Gulu University

Faculty of Science

Department of Computer Science

P.O. Box 166 Gulu

Proposed Programme Name:

Master of Science in Information and Communication Technologies
for Development (MSc. ICTD) Degree Programme

Weekend Programme
July 2017

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1.0 INTRODUCTION

1.1 Gulu University

Gulu University is a Public University established in October 2002 by Statutory Instrument No. 16 of 2003. Gulu University, through its programmes, is set to make significant contributions to peace, stability, reconstruction and sustainable development.

The Vision of Gulu University is to be a leading academic Institution for the promotion of community transformation and industrialisation for sustainable development. The Mission being to expand access to higher education, provide quality professional training for delivery of appropriate social services and conduct research geared towards community transformation and conservation of biodiversity. The Vision, Mission and Goals of Gulu University are set to serve as a launch-pad for equitable and sustainable development.

The core values of Gulu University include: professionalism; integrity, effectiveness and efficiency; accountability and transparency; teamwork; gender responsiveness; concern for the elderly and people with disabilities.

The Faculty of Science was established in 2008, following the split of the former Faculty of Science Education into Faculty of Science and Faculty of Education and Humanities. The Vision and Mission of the Faculty of Science is in tandem with that of Gulu University; to play a leading role in post-war reconstruction and rehabilitation of the region through the provision of human resources in the areas of basic and applied sciences, technology, research and other services. It is also in conformity with the strategic plan of Gulu University aimed at producing high level human resource that can effectively participate in solving the social and economic problems of the country.

The Department of Computer Science is the largest of the six departments under Faculty of Science. It was established 2003 with one programme (Diploma in Computer Science). Bachelor of Science in Computer Scienceprogramme was introduced in 2005 and subsequently in 2006, Bachelors in ICT (BICT) was introduced. To-date the Department stills runs the original three programmes (Diploma, BSc. and BICT) hence the need to diversify into new programmes as demanded in themainstream ICT industry as well as other areas where ICTs are used.

2.0 Programme Name and Corresponding Award

The name of the programme is Master of Science in Information and Communication Technologies for Development (ICT4D) leading to an award of Master of Science in Information and Communication Technologies for Development (MSc ICTD).

3.0 Programme Duration

The duration of MSc ICT4D is two academic years which corresponds to four semesters.

4.0 Programme Description

The MSc. in ICT4D Degree programme offers a course of study covering technical units such as information management skills and contextual units such as development skills. The course is suitable for students aiming for professional fields where ICT is used as a tool for development, in government, non-government and private sectors. The programme blends theory and practice into a learning experience that develops skills applicable to complex real-world problems. The mission of this programme is to produce competent individuals who are able to initiate and implement sustainable change with rigor in developing regions and especially in Africa, using ICTs.

5.0 Programme Rationale

Uganda's vision 2040 seeks to transform the Ugandan society from a peasant to a modern, prosperous, and competitive upper middle-income country by 2040. This ambitious vision, however, is not realizable with the current largely illiterate society and weak science and technology environments that can only be strengthened by increased university training. At the same time, information and communication technologies(ICTs) have become a key factor in global development. Indeed, Brown and Grant (2010) maintain that ICTs are enablersfor sustainable development in developing countries. As such, the MSc.ICTD programme is intended to create ICT4D champions who combine the necessary technical and contextual competencies to deliver sustainable ICT4D projects. The students will acquire long-term capabilities in development and informatics to use digital technologies to transform socio-economic development. As such, the programme will prepare students to work in highly dynamic environment of ICT4D, including government sector, private sector, international organisations, NGOs, and global business.

6.0 Programme Goals, Objectives and Learning Outcomes

The goal of the MSc. ICTD programme is to produce competent individuals who are able to initiate and implement sustainable change with rigor in developing regions and especially in Africa, using ICTs.The objectives of this programme are:

i) To build human resource capacity in ICT4D discipline who are able to use ICT as a tool for development;
ii) To generate a pool of highly qualified candidates able to pursue research careers in PhD in ICT4D;
iii) To produce professionals with theoretical and practical skills in ICT4D in order to address the increasing demand for ICT4D research;
iv) To promote social economic development by directing students' dissertations on topics of direct profession concern to them.
v) To prepare students for life-long learning.

6.1 Learning Outcomes

Upon completion of this programme, students will be able to:
    (i) Demonstrate capacity for research and development in ICT4D;

(ii) Initiate research ideas in ICT4D for further investigation at PhD level;

(iii) Identify, conduct, present and share original research through the dissertations and publications;

(iv) Utilize the knowledge and skills learned to identify problem and provide ICT based solutions for social economic development;

(v) Engage in other forms of academic and professional education enabled by ICTs.

7.0 Admission Requirements

To qualify for admission, a candidate must fulfil the general Gulu University entry requirements for master's degrees, and in addition the candidate must be a holder of either;

(i) A Postgraduate Diploma in computing disciplines, including Information Systems, Information Technology, Computer Science, Software Engineering, and Computer Engineering from a recognized University/Institution; **or**

(ii) A Bachelor's degree with a minimum of CGPA 2.80 in Information Systems, Information Technology, Computer Science, Software Engineering, and Computer Engineering from a recognized University/ Institution, from a recognized University/Institution; **or**

(iii) Any other honours degree with minimum of CGPA 3.50 and evidence of basic computer skills; **or**

(iv) A Master's Degree in any science discipline or other relevant disciplines such as MBA, M. Statistics, MA. Economics from a recognized University/Institution.

7.1 Target Group

ICT has become a key factor in global development and thus the ICT4D programme will continue to attract students with a wide range of backgrounds. In traditional graduate programmes, it is assumed that students enrolled have a common background obtained through an undergraduate degree in that field. The MSc. ICTD programme may also attract experienced individuals including computing/information technology professionals and people seeking career changes. The MSc. ICTD programme is appropriate for:

- An honours degree with minimum of 2.8 in computing disciplines, including Information Systems, Information Technology, Computer Science, Computer Engineering, and Software Engineering from recognised Ugandan, regional or international University.

- An honours degree with minimum CGPA 3.5 in non-computing/information technology disciplines from recognised Ugandan, regional or international University and with substantial public, commercial or industrial experience as well as evidence of good basic computer skills.

