audio, video, graphics, animation, and any other medium where every type of information can be represented, processed, stored, transmitted, produced and presented digitally.
Course Objectives	The objectives of this course are to: 1. To provide an introduction to the theory and practice of computer graphics and multimedia. a. Multimedia majors will acquire technical skills necessary to present project materials in a manner that mirrors industry standards. b. Multimedia majors will be skilled in taking an idea from beginning concept to organized, researched and planned project. 2. To understand computational development of graphics and multimedia design 3. To provide in-depth knowledge of display systems, image synthesis, shape modeling of 3D application. 4. To Understand basic concepts related to Multimedia including data standards, algorithms and software 5. To Experience development of multimedia software by utilizing existing libraries and descriptions of algorithms. 6. Explore alternative approaches to interactive digital development tools 7. Be able to clarify project requirements and have skills to produce content appropriate for end-use.

8.	8. Effective team-based approach to enhance knowledge	
Learning Outcomes	By the end of the course, students will be able to: 1. Gain proficiency in 3D computer graphics API programming 2. Enhance the perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information. 3. Able to understand different realizations of multimedia tools 4. Able to develop interactive animations using multimedia tools 5. Gain the knowledge of different media streams in multimedia transmission 6. Have a clear understanding of the different multimedia representation formats that computers use. 7. Appreciate the need to represent multimedia data in different formats. 8. Understand the techniques used to represent electronic information and data on various storage media. 9. Determine and assess the multimedia storage needs of different business entities 10. Understand the theory behind different data compression techniques. 11. Appreciate the importance and challenge of the security of electronic information 12. Understand the ethics of electronic property rights and the methods of enforcing it.	
Teaching and Learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & Practicals.	
No.	**Detailed Course Outline**	**Allocated Time**

1.	• **2D GRAPHICS** Transformations – Clipping – Window – View Prot Mapping – Graphical User Interfaces and Interactive Input Methods – Picture Construction Techniques – Virtual Reality Environment.	**4 Hours**
2.	• **3D GRAPHICS** -3D Transformation – 3D Viewing – Visible Surface Detection – Back Face Detection –Depth Buffer Method – Scan Line Method.	**4 Hours**
3.	• **4D GRAPHICS** Creating a manipulating primitive shapes, Creating and understanding splines, Creating Nurbs, Shapes and parameters, Deformers, Polygon modelling tools, Creating and applying textures, Adding text and company logos, Importing Adobe Illustrator paths	**4 Hours**
4.	• **MULTIMEDIA BASICS** Introduction to Multimedia – Components – Hypermedia – Authoring – Authoring tools –File formats – Color models – Digital Audio representation – Transmission – Audio signal processing – Digital music making – MIDI – Digital video – Video compression techniques – Video performance measurements – Multimedia Databases – Animation – Key frames and tweening techniques – Principles of animation – Virtual reality –Multimedia for portable devices	**12 hours**

5.	• **MULTIMEDIACOMMUNICATION** Stream characteristics for Continuous media – Temporal Relationship – Object Stream Interactions - Media Synchronization – Models for Temporal Specifications – Streaming of Audio and Video – Recovering from packet loss – RTSP — Multimedia • Communication Standards –RTP/RTCP – SIP and H.263- Real time streaming and Ondemand streaming	**12 hours**
6.	• **MULTIMEDIA APPLICATION DEVELOPMENT** Design, Development and evaluation of multimedia a system - The development of user interface design - Design Process - MultiMedia & the Internet - Multimedia Conferencing Multimedia file sharing – Multimedia broadcasting - Multimedia Development Issues -Multimedia project – Structured Multimedia development - Multimedia project timing - Sample project	**20 hours**
Total Contact Hours		**60 Hours**

References

1. Aaris Sherin, Irina Lee, Poppy Evans, *The Graphic Design Reference & Specification Book Everything Graphic Designers Need to Know Every Day*, 2013
2. David Dabner, Sandra Stewart, Eric Zempol, Graphic Design School: The Principles and Practice of Graphic Design 5th Edition, 2010
3. Timothy Samara, *Graphic Designer's Essential Reference: Visual Elements, Techniques, and Layout Strategies for Busy Designers*, 2011
4. Richard Poulin, *The Language of Graphic Design: An Illustrated Handbook for Understanding Fundamental Design Principles*, 2011

RECESS

ISLAMIC UNIVERSITY IN UGANDA **COURSE OUTLINE**	
Faculty	Science
Department	Computer Science
Course Title	Industrial Training
Year of Study	II
Course Code	**FOS 2205**
Mode of Assessment	**Weight%**
➢ Programme evaluation form from Agency Supervisor. ➢ Internship Report by student ➢ Evaluation on site by Academic Supervisor *Marked out of a total of 130 marks and converted to 100%*	30% 30% 70%
Total	**100%**
Course Instructor(s)	
Course Description	This course is conducted in an industrial setting / placement/internship. The student is attached to an organization which assigns him / her duties and responsibilities. The attachment exposes the learner to a typical and practical working environment. Students should spend a minimum of 6 weeks.
Course Objectives	The course aims to enable students to:

	i. Be familiar with the different computing careers and their roles in a real world business organization. ii. Apply and translate computing knowledge and best practices to real industry based problems iii. Acquire soft skills to enhance effective participation in group based industry projects iv. Learn and practice good working ethics and communication skills with industry based staff and Supervisors.	
Learning Outcomes	By the end of this course, the student should be able to: i. Relate the different types of Computing careers and their roles in a real world business organization. ii. Apply and translate computing knowledge and best practice to industry based problems iii. Demonstrate creativity and innovation in solving problems related to real-life projects iv. Demonstrate soft skills for enhanced effective participation in group based industry projects **v.** Demonstrate and practice good working ethics, communicate effectively and exhibit good interpersonal skills with industry based staff and Supervisors.	
Teaching and Learning	This course is conducted in an industrial setting / placement/internship during recess for a period of six (6) weeks.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	• The major areas that will be emphasized during industrial training include:	
2.	• Orientation: Expectations, working etiquette, Career Prospects, human resource policies • Documentation: weekly log books, report writing, review of IT and communication policies and IT manuals	1 WEEKS **(2 hours)**