- Holders of other Masters' Degrees wishing to undertake additional studies in ICT4D.

8.0 Available and Proposed Human Resource

The programme will engage the existing human resources at Gulu University and where necessary, external academics will be recruited. The following table gives the details of available staff who will be involved in running the courses.

S/N	Name	Qualification and Awarding Institution	Area of Specialization	Status	Avg load (hrs/wk)
1	Benedict Oyo	BSc. Educ (Mak) MSc. Computer Science (Mak), PhD Information Systems (Mak)	E-learning, ICT4D, System Dynamics, Information Management, Design Science	Full-time	9
2	Amos SSematimba	BSc. Educ (MUST) MSc. Mathematics (Mak) PhD-Mathematics (Wageningen University)	Bio-Mathematics, Bio-Statistics, Systems Modelling	Full-time	3
3	Raphael Aregu	BSc. Information Science (Mak) MSc. Information Science (Mak) PhD -Computer Science (University of Groningen)	ICT4D, e-Resources Development, Knowledge management	Full-time	10
4	Daniel LuliroNadhomi,	BA Arts (Mak) Masters in Geo-Information Science (ITC, The Netherlands) PhD – Geography (Mak)	Geo-Informatics, Geo-Statistics, System Dynamics	Full-time	6
5	Paek Nam IL	BSc Comp. Science (SNT – D.P.R.Korea) Masters in Comp. Science (SNT –	Artificial intelligence, embedded systems, operating systems	Full-time Visiting Professor	12

		D.P.R.Korea) PhD in Comp. Science (SNT – D.P.R.Korea)			
6	Geoffrey Andogah	BSc. Electrical Engineering (University of Dar es Salaam) MSc. Power System Automation (HIT, China) PhD – Computer Science (University of Groningen)	Information Retrieval, Data Mining, Web and Mobile Development, and Interface Design	Part-time	

Two members of staff, Ms. Proscovia Olango who is currently writing her PhD thesis and Mr. Geoffrey Tabo who is currently in the second year of PhD research will be engaged on completion of their PhDs.

9.0 Infrastructure Facilities

i) Lecture Rooms/ Computer Laboratory

The Department has four computer laboratories used for both lectures and practicals. The first computer laboratory (Lab II), measuring 18 m by 9 m, has 40 thin client computers. The second lab (Lab III) measures same as the first lab and has 40 desktop computers. The third lab (Cisco Lab) measures 20 m by 10 m and has eighty (80) thin client computers. The fourth lab, which is earmarked for this programme has 15 desktop computers and measures 10 m by 5 m. The MSc. students are expected to have their laptops and therefore the 15 desktop computers earmarked for them are sufficient.

ii) Library

The main Gulu University library will be accessible in this programme. In addition, online books and journals will be used.

10.0 Programme Regulation

10.1 Course Module Assessments

The general assessment of course modules will be based on of 100 total marks with proportions as follows:-

    a. Continuous coursework – 40 marks;
    b. Examination – 60 marks.

However, some courses have varying assessment distributions that are described in the detailed course descriptions. A minimum of two course assignments/tests shall be required per course.

10.2 Grading System

(i) Course Unit Grading

Each Course will be graded out of a maximum of 100 marks and assigned an appropriate letter grade and a grade point as follows:

Marks	Letter Grade	Grade Point	Interpretation
80-100	A	5.0	Excellent
75-79	B+	4.5	Very Good
70-74	B	4.0	Good
65-69	C+	3.5	Fair
60-64	C	3.0	Pass
55-59	D	2.5	Compensatory Pass
0-54	F	0.0	Fail

(ii) The following additional letters will be used, where appropriate:
  W: Withdraw from Course;
  I: Incomplete;
  P: Pass;
  F: Failure.

(iii) Progression

Progression shall be regarded as normal, probationary or discontinuation as per the standard Gulu University Senate guidelines:

Normal Progress: This occurs when a student passes each course taken with a minimum Grade Point of 3.0.

Probationary: This is a warning stage and occurs if either the cumulative grade point average (CGPA) is less than 3.0 and/or the student has failed a core course. Probation is waived when these conditions cease to hold.

Discontinuation: When a student accumulates three consecutive probations based on the CGPA or the same core course(s), he/she shall be discontinued. A student who has failed to obtain at least the pass mark (60%) or grade point of 3.0 during the third assessment in the same course(s) he/she had retaken shall be discontinued from his/her studies at the University. A student who

has overstayed in an academic programme by more than two (2) years shall be discontinued from his /her studies at the university.

10.3 Pass Mark

A minimum pass grade for each course shall be 3.0 grade points, an equivalent of 60%.

10.4 Retaking a Course or Courses

i) A student shall retake a course when next offered in order to obtain at least the pass mark (60%) if he/she had failed during the first attempt in the course(s). A Student may take a substitute elective, where the Student does not wish to retake a failed elective.
ii) A student who has failed to obtain at least the pass mark (60%) during the second assessment in the same course(s) he/she has retaken shall receive a warning.
iii) Where students miss to sit examinations for justified reasons; they should not be recorded as those who retake when they sit the examinations when next offered.
iv) A student shall not be allowed to accumulate more than five (5) retake courses at a time. Students are required to register for retake course(s) first before registering for new courses offered in that semester and the retake courses should fit into the approved normal load so as to avoid time table clashes.
v) Students who have a course(s) to retake and these course(s) fall beyond the set normal semester load for their academic programmes shall pay tuition fees for any course(s) to be retaken. Besides, such students also pay the re-examination fees per course retaken as well as the registration fees.

10.5 Conceded Pass

10.5.1 Definition of conceded pass

A conceded pass is a pass granted for a course in which a final year candidate is within five marks of a pass mark in the course assessment. The pass is conceded on the basis that the student's overall performance in other courses for the program has been sufficiently strong to counter the deficient percentage in that particular course.

10.5.2 Circumstances Potentially Warranting a Conceded Pass

The personal circumstances of a student must be taken into account, the student's performance in the course could have been adversely affected by his or her personal circumstances. The circumstances for approval of a conceded pass may include but not limited to:
i) Student illness or medical condition
ii) Family issues (family injury or illness, bereavement, etc)
iii) Commitment to participate in national sport or other activities that warrant favorable consideration.
iv) Commitment to assist with service activities.
v) Unavoidable and unexpected work commitments (e.g. relocation).

vi) Awarding conceded passes does not compromise there equipment's for accreditation of that programme by a professional body.

10.5.3 Responsibility and Procedure

a. The conceded passes are granted at the discretion of the faculty/institute body of governors. Students are not automatically entitled to the conceded passes and may not request them.
b. The board of examiners shall during the time of consideration of examination results, identify and grant students the legibility for conceded passes. A student will then be formally informed that he/she has been offered a conceded pass.

10.5.4 Eligibility for Conceded Pass

A conceded pass shall be granted under the following conditions:
a. A candidate shall be eligible for conceded pass if the final mark in the course is in the range of 55-59%, CGPA of a student will be at least 3.0.
b. A conceded pass may only be awarded if a student has attempted a paper at least three times. The better of the grades and will be used for awarding a conceded pass.
c. A conceded pass shall be discretionary and examination boards shall take into account the following;
   i) The result a student has scored, each time he/she has attempted a paper.
   ii) A student's overall academic record.
   iii) Comments from his/her lecturers e.g on his/her class attendance and participation
   iv) Whether the course is required for professional accreditation or it is necessary for a student to demonstrate professional or clinical competence as part of its assessment requirements.
d. A conceded pass shall be granted to a whole course not a particular piece of assessment.
e. Candidates granted conceded pass shall earn a credit on the basis of conceded pass "CP"
f. Only candidates in their final year of study shall be eligible for conceded pass.
g. The number of conceded pass will only be restricted to one course.
h. Incase a candidate does not qualify for conceded pass as stipulated above, the existing provision in the semester regulation will guide as the case may be.

10.5.5 Recording a conceded pass in the academic transcript

A granted conceded pass will be recorded on the student's academic transcript by indicating a true percentage/grade achieved and "CP" as a grading code.

10.6 Weighting System

The weighting unit is based on a Credit Unit (CU). A Credit Unit is one contact hour per week per semester or a series of fifteen (15) contact hours per semester. A contact hour is equal to (i) one lecture hour, or (ii) two practical hours, or (iii) two tutorial hours.

10.7 Calculation of Cumulative Grade Point Average (CGPA)

The CGPA shall be calculated as follows:

$$\text{CGPA} = \frac{\sum_{i=1}^{n} GP_i * CU_i}{\sum_{i=1}^{n} CU_i}$$

Where GPi is the Grade Point score of a particular course i;
CUi is the number of Credit Units of course i; and
n is the number of courses so far done.

10.8 Master's Dissertation

Students are required to demonstrate their ability to independently formulate a detailed research proposal, as well as develop and demonstrate their dissertation thoroughly.
(i) A candidate shall submit a research proposal to the Faculty of Science Higher Degrees Committee during the second semester of the first academic year.
(ii) A candidate shall be allowed to formally start on the dissertation after the second semester.
(iii) A candidate shall be assigned a supervisor who is a specialist in the candidate's field of study to undertake supervision of the research work.
(iv) The candidate shall execute the dissertation during second year (the third and fourth semesters).
(v) The candidate shall submit a dissertation report by the end of the fourth semester.

10.8.1 Passing of a Dissertation

To pass the Dissertation, the candidate shall satisfy the Internal Examiner, External Examiner, and Viva Voce Committee independently.

10.8.2 Revised Dissertation

A candidate, who fails to satisfy the examiners, shall re-submit a revised dissertation in accordance with the standing University guidelines for the dissertation examinations.

10.9 Minimum Graduation Load

To qualify for the award of the degree of Master of Science in ICT4D, a candidate is required to obtain a minimum of 75% class attendance, a CGPA of at least 3.0 from the required 31 credit units of taught courses. In addition, the candidate should have scored at least 60% in the dissertation and should have exceled in Viva Voce and effected satisfactory corrections to the comments made by the Examiners and Viva Voce Committee.

11.0 Knowledge Areas Covered in the Curriculum

The curriculum is based on six broad knowledge areas that make up practical and resourceful information systems. The six knowledge areas are:

(i) ICT and Development
(ii) Research and Development
(iii)E-Services
(iv)Web and Mobile Technologies
(v) Innovations Management
(vi)ICT4D Projects
The following section gives the details of courses corresponding with these knowledge areas.

Programme Structure

Code	Name	LH	PH	TH	CH	CU
Semester I (5 core courses)						
MID 7101	ICT and Social Economic Development	30	-	30	45	3
MID 7102	Business Process Modelling and Analysis	30	30		45	3
MID 7103	Web Technologies and Internet Security	30	30	-	45	3
MID 7104	Database Modelling	30	30		45	3
MID 7105	Research Methodology	45	30		60	4
	Total Credit Units					**16**
	Semester II (5 courses)					
	Core (4 courses)					
MID 7201	ICT Innovations and Entrepreneurship	30	-	30	45	3
MID 7202	Geographical Information Systems and Remote Sensing	30	30	-	45	3
MID 7203	E-Services Delivery	30	-	30	45	3
MID 7204	ICT Policy and Regulation	30	30	-	45	3
	Electives (1 course)					
MID 7205	Multimedia Design and Development	30	30	-	45	3
MID 7206	Mobile Applications Development	45	30	-	45	3
	Total Credit Units					**15**
	Semesters III & IV (A Master's Dissertation)					
MID 8101	Master's Dissertation in ICT4D	-	150		75	5
	Total Credit Units					**5**

Course Distribution by Knowledge Area
The list below summarizes the distribution of the different MSc. ICTD curriculum course units in seven knowledge areas:

(i) ICT and Development
MID 7101: ICT and Social Economic Develop

MID 7204: ICT Policy and Regulation

(ii) Research and Development
MID 7102: Business Process Modelling and Analysis
MID 7105: Research Methodology

(iii) Web and Mobile Technologies
MID 7103: Web Technologies and Internet Security
MID 7206: Mobile Applications Development