3.	• Soft skills: work ethics, customer care, communication skills, time management, general discipline, team work, problem solving skills, adaptability, confidence	2 WEEKS **(15 hours)**
4.	• Technical skills: systems administration, repair and maintenance, communication and network devices, auditing of policies and infrastructure, Information management, website development, IT quality assurance, security, systems development	**2 WEEKS (15 hours)**
5.	**Reporting** ➢ Students will be expected to develop an internship report at the end of the programme. The report is expected to follow a standard format Students will also be given standard copies of daily work logs (records) for ensuring proper records keeping and final report compilation. The logs are to be signed by the work supervisor and attached to the report. The activity log will contain the date, activity, description, and skills acquired.	**1 WEEK (3 hours)**
Total Contact Hours		**45 HOURS**

14.5 Year Three – Semester I

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE	
Faculty	Science
Department	Computer Science
Course Title	Computer Organization and Architecture
Year of Study	III
Course Code	CSC 3105
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures, discussion and practicals.

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	The aim of the course is to present how modern computer systems work and is built. Methods are discussed which have been developed in order to improve the performance of current microprocessors and parallel systems
Course Objectives	1. To describe and explain the different types of microprocessors and their applications 2. To explain registers, flags and their purpose in microprocessors and their application
Learning Outcomes	Instruction set, memory management and hierarchy, input/output and buses, pipelining techniques, branch prediction, RISC architectures, parallel architectures and multiprocessors.

Teaching and Learning	The class will meet for four hours each week. The Class time will be used for a combination of lectures, discussions and Practical work.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**Timing** • Introduction to microprocessor architecture • Define and explain instruction cycle, and time diagram. • Explain Operand fetch cycle, idle cycle up operation; • Draw and explain timing diagram for read and write for memory. • Draw and explain timing diagram for I/O read and write machine cycle. • Explain Interrupt.	**4 Hours**
2.	**Instruction set** • Learn and simulate processor instructions for Add, Sub, Div, Mult, copy transfer etc. • Explain enabled interrupts, call and conditional calls	**8 Hours**
3.	**Microprocessor programming** Explain : * machine language * Assembly language * High level language * Coding microprocessor programs using Assembly language.	**8 hours**
4.	**VHDL** Explain basics of VHDL, and basic building block.	**4 Hours**
5.	**Memory** • memory hierarchy • cache memory • performance metrics • external memory • virtual memory	**8 Hours**

6.	**Input/output (I/O)** • CPU-Controller I/O • Direct memory access-DMA • memory-mapped	**8 Hours**
7.	**CPU** • buses • registers • ALU • control unit • exception handling	**8 Hours**
	Pipelining instruction pipelining Organization of pipelined units, Pipeline hazards, Reducing branch penalties, Branch prediction strategies. Microprogramming Instruction cycle and pipelining	**4 Hours**

	Parallel Processors • Parallel programs, • Performance of parallel computers, • A classification of computer architectures, • Array processors, • Multiprocessors, • Multicomputer, • Vector processors. • Cache Coherence and the MESI Protocol. • SIMD & MIMD, • Shared memory	**4 Hours**
	Micro Controllers • Define and explain micro controllers. • Draw and explain the simple block diagram of MC. • Compare and contrast microprocessor and micro controllers.	**4 Hours**
Total Contact Hours		**60 Hours**

References

1. Stallings, William: *Computer organization and architecture: designing for performance*. 6th edition, Prentice Hall Pearson Education, 2003.
2. Page, Daniel: *A practical introduction to computer architecture*. Springer, 2009.
3. Abd–El-Barr, Moustafa: *Fundamentals of computer organization and architecture*. Wiley Interscience, 2005.

COURSE OUTLINE	
Faculty	Science
Department	Computer Science
Course Title	Human Computer Interaction
Year of Study	III
Course Code	**BIT 3107**
Credit Hours	3
Contact Hours	45
Mode of Delivery	Lectures, Practical, Peer discussions, Case study, Group work, Demonstrations

Mode of Assessment	**Weight%**
Coursework / continuous assessment	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	The course helps students to appreciate the delicate and divergent nature of human and computer interactions. It delves into the dynamics of user interface designs including their evaluations as well as usability issues for both software and related devices.
Course Objectives	The objectives of this course are to: 1. Appreciate established human-computer interaction approaches and techniques.

	2. Acquire knowledge on the design and presentation of user interfaces 3. Explain selected software evaluation techniques and heuristics.
Learning Outcomes	By the end of the course, students will be able to: 1. Apply established human-computer interaction approaches and techniques 2. Produce conceptual and physical designs using prototyping methods 3. Evaluate software interfaces using learnt heuristics.
Teaching and Learning	The class will meet for three hours each week. Class time will be used for a combination of lectures, Practical, Peer discussions, Case study, Group work, and Demonstrations.

No.	**Detailed Course Outline**	**Allocated Time**
1.	• Introduction: significance of HCI, conceptual frameworks for HCI, usability, Contexts for HCI (mobile devices, consumer devices, business applications, web, business applications, collaboration systems, games, etc.), multi-disciplinary nature of HCI.	**5 Hours**
2.	• User Interfaces: principles, standards, user interface events, UI construction	**6 Hours**
3.	• Design: design approaches, look-and-feel (layout, color, fonts, menus, labeling), Handling human/ system failure, design mistakes, tasks and process modeling, visualization, representations, multimedia interaction (graphics, sound, audio e.t.c), device specific (e.g., cell phones, tablets)	**12 Hours**
4.	• Evaluation: evaluation paradigms, frameworks, heuristics, usability testing (efficiency, learnability, user satisfaction)	**7 hours**

5.	• Behavior and form: software posture, flow, navigation, Interaction (command line, menu, voice, gestural, WIMP, data retrieval and feedback), language (metaphors, idioms, tone) and software attributes.	**8 hours**
6.	• Human and social factors: culture communication with users, human diversity, user documentation, applied psychology, social psychology, social networking	**7 hours**
Total Contact Hours		**45 Hours**

References

1. Alan Dix, Janet Finlay, (2001) Human–Computer Interaction, Third Edition
2. Ben Shneiderman & Catherine Plaisant (2009), DESIGNING THE USER INTERFACE Strategies for Effective Human-Computer Interaction / 5th Edition
3. Katherine Hepburn (2004) INTERACTION DESIGN, beyond human-computer interaction

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science
Department	Computer Science
Course Title	IT Ethics and Professionalism
Year of Study	III
Course Code	BIT 3104
Credit Hours	3
Contact Hours	45
Mode of Delivery	Lectures, Peer discussions, case studies

Mode of Assessment	**Weight%**
Coursework / continuous assessment	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	The course provides awareness of the legal, social, ethical and professional issues in the practice of a career in computing. It discusses the impact of past, present and future IT initiatives on society.
Course Objectives	The objectives of this course are to: 1. Professional conduct and responsibilities to client, employer and public. 2. The ethical, legal and moral issues within the computing domain.

	3. Impact of IT initiatives on society.	
Learning Outcomes	By the end of the course, students will be able to: 1. Observe professional conduct and responsibilities to client, employer and public. 2. Appreciate the ethical, legal and moral issues within the computing domain. 3. Examine the impact of IT initiatives on society.	
Teaching and Learning	The class will meet for three hours each week. Class time will be used for a combination of Lectures, Peer discussions, case studies.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	• Introduction: IT profession, standards, expectations, definitions	**3 Hours**
2.	• Ethics: ethical theories, ethical analysis, Methods and tools	**6 Hours**
3.	• Risks and liabilities	**3 Hours**
4.	• Intellectual property rights: copyrights, patents, identify theft, trademarks	**3 hours**
5.	• Impact: Computer and Cyber Crimes, emerging technologies (e.g. robotics, virtual reality, artificial intelligence),	**3 hours**
6.	• Privacy, anonymity and civil liberties	**3 hours**
7.	• Social challenges in computing	**9 hours**
8.	• Legal issues: laws, policies, frameworks	**7 hours**
9.	• Code of Conduct (international and national CS bodies e.g. IEEE, ACM) • Islamic ethical perspective	**5 hours**

10.	• Islamic ethical perspective	**3 hours**
Total Contact Hours		**45 Hours**

References

1. “Professional Issues in Information Technology” Frank Bott, First south Asia Edition. Chennai Micro Print (P) Ltd., Chennai, India. 2007

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science
Department	Computer Science
Course Title	Computer Networks & Data Communication
Year of Study	III
Course Code	CSC 3110
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures and practical sessions

Mode of Assessment	**Weight%**
Assignment	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	Data communication and network touches all contemporary business function in many ways. Marketing functions, accounting, administrative, and almost all functions of business depend heavily on data communication infrastructure for transfer of data and information between people, departments, sites etc. with that in mind this course has been designed to provide technicians and network administrators with technical knowledge and practical skills to handle data communication and network infrastructure. .
Course Objectives	o To acquaint students with network and data communication concepts o To learn how the OSI contributes to communication in open systems o To learn the difference between the OSI model, TCP/IP architectural model and the three layer model.
Learning Outcome	By the end of the course students should be able to confidently • Define , identify and recognize the building block of data communication infrastructure • Understand types and how transmission happens on data communication network • List and discuss data communication standards

	• Identify OSI and TCP/IP models • Understand and configure devices on a network • Understand equipment on Voice network • Practically attach a computer on a network • Practically configure a router and switch • Practically configure and install an Access point • Determine parameters of expanding a network • Document a network infrastructure • Customer handling skills • Students should be able to describe the OSI, TCP/IP and the Three layer model • Students should be able to explain the modes of data and media transmissions	
Teaching and Learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & practical sessions.	
No.	**Detailed Course Outline**	**Allocated Time**
1. **Introduction**	1. Data communication 2. Analog vs Digital transmission 3. Simplex, half duplex and duplex transmission	**6 Hours**
2. **Data communication model**	1. Layered arch and protocol 2. Layer of the OSI model 3. TCP/IP model 4. Data encapsulation	**6 Hours**
3. **LAN**	1. LAN configuration 2. Media and connectors 3. NIC, IP addresses and MAC address 4. LAN Topologies 5. LAN Architectures	**10 Hours**
4. **LAN Connectivities**	1. LAN devices 2. LAN Design 3. LAN protocols	**8 hours**