(iv) E-Services
MID 7203: E-Services Delivery

(v) Innovations Management
MID 7201: ICT Innovations and Entrepreneurship

(vi) ICT4D Projects
MID 7202: Geographical Information Systems and Remote Sensing
MID 7205: Multimedia Design and Development
MID 7205: Business Intelligence and Data mining
MID 8101: Master's Dissertation in ICT4D

Detailed Curriculum

Course Name: **ICT and Social Economic Development**
Course Code: MID 7101
Year of Study: 1
Semester: 1
Contact Hours: 45
Credit Units: 3

Course Description:
This course explores the roles of ICTs in socio-economic development, informed by the broader theoretical and policy-level frameworks. It underscores the role of Information and Communication Technology (ICT) towards achieving developmental goals through topics including: development and knowledge bases societies, global software outsourcing, ICT infrastructure and policy, ICTs for trade and market access, ICT and smallholder agriculture, ICT and education, e-government, gender and ICT.

Course Objectives
This course aims at:
(i) Enabling students to develop an understanding of ICTs in achieving socio-economic development.
(ii) Demonstrating to students the importance of ICTs in improving livelihoods in areas including: smallholder agriculture, health, education, trade and gender.

(iii)Facilitating students to apply critical conceptual frameworks to analyse case studies in ICT4D projects.

(iv)Equipping students with skills and knowledge for integration of ICTs in implementation of development goals.

Course Learning Outcomes: On completing this course, students should be able to:

(i) Develop an understanding of ICTs in achieving socio-economic development.

(ii) Analyse the role of national policy in promoting effective developmental use of ICT.

(iii)Apply critical conceptual frameworks to analyse case studies and their own experience of ICTs in development projects.

(iv)Identify key roles, challenges and questions in the application of ICTs to specific development goals.

Detailed Course Content:

(a) Development and knowledge based societies	(6 hours)
(b) Global software outsourcing	(3 hours)
(c) ICT infrastructure and policy	(3 hours)
(d) ICTs for trade and market access	(6 hours)
(e) ICTs and smallholder agriculture	(6 hours)
(f) ICTs and education	(6 hours)
(g) Health informatics	(6 hours)
(h) E-governance	(6 hours)
(i) Gender and ICTs	(3 hours)
Total	**45 hours**

Study Material

Laptops with a modern operating system for which the student has administrator privileges, LCD projector and fast Internet.

Mode of Delivery

Lectures, class discussions, case studies and instructor-led seminars will be the main method of instruction.

Mode of Assessment

The assessment will be in form of tests (20%) and class presentations (10%) individual assignment (10%) and end of semester examinations (60%).

Reference List

Avgerou, C. (2010). Discourses on ICT and Development. *Information Technologies and International Development*, 6(3), 1-18.

Brown, A., & Grant, G. (2010). Highlighting the Duality of the ICT and Development Research Agenda. *Information Technology for Development*, 16(2), 96-111.

Walsham, G. & Sahay, S. (2006). Research on information systems in developing countries. *Information Technology for Development*, 12(1), 7-24.

Vrasidas, C., Zemblyas, M. & Glass, G. V. (2009). ICT for development: Challenges and possibilities. In C. Vrasidas, M. Zembylas& G. V. Glass (Eds.) ICT for education, development and social justice (pp. 3-15), Information Age publishing.

Course Name: **Business Process Modelling and Analysis**
Course Code: MID 7102
Year of Study: 1
Semester: 1
Contact Hours: 45
Credit Units: 3

Course Description:
The aim of this course is to provide a common understanding and a common language to the theoretical and applied concepts of process modelling and business systems development. It is designed to give students the knowledge and skills required to accurately analyse and model existing business processes and to use these models to identify areas of the business which could be improved either through automating the processes using IT systems or redesigning a process to be more efficient. The course discusses the elements of process models and explores business processes within organizations as well as interacting processes involving several organizations. Techniques of analysing business processes from a formal perspective will also be covered. In effect, much of the course is aimed at developing the thinking skills and mental framework for effective process modelling rather than merely teaching notation and methodology.

Course Objectives:
This course will enable students to:
(i) Develop an understanding of business organization operations, their relationships and functional structures and the advantage of considering the process oriented view of organizations;
(ii) Learn how to establish the strategic and organisational bases for business process modelling;
(iii)Gain knowledgeof business process management systems, systems implementation and enabling IT tools and technologies.
(iv)Develop intellectual skills in formulating IT and business problems and intervention measures.
(v) Acquire skills in simulation software for analysing business processes.

Course Learning Outcomes:
On completion of the course, students are expected to:
(i) Demonstrate understanding of business organization operations, their relationships and functional structures.
(ii) Apply the basic concepts of business process modelling, frameworks and standards in supportingorganisational business processes;
(iii)Demonstrate understanding of information systems modelling in businesses, business process

management systems, systems implementation and enabling IT tools and technologies.

(iv) Apply knowledge and skills of the analytical tools that can be used to model, analyse, understand, and design business processes;

(v) Demonstrate skills in using simulation software to implement relevant business process projects.

Detailed Content:
  i. Introduction to Business Process Modelling (terminology, concepts, and background of Business Process Modelling and Analysis)   (3 hours)
  ii. Analysing Business Process Behaviour (strategic contexts of business processes, business process hierarchies, process views and frameworks)   (9 hours)
  iii. Approaches to Business Process Modelling and Analysis (Analysing process flows, handouts and tasks; challenging business rules; analysing as-is and to-be business processes)   (9 hours)
  iv. Modelling the business (notations, rules, flows, events that trigger business processes, business process measures, gateways, swim lanes, pools and lanes, and data gathering)
                        (12 hours)
  v. Business process management Systems   (3 hours)
  vi. Business Modelling with UML and ARIS   (6 hours)
  vii. Business Process Choreographies (lifecycle, design, structural aspects, control patterns, distributed control and data management).   (3 hours)

        Total   **45 hours**

Study Material
Laptops with a modern operating system for which the student has administrator privileges, LCD projector and fast Internet.

Mode of Delivery
Lectures, tutorials and instructor-led seminars will be the main method of instruction. In addition, practical exercises for both the group and individuals will be given based on real life case studies. Individual literature review of current developments in the business process modelling field will be explored.

Mode of Assessment
The assessment will be in form of tests (20%) and class presentations (10%) individual assignment (10%) and end of semester examinations (60%).

Reading List
(i) Jacka, J.M., & Keller, P.J. (2009). Business Process Mapping: Improving Customer Satisfaction (2nd ed.). Hoboken, NJ: John Wiley & Sons.
(ii) Milicev, D. (2009). Model-Driven Development with Executable UML (1st ed.). Wrox Publishers.

Course Name: **Web Technologies and Internet Security**
Course Code: MID 7103

Year of Study: 1
Semester: 1
Contact Hours: 45
Credit Units: 3

Course Description:
This course provides students with non-IT educational background with necessary knowledge of core principles and technologies of Web design and internet security. Students with prior knowledge in Web technologies at the bachelors' level will refresh their knowledge before advancing to new areas covered in this course. The course will give an overview of web scripting including client and server side scripting. It will also cover Web services and Internet security. Emphasis will be made on Responsive Design using technologies such as HTML5, Style sheets (CSS3), XML, XSL, PHP, ASP. MVC framework will be used for developing the web applications and supporting Web security frameworks will also be studied.

Course Objectives:
This course will enable students to:
(i) Gain knowledge and understanding of fundamental principles of web design and web technologies.
(ii) Develop practical skills and competency in building effective (responsive) and usable web applications.
(iii) Integrate security measures in Web design and maintenance.
(iv) Gain understanding of integrating multiple Web technologies to achieve sustainable Web services.

Course Learning Outcomes:
On completion of this course, students are expected to:
(i) Demonstrate understanding fundamental principles of web design and web technologies.
(ii) Apply concepts of Wed design to in building effective (secure, responsive) and usable web applications.
(iii) Demonstrate competency in securing and maintaining Web applications.
(iv) Analyse and implement Web projects as service oriented or application oriented.

Detailed Content:
(i) Fundamental principles of Web design;   (4 hours)
(ii) Information architecture and asthetics(page layout, colour) and style consistency
                                                                               (4 hours)
(iii) Use of multimedia design for Websites;   (8 hours)
(iv) Overview of Web technologies: Markup languages (HTML, XHTML, XML), Style Sheet Languages (CSS, XSL), Client-side scripting (JavaScript, VB Script), service-side scripting (PHP, ASP);   (12 hours)
(v) Responsive Web design;   (8 hours)
(vi) Securing websites: cross-site scripting (XSS), SQL injection,service authentication, buffer overruns, address spoofing, web hijacking and recovery;   (6 hours)
(vii) Web hosting, management and maintenance.   (3 hours)
Total   **45 hours**

Study Material
Laptops with a modern operating system for which the student has administrator privileges, a server computer, LCD projector and fast Internet.

Mode of Delivery
Lectures, tutorials and instructor-led seminars will be the main method of instruction. In addition, practical exercises for both the group and individuals will be given based on real life case studies.

Mode of Assessment
The assessment will be in form of tests (20%) and class presentations (10%) individual assignment (10%) and end of semester examinations (60%).

Reading List:
i) Frain, B. (2012). Responsive Web Design with HTML5 and CSS3. Packt Publishing
ii) Jackson, W. (2016). HTML5 Quick Markup Reference. Lompoc, CA: Apress. DOI 10.1007/978-1-4302-6536-8.
iii) Web Designer Issue 243 (2015). Responsive Design.

Course Name: **Database Modelling**
Course Code: MID 7104
Year of Study: 1
Semester: 1
Contact Hours: 45
Credit Units: 3

Course Description:
This course introduces the theoretical and practical issues relating to the design and use of database systems. In addition to the provision of a very sound foundation in traditional, second generation database systems it explores the representation and management of complex information resources with third generation database technology. The course highlights how database systems are at the core of modern information-rich Websites, and explores the role of XML and Semantic Web technologies in creating a "Web of data".

Course Objectives:
This course will enable students to:
(i) Gain knowledge and understanding of how XML and Semantic Web technologies are used to model and manage Web information.
(ii) Develop skills in linking databases to Web interfaces.
(iii)Create XML and Semantic Web information models.
(iv)Analyse a conceptual schema for an appropriate database management system.
(v) Design object oriented and extended relational database schemas.

Course Learning Outcomes:

On completion of this course, students are expected to:
(i) Demonstrate understanding of howXML and Semantic Web technologies are used to model and manage information on the Web.
(ii) Apply interface development skills in linking databases to Web interfaces.
(iii) Demonstrate understanding of XML and Semantic Web information models.
(iv) Show competence in conceptual database modelling.
(v) Demonstrate understanding of applications areas of object oriented and relational database schemas.

Detailed Content:
(i) Database essentials: relational and object-oriented fundamentals. (3 hours)
(ii) SQL fundamentals:data types, data definition and manipulation, query processing, and views.
(6 hours)
(iii) Distributed DBMSs and Replication:Distributed DBMSs concepts and design; distributed DBMSs advanced concepts; replication and mobile databases. (9 hours)
(iv) Data structures for database processing: flat files, binary relationships, representation of secondary keys. (9 hours)
(v) Web and DBMSs: Web technology and DBMSs; semi structured data and XML.
(9 hours)
(vi) Business Intelligence Systems: Data warehousing concepts, reporting systems, and data mining. (9 hours)
Semester Total **45 hours**

Study Material
Laptops with a modern operating system for which the student has administrator privileges, a server computer, LCD projector and fast Internet.

Mode of Delivery
Lectures, tutorials and instructor-led seminars will be the main method of instruction. In addition, practical exercises for both the group and individuals will be given based on real life case studies.

Mode of Assessment
The assessment will be in form of tests (20%) and class presentations (10%) individual assignment (10%) and end of semester examinations (60%).

Reading List:
i) Elmasri, R., & Navathe, S.B. (2016). Fundamentals of Database Systems (7th ed.). Hoboken, NJ: Pearson Higher Education.
ii) Kroenke, D.M., & Auer, D.J. (2014). Database Processing. Pearson Education.
iii) Rahimi, S.K., & Haug, F.S. (2010). Distributed Database Management Systems. Hoboken, NJ: John Wiley & Sons, Inc.