5.	1. Network operating systems and Internetwork operating system 2. NOS 3. NOS in market today 4. NOS management utilities 5. Basic configuration of a router using GUI/OSI	**4 Hours**
6.	The web as an example of client-server computing	**6 Hours**
7.	Building web applications	4 **Hours**
8.	Network management	**4 Hours**
9.	Multimedia networking	**4 Hours**
10.	Multiple access & Multiplexing	**2 Hours**
11.	Network Security	**2 Hours**
12. **Voice Networks**	1. Why Voice networks 2. PBX 3. IP PBX 4. Computer telephony, soft phones and IP based phones Cellar networks	**4 Hours**
Total Contact Hours		**60 Hours**

References

cisco. (2008). *Cisco Discovery 1.* cisco press.

Gacia, L. (2002). *communication Networks: Foundamental concepts.* New delhi: PHI.

Miller, D. (2006). *Data Communication networks.* New York: McGraw-Hill.

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science

Department	Computer Science
Course Title	Software Engineering
Year of Study	III
Course Code	**CSC 3109**
Credit Hours	3
Contact Hours	45
Mode of Delivery	Lectures, Practicals, Tutorials, Group work

Mode of Assessment	**Weight%**
Coursework, take home assignments, project Final Examination	30% 70%
Total	**100%**

Course Instructor(s)	
Course Description	This course introduces students to techniques and methodologies of software development. It discusses management, evaluation and challenges encountered in software development and usage.
Course Objectives	The objectives of this course are to: 1. Explain the process of software development 2. Describe techniques and methodologies used in the software development process 3. Gain skills to design software artifacts 4. Build skills in software process management and evaluation
Learning Outcomes	By the end of the course, students will be able to:

	1. Describe the process of software development 2. Apply techniques and methodologies used in the software development process 3. Design software artifacts 4. Manage the development process and evaluate software	
Teaching and Learning	The class will meet for three hours each week. Class time will be used for a combination of Lectures, Practicals, Tutorials, Group work.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	• **Introduction**: History of software design and development, Software terminologies, types of software, software characteristics and myths, software development principles and qualities.	**4 Hours**
2.	• Software requirements: Levels, tools for requirement elicitation and software requirement specification.	**4 Hours**
3.	• Review of Software lifecycle and methodologies: life cycle, methodologies, Operations and support, System evolution, maintenance and obsolescence.	**5 Hours**
4.	• Tools/techniques for developing software: Structure charts, program design language, structured walk through, pseudo-code, tree diagrams, decision tables, prototypes	**4 hours**
5.	• Software design: Abstraction, coupling, cohesion, integration	**3 hours**
6.	• Software project management: team processes, organization and decision making, roles and responsibilities of the software team, role identification and assignment, project tracking, team problem resolution, project scheduling, and risk analysis, version control, project management tools.	**6 hours**
7.	• Architecture: Architectural styles, mapping requirements	**3 hours**

8.	• Evaluation: white box and black box testing, software metrics, software measurement and estimation, software process measurements	**3 hours**
9.	• Documentation of software artifacts: principles, examples, deliverables	**3 hours**
10.	• Practicals	**10 hours**
Total Contact Hours		**45 Hours**

References

1. Software Engineering by Ian Sommerville, 7th edition, Addison-Wesley, 2006.
2. Software Engineering: A practitioner's approach by Roger S. Pressman, 6th edition, McGraw-Hill International edition, 2005.
3. Ambler, S. W. and Jeffries, R. (2002). Agile modeling, New York: John Wesley and sons
4. Humphrey, W. S. (1995). A discipline for software engineering. Reading, MA: Addison Wesley.
5. Kuvaja,P., Simila, J., et al. (1994). Software process assessment and improvement: the BOOT STRAP approach. Oxford: Blackwell publishers.
6. Somerville, Ian. (2007). Software engineering: 8th edition, Pearson Education Ltd publishers.

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science
Department	Computer Science
Course Title	Business Intelligence & Data Warehousing
Year of Study	III

Course Code	CSC 3108
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures and demonstrations
	1. Databases 2. SQL 3. MS Excel.

Mode of Assessment	**Weight%**
Course work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	The course is a combination of the Business Intelligence and Data Warehousing. It begins by understanding what business intelligence and its drivers. It discusses the development of data warehouses from databases which in turn gave birth to newer techniques of business intelligence. Practical sessions in the paper are based on the Data Warehousing and Business Intelligence lectures.
Course Objectives	1. To explain why the explosion of data merited the development of data warehouses from databases. 2. To understand the newer techniques of business intelligence. 3. To learn how Business Intelligence & Data Warehousing fit together

	4. To learn about data extraction, transformation, and loading. 5. To explore and visualize data and understand data warehouse architecture	
Learning Outcomes	By the end of the course, students will be able to: 1. Acquire general knowledge about Basic concepts of business intelligence and data warehousing, terminologies associated, critical success factors & risks, business intelligence applications, data warehousing & business intelligence development processes and Industry implementations. 2. Apply general skills on the concepts of analysis and management of data from databases to data warehouses 3. Apply communication skills within the computing paradigm 4. Assess and manage data warehouse related projects	
Teaching and learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & demonstrations.	
No.	**Detailed Course Outline**	**Allocated Time**
2. **What is BI**	*It is expected that students will be able to study:* • Brief History of BI and DWH, Data to Information Lifecycle, Business Intelligence (BI) defined, Data Warehousing (DW) defined	**1 Hours**
3. **Where is BI being used today**	*It is expected that students will be able to study:* • Significance of BI, Business Drivers For BI, BI Relation to Other Information Systems, Industry Applications that use BI, The future of BI	**1 Hours**