Course Name: **Research Methodology**
Course Code: MID 7105

Year of Study: 1
Semester: 1
Contact Hours: 60
Credit Units: 4

Course Description:
The course will prepare students for advanced research by examining how to plan, conduct and report on empirical investigations. The course will cover techniques applicable to each of the steps of a research project, including formulating research problem, objectives, questions, theory building, data analysis (using both qualitative and quantitative methods), building evidence, assessing validity, and publishing. Guidelines on the preparation and writing of a research dissertation will also be discussed.

Course Objectives:
This course will enable students to:
i) Acquire knowledge and skills in research process, activities, and ethics.
ii) Develop skills in stating research problems and objectives.
iii) Perform critical literature review and scientific writing.
iv) Investigate and adopt appropriate research methods and data collection techniques.

Course Learning Outcomes:
At the end of this course, students will be able to:
  i) Demonstrate competency in undertaking research while observing ethical measures.
  ii) Apply critical thinking skills in articulating research problem, aim and objectives.
  iii) Assess and critique a published journal article that uses one of the primary research methods in the field.
  iv) Select and adopt appropriate methodology and data collection methods in addressing the research objectives.

Detailed Course Content: The course will cover the following topics:
  i.   Introduction (research terms, research process, activities and skills associated with the research process)   (3 hours)
  ii. Literature review (structure, referencing, writing up, presentation skills, introduction to relevant software).   (9 hours)
  iii. Scientific writing (abstracts, identifying research problems, research objectives, research questions and hypothesis, paper writing and publication, research ethics).   (9 hours)
  iv. Research methods (Information Systems methods, research designs, qualitative and quantitative approaches)   (9 hours)
  v.   Design Science Methodology (emphasis of rigour and relevance in ICT research)   (6 hours)
  vi. Overview of data collection and analysis (data collection techniques, selection of suitable data collection approach, sample size and precision, variable and value labels; descriptive statistics; T-test, confidence interval: one sample; two independence samples, two paired samples)   (9 hours)
  vii. Bivariate Correlation - The correlation coefficient; Scatter diagrams; Plotting the scatter diagram; Significance of the correlation coefficient; connection with Regression

viii. Linear Regression - Introduction to regression; The regression coefficient; The intercept; The relation between regression and correlation coefficients; Significance of the regression coefficient; Simple regression diagnostics. (3 hours)

ix. Multiple Regression - Partial regression coefficients; Model (variable) selection; Regression with dummy variables. (3 hours)

x. Analysis of Variance - Comparison of several means: one way ANOVA; Multiple classifications; Interactions; Adjusting for covariates (3 hours)

xi. Multivariate Analysis - The nature of multivariate data; generalization of the t and F tests; repeated measures analysis of variance. (3 hours)

Total   **60 hours**

Study Material

Laptops with a modern operating system for which the student has administrator privileges, LCD projector and fast Internet.

Mode of Delivery:

Lectures will be used to introduce the learning material and for demonstrating the key concepts by example. Assignments on literature critiques will form a major part of this course. The students will identify researchable problems from which they will apply the concepts taught in class with an aim of producing research proposals by the end of the semester. The students will make presentations of their draft proposal for critique and feedback from their peers and the course lecturer.

Mode of Assessment: Assessment will categorize as follows:

Progressive assessment 20%
Individual work (scientific writing and research proposal development) 10%
Presentation (skills) 10%
Final written Exam 60%

Reference List

(i) Ang, S.H. (2014). Research Design for Business & Management. London: SAGE Publications Inc.

(ii) Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches* (4th Ed.). Thousand Oaks, CA: Sage.

(iii) Lochmiller, C.R., & Lester, J.N. (2017). An Introduction to Educational Research. Thousand Oaks, CA: SAGE Publications, Inc.

Course Name: **ICT Innovation and Entrepreneurship**
Course Code: MID 7201
Year of Study: 1
Semester: 2
Contact Hours: 45
Credit Units: 3

Course Description:
This course aims to provide students with an understanding of the nature of IT enterprise and entrepreneurship. It emphasises the role of IT, the entrepreneur, and innovation in the entrepreneurial process. The course content covers the needs of students in a wide area of innovation supported by ICTs including: those thinking about starting a business or who are already in business - large or small; those who are interested in commercialising their own innovations or of others; and those who advise entrepreneurs or engage in policy making in the entrepreneurship area.

Course Objectives:
The course will enable students to:
i)   Develop skills in implementing entrepreneurial activities supported by innovative ICT solutions.
ii)   Develop skills and unique methods for IT business venturing.
iii) Develop knowledge and understanding of entrepreneurship and innovation from both a theoretical and practical perspective.
iv)   Articulate the role of the entrepreneur in the IT enterprise creation process.
v)   Use entrepreneurial principles throughout their research activities.

Course Learning Outcomes:
By the end of the course, the student should be able to:
i)   Demonstrate skills in implementing entrepreneurial activities supported by innovative ICT solutions.
ii)   Demonstrate skills in IT business venturing.
iii) Demonstrate understanding of entrepreneurship and innovation from both a theoretical and practical perspective.
iv)   Recognise the role of the entrepreneur in the new enterprise creation process.
v)   Apply entrepreneurial principles in their research projects.

Detailed Content
i.   Theoretical and practical perspectives of entrepreneurship and innovation. Imitative versus disruptive innovation.   (6 hours)
ii.   Introduction to IT projects and risk management.   (4 hours)
iii. Prototyping business models   (4 hours)
iv.   Managing innovations and software ventures, partnering, branding and marketing
                                                                              (8 hours)
v.   Opportunities, resource and quality management, and value addition in entrepreneurship
                                                                              (8 hours)
vi.   Information technology in the entrepreneurial process   (4 hours)

vii. Designing innovative IT solutions   (9 hours)

viii. Ethics and social entrepreneurship. (3 hours)

Total **(45 hours)**

Study Material
Laptops with a modern operating system for which the student has administrator privileges, a server computer, LCD projector and fast Internet.