3. **Data Mining**	• Knowledge Discovery Definition, What is Data mining, Methods used for Data Mining (Classification, Regression, Anomaly detection, Clustering) • Association learning- Market Basket Analysis, Summarization- applying visualization and report generation**.**	**1 Hours**
4. **Big Data**	• What is Big data, How to understand Big Data to enhance Organization operations	**2 Hours**
5. **BI & DWH**	• How do BI & DWH fit together (DWH backend-BI front end)	**2 Hours**
6. **The architectures**	*It is expected that students will be able to study:* • BI Reporting for Analytics, OLAP Architectures	**3 Hours**
7. **Data warehouse architecture**	*It is expected that students will be able to study:* • The data flow processes, Transforming data to information, Data Stores, Data Warehouse, Data Marts, Cubes	**6 Hours**
8.**Data Integration**	*It is expected that students will be able to study:* • Overview Data, Modeling concepts – Dimension modeling, Data Warehouse Implementation	**6 Hours**
9. **Data Extraction, Transformation, Loading**	• Data Sources (Transaction Processing Systems), Data Extraction (data formats and inter-system data exchange), Data Transformation (data cleaning), Data Loading	**20 Hours**
10. **Exploring and Visualizing Data**	• Using specialized graphs to explore data in a detailed, Data cleaning for larger data sets	**3 Hours**
Total Contact Hours		**45 Hours**

References

1. Data Mining Concepts and Techniques. Hann
2. The data warehouse tool kit by Ralph Kimball and Margy Ross (2002), John Wiley & Sons, Inc.
3. Data base design and application by Conolley & Conolley (2002), Longman Publishers.

4. Principles and Implementation of Data Warehousing by Rajeev Parinda (2006), Firewall Media.
5. Online resources: Articles, Journals etc.Shively, W.P (2003). Power and Choice: An Introduction to Political Science (8th Edition). New York: McGraw-Hill

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science
Department	Computer Science

Course Title	Web Programming
Year of Study	III
Course Code	BIT 3103
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures, demonstrations and tutorials

Mode of Assessment	**Weight%**
Coursework	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	This course on web development techniques is a brief introduction to the most common methods of adding useful, interactive and dynamic elements to a web site.
Course Objectives	• To demonstrate scripting PHP to develop active web pages. • To train learners to design and connect a web page to a database • To train students to develop web based email function • To demonstrate the process of transfer file to a host server
Learning Outcomes	Students should be able to: 1. Design and develop web pages with interactive features 2. Manage a website hosting and maintenance process 3. Use a web development tools to produce professional work 4. Identify the main concepts in the web development environment 5. Create web pages using HTML and CSS

	6. Add interactivity to web pages using JavaScript 7. Create server scripts using PHP 8. Identify alternative web development technologies 9. Describe legal and ethical issues in web development	
Teaching and Learning	The class will meet for four hours each week. Class time will be used for a combination of lectures, demonstrations and tutorials.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**Web page design with HTML and CSS** • Describe the structure of a HTML page using various HTML tags • Modify the presentation of information of a given HTML page by adding • images and various formatting • Create web pages with inter-page and intra-page links • Add and manage frames • Describe the use of HTML forms and include them in a HTML page • Describe a style sheet language in contrast to markup language • Describe programming concepts of CSS language • Create a website using HTML and CSS • Adaptive User Interface Design (*Bootstrap modules)*	**12 Hours**

2.	**Client-side programming with JQuery** *It is expected that students will be able to:* • List client-side scripting languages • Explain the programming concepts and data types in JavaScript language • Identify the object-oriented concepts used by Jquery • Identify the document object model (DOM) of a HTML document and access different components using Jquery • Explain event handling in JavaScript • Use JavaScript to create a simple webpage with dynamic content • Create a webpage including forms and use Jquery to validate fields	**12 Hours**
3.	**Server-side programming with PHP** *It expected that a student will be able to* • Explain server-side programming • List server-side programming languages (ASP.NET, JSP, Rubi, etc.) • Explain the programming concepts and data types in PHP language • Identify the object-oriented concepts in PHP • Use PHP to process a HTML form • Identify some useful functions in PHP • Create sessions in a PHP-based website • Identify other facilities in PHP • Connect to a MySQL database using PHP and exchange data	**20 Hours**

4.	**Real time Interactions** • Instant messaging on websites, live chats, etc.	**3 hours**
5.	**Other Web development Technologies** *It is expected that students will be able to:* • Identify HTML editors and their features • List popular solution stacks and explain their advantages and disadvantages • Identify the 3-tier architecture in web application development • Distinguish between web servers and application servers • Explain how AJAX can be used to improve the presentation of information • Identify issues involved in publishing a website to a web server • Describe copyright and privacy issues in web content development • Identify available technologies to make web transactions secure.	**12 hours**
Total Contact Hours		**60 Hours**

References

1. Steven M. Schafer (2005), HTML, CSS, JavaScript® , Perl, Python®, and PHP Web Standards Programmer's Reference, ISBN: 81-265-0620-2, Wiley Publishing Inc., USA (Indian Edition)
2. *Python Web Programming* - Steve Holden - New Riders Publishing
3. *Core Python Programming* - Wesley Chun - Prentice Hall

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE	
Faculty	Science
Department	Computer Science
Course Title	Business Application Programming
Year of Study	III
Course Code	BIT 3106
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures and Practicals

Mode of Assessment	**Weight%**
Coursework	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	This course is an in depth study of computer programming with an emphasis on business applications. In the course, students will develop an understanding of fundamental programming logic and learn to use basic programming structures to solve business problems.

	The course covers a review of object-oriented programming, principles of program design, programming structures, data types and structures, program testing, and debugging. Emphasis is placed on the implementation of programs with procedural structures, along with graphical user interfaces and event-driven code. Upon completion, students should be able to design, code, test, and debug programs based on business requirements using a selected programming language. Though a variety of languages and tools exist today, the .NET environment and MySQL database server will be used in this period of study
Course Objectives	1. Students will use problem-solving and logic skills to solve business and education applications using sequence, repetition, and choice structures. 2. Students will be able to plan graphical-user applications using pseudo code, flowcharts, and/or IPO charts to produce user-friendly computer programs. 3. Students will create and design Visual C#.NET, Visual Basic.NET forms or Java forms using controls and their properties. 4. Students will be able to write code that is efficient and meets acceptable programming standards to produce applications with correct output. 6. Students will document programs using well-written internal comments. 7. Students will have a solid understanding of fundamental programming and design techniques 8. Students will have a solid understanding of debugging techniques and will be able to debug syntax, logic, and run-time errors in computer programs.
Learning Outcomes	• Demonstrate understanding of the key stages of system development and their relevance to business application development. • Identify key data processes and develop technical systems designs (Data Flow and Entity Relation Models) from business systems analysis • Demonstrate understanding of key concepts in object oriented programming and their applications in business application program implementation • Identify and apply basic program structures and data types in business application implementation using a selected programming

	language. • Implement a fully functional business application using a modern systems development environment	
Teaching and learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & practicals.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	• Introduction to the Object-Oriented Programming Language (C#)	**2 Hours**
2.	• User Interface Design using XAML	**10 Hours**
3.	• Variables, Constants, and Business Calculations	**6 Hours**
4.	• Decisions and Conditions	**2 hours**
5.	• Menus, Common Dialog Boxes, Sub Procedures, and Function Procedures	**4 hours**
6.	• Multiform Projects	**10 hours**
7.	• Lists, Loops, and Printing	**4 hours**
8.	• Arrays and Data Files	**6 hours**
9.	• Database Applications and event handling	**6 hours**
10.	• Graphics, Animation, and Sound	**4 hours**
on	• Business application project	**10 hours**
Total Contact Hours		**60 Hours**

References

1. Object Oriented Design and Applications Second Edition, Booth G, 1993
2. Mastering C# Database Programming, Jason Price, SyBex, 2003
3. Pro ASP.NET programming, Damon Armstrong, Apress, 2005

4. Beginning AJAX with ASP.NET, Wallace B. McClure et al, Wiley Publishing, 2006

14.6 Year Three – Semester II

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE	
Faculty	Science
Department	Computer Science
Course Title	Technopreneurship
Year of Study	III
Course Code	BIT 3205
Credit Hours	3
Contact Hours	45
Mode of Delivery	1. Experiential learning – 'learning by doing' 2. Classroom discussion, peer tutoring.. 3. First-hand interaction with local and regional entrepreneurs. 4. Research, discussion on the experiences of notable entrepreneurs in the region. 5. Use of cases, scenarios, simulations, role play. 6. Group work on projects. 7. Group work and group presentation.. 8. ICT tools and internet sources (audio/video)

Mode of Assessment	**Weight%**
Assignment	30%
Examination	70%

Total	**100%**
Course Instructor(s)	
Course Description	This course deals with enabling students to develop a mentality of thinking innovatively and create jobs other than seeking jobs.
Course Objectives	The objectives of this course are to: 1. Develop an entrepreneurial mind-set. 2. Enhance the students' understanding of the entrepreneurial process from idea generation, to concept development and creation of the venture; 3. Describe the various forms & attributes of Business Ownership. 4. Design a unique business plan, marketing plan and marketing analysis to target prospective clients or customers. 5. Develop critical thinking and problem solving skills through creativity, innovation and logical applications. 6. Enable students to appreciate the increasing impact of disruptive innovations.
Learning Outcomes	By the end of the course, students will be able to: 1. Identify and recall basic facts, concepts, and principles of Entrepreneurship theory /Technopreneurship 2. Understand the process of venture creation 3. Critically analyze complex situations and determine innovative solutions 4. Design a Business plan 5. Distinguish relationships among various components of business and its environment
Teaching and Learning	The class will meet for three hours each week. Class time will be used for a combination of lectures, group work, simulation, and presentations/discussions.