Mode of Delivery
Lectures, tutorials and instructor-led seminars will be the main method of instruction. In addition, group projects on innovative IT solutions will be presented.

Mode of Assessment
The assessment will be in form of tests (20%) and class presentations (10%) group assignment (10%) and end of semester examinations (60%).

Reading List
i) Hisrich, R., Peters, M., &Shepherd, D. (2016).Entrepreneurship (10[th]ed.), McGraw-Hill/Irwin.
ii) Peter F. Drucker, P.F. (2009). Innovation and Entrepreneurship.Collins Business.
iii) Shalley, C.E., Hitt, M.A., & Zhou, J. (2015). The Oxford Handbook on Creativity, Innovation and Entrepreneurship. Madison, NY: Oxford University Press.

Course Name: **Geographical Information Systems and Remote Sensing**
Course Code: MID 7202
Year of Study: 1
Semester: 2
Contact Hours: 45
Credit Units: 4

Course Description:
This course introduces students to the concepts of geographical information systems and their applications. Geographical information systems (GIS) are powerful tools for handling geographically referenced data. The course tackles fundamental principles, concepts and techniques of GIS and remote sensing (RS). Students will also be introduced to theoretical, practical and application oriented aspects of GIS and RS. Students finishing the course will be able to learn how to independently design and carry out sequential data processing chains in the application fields of geo-information science.

Course Objectives:
The course will enable students to:
   i) Develop basic, practical understanding of GIS concepts, techniques and real world applications.
   ii) Acquire skills in the language of GIS and apply basic concepts of geography necessary to efficiently and accurately use GIS technology and data concepts.
   iii) Examine how GIS is utilized in the larger context of business needs and IT strategies.

iv) Develop GIS prototypes using GIS tools.

v) Have an understanding of GIS and its relationship to mapping software development.

Course Learning Outcomes:

By the end of the course, the student should be able to:

i)   Demonstrate understanding of GIS concepts, techniques and real world applications.

ii) Apply GIS technology in addressing relevantbusiness needs.

iii) Demonstrate understanding of the basic concepts of geography necessary to efficiently and accurately use GIS technology and data concepts.

iv) Apply concepts and principles of GIS in developing relevant prototypes

v)   Demonstrate an understanding of GIS and its relationship to mapping software development.

Detailed Content

i.   Functionality and applications of a GIS (2D, 3D, or 4D (3D + time)   (6 hours)

ii.   Spatio-temporal Information Systems   (12 hours)

    Conceptual Modeling of Geographic Applications

    Spatial Query Languages

    Spatio-temporal data structures and indexing

    Geographical Information Applications Over the Internet

    Precision Farming and Geographic Systems

    Biodiversity Information Management

    Issues in Spatio-temporal databases systems: data Models, languages and moving

iii. Spatial Data Management   (8 hours)

    GIS Project Planning and Implementation

    Geographic Information Legal Issues

    Spatial Data Quality

    Spatial Data Standards

    Cartographic communication - the display of spatial data.

iv.   Introduction to Spatial Decision Support Systems   (4 hours)

    Spatial Decision Support Systems: an Overview

    SDSS in Environmental Management

v.   Multi-Criteria Evaluation (MCE)   (6 hours)

    Land suitability

    Plan/scenario Evaluation

    Site search/selection

    Resources allocation

    Transportation/vehicle routing/

    Scheduling

    Impact assessment

vi.   Location-allocation, coordinate systems and map projections and remote sensing.

    (3 hours)

vii. Mobile GIS" (location based services, combination with positioning, e.g. GPS, Galileo).

    (3 hours)

viii. Laboratory assignments to include: urban & rural planning, water, management, utilities pipelines and cables and ethical issues.   (3 hours)

Total   **45 hours**

Study Material
Laptops with a modern operating system for which the student has administrator privileges, a server computer, LCD projector and fast Internet.

Mode of Delivery
Lectures, tutorials and instructor-led seminars will be the main method of instruction. In addition, practical exercises for both the group and individuals will be given based on real life case studies.

Mode of Assessment
The assessment will be in form of tests (20%) and class presentations (10%) individual assignment (10%) and end of semester examinations (60%).

Reading List
i) Njoku, E.G. (Ed.) (2014). Encyclopedia of Remote Sensing. New York, NY: Springer Science.
ii) Svennerberg, G. (2010). Beginning Google Maps API 3. New York, NY: Springer Science.

Course Name: **E-Service Delivery**
Course Code: MID 7203
Year of Study: 1
Semester: 2
Contact Hours: 45
Credit Units: 3

Course description:
The course introduces e-governance, policy and management issues specific to e-governance. It examines the basics of e-governance; e-governance laws and policies; and different kinds of e-services delivered by governments. In addition, models of best practices in e-service delivery. Core questions addressed in the course include what government functions are best implemented through e-government methods, how e-government initiatives may be evaluated to assess effectiveness, what exemplary practices might improve e-government effectiveness, what the socio-political implications of e-governance are, and how the training of public administrators must change given new roles emerging due to the rise of e-governance.

Course Objectives:
This course will enable students to:
    (i) Acquire knowledge of existing and emerging electronic services;
    (ii) Improve understanding of possible innovations in public administration through electronic services delivery;
    (iii)Develop skills of the effective use of electronic services as citizens;
    (iv) Strengthen their research ideas into future Masters dissertations.

Course Learning Outcomes:

By the end of this course, students will be able to:

(i) Demonstrate knowledge and understanding of e-services issues, trends and importance to society;

(ii) Apply e-services knowledge in developing solutions for effective electronic services delivery;

(iii) Apply models of best practices in e-service delivery;

(iv) Develop research proposals in areas of e-health, e-agriculture, e-learning and e-governance.

Detailed Course Content:

i.	Phases of e-government and stages of e-government development;	(6 hours)
ii.	E-government initiatives (e-procurement, e-licensing, e-governance);	(3 hours)
iii.	Online citizen access to governmental databases;	(4 hours)
iv.	E-government functions and methods;	(4 hours)
v.	Organizational, social and political impacts of E-government initiatives and e-democracy initiatives;	(4 hours)
vi.	E-health issues (importance, implementation and sustainability);	(8 hours)
vii.	E-learning issues (importance, implementation and sustainability).	(8 hours)
viii.	E-agriculture issues (importance, implementation and sustainability).	(8 hours)
Total		**45 hours**

Study Material

Laptops with a modern operating system for which the student has administrator privileges, a server computer, LCD projector and fast Internet.