No.	Detailed Course Outline	Allocated Time
1.	**The Entrepreneurial mindset** It is expected that the student will study: 1. The nature and growth of entrepreneurship 2. Entrepreneurship and Technopreneurship 3. Entrepreneurship and Small Business Management 4. Types of Entrepreneurs 5. Characteristics of an Entrepreneur 6. Noted regional entrepreneurs(Case Studies/ Startups) 7. Mistakes of Entrepreneurs 8. Critical success factors. 9. Myths of Entrepreneurship	**6 Hours**
2.	**The Entrepreneurial process** Steps in the Entrepreneurial Process: • Idea generation, • Opportunity identification, • Business concepts, • Resources. • Implementing and managing a venture • Harvesting the venture • Emerging Trends	**10 Hours**
3.	**Creativity and Innovation** • Principles of creativity • Principles of Innovation • Disruptive, Incremental and Open innovations • Nurturing and Managing Innovation • Methods of protecting Innovation and creativity	**12 Hours**

4.	**Essentials of business ownership** • Types of ventures • Risk and Benefits, Lean Management • Legal and Regulatory Framework • Ethics and Social Responsibility	**3 hours**
5**.**	**Venture planning and creation** 1. Market Research (venture opportunity screening), IT Products Marketing 2. Feasibility Analysis 3. Start-up capital and Financial Statements 4. Developing the Business Model 5. Introduction to the Business Plan.	**14 hours**
Total Contact Hours		**45 Hours**

References

Moten, A.R & Islam, S.S (2009). Introduction to Political Science (3rd Edition). Singapore: Thomson.

1. Rajagopal Architecting Enterprise, Managing Innovation, Technology, and Global Competitiveness 2014

2. Thomas N. Duening, Ph.D**:**Technology Entrepreneurship Creating, Capturing, and Protecting Value ,2010

3. Barreira, J., and B. Urban. The Entrepreneurial Mindset: Cognition, Motivation and Behaviours. South Africa: Pearson Education, 2011.
4. Kuratko, Donald F. Entrepreneurship: Theory, Process, Practice 9th Edition. Mason, Ohio: South-Western Cengage Learning, 2011.

ISLAMIC UNIVERSITY IN UGANDA

COURSE OUTLINE

Faculty	Science

Department	Computer Science
Course Title	Systems & Network Administration
Year of Study	III
Course Code	**BIT 3206**
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures and Practicals

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	This course provides the most essential aspects of System/ administration. It exposes learners to the analysis and troubleshooting of problems that arise from day to day use of computer networks. It also develops the multiple skills necessary to perform systems administration tasks.
Course Objectives	The objectives of this course are to: 1. Demonstrate an understanding of operating systems, user accounts and hardware devices. 2. Familiarize themselves with use, management and control of systems after installation. 3. Demonstrate system security set up and programming. 4. Describe the processes and techniques of corporate system security.

Learning Outcomes	By the end of the course, students will be able to: 1. Install computer operating systems and set up user accounts 2. Configure hardware devices 3. Control, manage and use a system after installation 4. Build secure and reliable computer systems	
Teaching and Learning	The class will meet for four hours each week. Class time will be used for a combination of lectures & practicals.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	• Operating systems installation and configuration: Hardware requirements	**2 Hours**
2.	• Automating system configuration	**2 Hours**
3.	• Installing, Maintaining and Configuring Application software	**4 Hours**
4.	• Customizing the Desktop and user interface	**2 hours**
5.	• Managing Firmware, Boot Configuration and Startup	**2 hours**
6.	• Configuring user and computer policies	**4 hours**
7.	• Configuring system security	**4 hours**
8.	• Working with Remote system management tools	**2 hours**
9.	• Managing user access and security	**4 hours**
10.	• File system and storage management	**2 hours**
11.	• System protection and recovery	**4 hours**
12.	• Managing and securing mobility: Handling mobile devices	**2 hours**
13.	• Monitoring and maintaining systems	**2 hours**
14.	• Administering authentication and authorization	**2 hours**

15.	• Installing and maintain applications	**2 hours**
16.	• Managing Hardware devices and drivers	**2 hours**
17.	• Handling maintenance and supporting tasks	**4 hours**
18.	• Managing disk drives and file systems	**2 hours**
19.	• Managing file security and resource sharing	**4 hours**
20.	• Maintaining data access and availability	**2 hours**
21.	• Configuring and troubleshooting TCP/IP Networking	**2 hours**
22.	• Managing mobile networking and remote access	**2 hours**
Total Contact Hours	•	**60 Hours**

References

1. Matthew Hester, Chris Henley, Microsoft Windows Server 2008 R2 Administration Instant Reference, 2010
2. Derrick Rountree, Security for Microsoft Windows System Administrators: Introduction to Key Information Security Concepts, 2010
3. Evi Nemeth, Garth Snyder, Trent R. Hein, Ben Whaley, UNIX and Linux System Administration Handbook (4th Edition), 2010

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE		
Faculty	Science	
Department	Computer Science	
Course Title	Artificial Intelligence and Expert Systems	
Year of Study	III	
Course Code	CSC 3205	
Credit Hours	4	
Contact Hours	60	
Mode of Delivery	Lectures, Discussion and Problem solving	
Mode of Assessment		**Weight%**
Course Work		30%
Final Examination		70%
Total		**100%**
Course Instructor(s)		
Course Description	Artificial Intelligence is a science that deals in the study of intelligent entities. It is concerned with getting computers to do tasks that require human intelligence. It bases on the study of intelligence which has been an on-going study for over two millennia. The study of AI is important for several reasons. One reason is simply to understand human intelligence better. For example, we may be able to test and refine psychological and linguistic theories by writing programs which attempt to simulate aspects of human behaviour. Another reason is simply so that we have smarter programs. We may not care if the programs accurately simulate human reasoning, but by studying human reasoning we may develop useful techniques for solving difficult problems. AI currently encompasses a huge variety of subfields, ranging from general-purpose areas, such as learning and	

	perception to such specific tasks as playing chess, proving mathematical theorems, writing poetry, and diagnosing diseases. AI systematizes and automates intellectual tasks and is therefore potentially relevant to any sphere of human intellectual activity. In this sense, it is truly a universal field. This is an intermediate to advanced course in Artificial Intelligence. Python and prolog will be used mainly for the practical. Students are advised to get a working understanding of the prolog and python language.
Course Objectives	The objectives of this course are to: 1. Demonstrate an understanding/ have a good working knowledge of building AI applications using Python. 2. Attain transferable skills, sufficient to clearly articulate learned concepts as well as the ability to use Python proficiently to build AI applications. 3. Attain Intellectual Skills to be able to articulate the salient features relating to AI, including discussing appropriate usage scenarios under the different AI branches. 4. Demonstrate basic practical skills on how to implement and deploy AI applications
Learning Outcomes	At the end of this course, students should be able to understand the following concepts:- • **Knowledge and Understanding** The student should have a good understanding of the fundamental issues related to AI including the problems and its different facets of application in the real world. The student should also have a good working knowledge of building AI applications using Python. • **Intellectual Skills** At the end of the course, the student should be able to articulate the salient features relating to AI including discussing appropriate usage scenarios under the different AI branches. • **Practical Skills** The student should come out of the course with the basics skills on how to implement and deploy AI applications written in Python programming language.

	• **Transferable Skills** The student should leave the course with sufficient information to clearly articulate learned concepts as well as the ability to use Python proficiently to build AI applications or any other applications.	
Teaching and learning	The class will meet for four hours each week. Class time will be used for a combination of lectures, discussion and problem solving.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	Overview of AI - Intelligent Agents and their Environments	6 Hours
2.	Search (Uninformed, Any-Path Search)	4 Hours
3.	Search (Informed, Optimal Search) + Uncertainty	6 Hours
4.	Probabilistic reasoning and Inference - 31st	**4 Hours**
5.	Machine Learning (Supervised Learning)	**6 Hours**
6.	Machine Learning (Unsupervised Learning)	**4 Hours**
7.	Temporal reasoning under uncertainty (HMMs)	6 Hours
8	Logic/Logical reasoning	6 Hours
9	Image processing and Computer Vision	6 Hours
10	Robotics	6 Hours
11	Natural Language Processing	6 Hours
Total Contact Hours		**60 Hours**

References

1. Artificial Intelligence: A Modern Approach. By Stuart J. Russell and
2. Peter Norvig. Second Edition (2003).
3. Online Course materials. http://aima.cs.berkeley.edu/
4. Online Course materials at : http://www.aaai.org/AITopics/html/welcome

ISLAMIC UNIVERSITY IN UGANDA COURSE OUTLINE	
Faculty	Science
Department	Computer Science
Course Title	Concepts of Cloud Computing
Year of Study	III
Course Code	CSC 3206
Credit Hours	4
Contact Hours	60
Mode of Delivery	Lectures, Discussions and Practicals

Mode of Assessment	**Weight%**
Course Work	30%
Final Examination	70%
Total	**100%**

Course Instructor(s)	
Course Description	This course gives students an overview of the field of Cloud Computing, its enabling technologies, main Building blocks, and hands-on experience through 4 projects utilizing a public cloud (e.g Amazon Web Services). Cloud computing services are being adopted widely across a variety of organizations and in many domains. Simply, cloud computing is the delivery of computing as a service over a network, whereby distributed resources are rented, rather than owned, by an end user as a utility.
Course Objectives	1. It is our objective that students will develop the skills needed to become practitioners or carry out research projects in this domain. 2. To understand the fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability benefits, as well as current and future

	challenges; 3. To appreciate the different CPU, memory and I/O virtualization techniques that serve in offering software, computation and storage services on the cloud. 4. To get familiar with cloud storage technologies and relevant distributed file systems;	
Learning Outcomes	By the end of the course, students should be able to :- • Understand an overview of the field of Cloud Computing, and an in-depth study into its enabling technologies and main building blocks. • Gain hands-on experience, solving relevant problems through projects that will utilize existing public cloud tools.	
Teaching and learning	The class will meet for four hours each week. Class time will be used for a combination of lectures, discussion and practical work.	
No.	**Detailed Course Outline**	**Allocated Time**
1.	**Introduction** • Introduction to Cloud Computing • Building Blocks and Service Models in Cloud Computing.	6 Hours
2.	**Data Centers** • Historical Perspective • Data center Components • Design Considerations	4 Hours
3.	**Cloud Resource Management** • Resource Abstraction • Resource Sharing • Sandboxing • Case Studies :Google Apps, Google App Engine and Amazon EC2	6 Hours

4.	**Cloud Storage** • Introduction to Storage Systems • Cloud Storage Concepts • Distributed File Systems • Cloud Databases • Case Study: Amazon Storage	**4 Hours**
5.	**Programming Models** • Introduction to Programming Models • Variety of Programming Models • Case Study: Map Reduce	**6 Hours**
6.	**Software as a Service (SAS)**	**4 Hours**
Total Contact Hours		**60 Hours**

References

1. Cloud industry publications, online textbooks, and research papers on various topics connected to the various sessions.
2. Cloud Computing Concepts, Technology and Architecture (2013) Book by Ricardo Puttini, Thomas Erl, and Zaigham Mahmood