Mode of Delivery

Lectures, tutorials and instructor-led seminars will be the main method of instruction. In addition, practical exercises for both the group and individuals will be given based on real life case studies.

Mode of Assessment

The assessment will be in form of tests (20%) and class presentations (10%) individual assignment (20%) and end of semester examinations (50%).

Reference List

i. Alhomod, S.M., & Shafi, M.m. (2012). Best Practices in E government: A review of Some Innovative Models Proposed in Different Countries. International Journal of Electrical & Computer Sciences IJECS-IJENS 12(1). pp. 1-6.

ii. Berger, J.B., & Rose, J. (2015). Nine Challenges for e-Government Action Researchers. International Journal of Electronic Government Research, 11(3), 57-75

iii. Easttom, C. (2016). Computer Security Fundamentals (3rd ed.). Indianapolis, Indiana: Pearson Education, Inc.

Course Name: **ICT Policy and Regulation**
Course Code: MID 7204
Year of Study: 1
Semester: 2
Contact Hours: 45
Credit Units: 3

Course Description

This course provides learners with an opportunity to improve their professional skills and/or refocus their expertise through: expanding and updating their knowledge of ICT ecosystem policy and regulation; investigating research problems and exploring new ideas and experiences that optimize existing policies; reflecting on their personal goals, values and career paths.

Course Objectives

This course will enable students to:
   i. Acquire knowledge in a range of ICT policy and regulatory frameworks.
   ii. Use high-level conceptual and analytical tools for the ICT policy formulation and regulation.
   iii. Develop skills for formulation and evaluation of ICT policies for organizations of varying ICT penetration levels.
   iv. Undertake relevant ICT guided by prevailing ICT policy framework.

Course Learning Outcomes

On completing this course, students should be able to
   i. Demonstrate understanding of a range of ICT policy and regulatory frameworks.
   ii. Apply high-level conceptual and analytical tools for the ICT policy formulation and regulation.
   iii. Demonstrate skills in formulation and evaluation of ICT policies for organizations of varying ICT penetration levels.
   iv. Produce ICT artefacts from independent research done guided by prevailing ICT policy framework.

Detailed Content:

ICT industry and markets	3 hours
Issues in Internet policy and regulation	6 hours
Global trends in ICT policy, market structures and regulatory reform	6 hours
ICT Quality of service delivery and service pricing	6 hours
Spectrum management	3 hours
Quantitative techniques in decision making	6 hours

Telecommunications law	3 hours
Managing ICT infrastructure, technologies, resources, and innovation	6 hours
Research methods in ICT policy and regulation	6 hours
Total	45 hours

Study Material
Laptop with a modern operating system for which the student has administrator privileges and fast internet.

Mode of Delivery
The assessment will be in form of lectures, thematic area discussions, case studies and reading assignments and presentations from local experts in the field.

Mode of Assessment
The assessment will be inform of tests (20%), individual presentations (20%) and end of semester examinations (60%).

Reading List
i)   CIPESA (2015). ICT in Governance in Uganda: Policies and Practices. CIPESA ICT Research Series No. 05/15.
ii) Nicol, C. (Ed.) (2003). ICT Policy: A Beginner's Handbook. Johannesburg, South Africa: STE Publishers.
iii) https://www.ict.go.ug/policy (Draft National Spectrum Management Policy - 2017; Open Data Policy Draft -2017)

Course Name: **Multimedia Design and Development**
Course Code: MID 7205
Year of Study: 1
Semester: 2
Contact Hours: 45
Credit Units: 3

Course description:
This course presents the relationship between technology, innovation, media, content and cultures, whilst providing a forum for students to further develop their skills in specialised software such as: Illustrator, Photoshop, After Effects, Flash, Maya, and Final Cut Pro, related to multimedia design practice. Through practical tasks and critical exploration of the relationship between design, designers, users, media and software innovation, students will extend their understanding of the implications of software use and ways in which technology may impact on design and content. Students will develop an in-depth designed outcome based on this understanding.

Course Objectives:
 The course prepares students to become multimedia researchers, designers and animators. The

course objectives are to provide students with:
  i. Knowledge and understanding of core concepts, technologies and formats of multimedia.
  ii. Knowledge of the concept of Virtual Reality.
  iii. Skills of multimedia capture, authoring, production and compression.
  iv. Skills of deploying and serving media contents within web applications

Course Learning Outcomes:
By the end of this course, students will demonstrate:
  (i) Knowledge and understanding of core concepts, technologies and formats of multimedia;
  (ii) Skills of multimedia capture, authoring, production and compression;
  (iii) Skills of deploying and serving media contents within Web applications;
  (iv) Knowledge about how web accessibility can be enhanced through using multimedia;
  (v) Knowledge of the concept of Virtual Reality as an emerging technology

Detailed Course Content:

i. Definition of terms and concepts;   (3 hours)
ii. Multimedia capture; authoring; production; compression tools; and techniques;

                                                                           (6 hours)
iii. Graphic and streaming media formats, characteristics and interoperability;   (6 hours)
iv. Motion graphics and 3D animation;   (9 hours)
v. Using media contents within web applications;   (6 hours)
vi. Responsive interface design and digital publishing;   (6 hours)
vii. Information design and information architecture;   (3 hours)
viii.   Web design, web accessibility and virtual reality.   (6 hours)
Total   **45 hours**
Study Material
Laptops with a modern operating system for which the student has administrator privileges, a server computer, LCD projector and fast Internet.

Mode of Delivery
Lectures, tutorials and instructor-led seminars will be the main method of instruction. In addition, practical exercises for both the group and individuals will be given based on real life case studies.

Mode of Assessment
The assessment will be in form of tests (20%) and class presentations (10%) individual assignment (10%) and end of semester examinations (60%).

Reading List
(i)Costello, V., Youngblood, S.A., & Youngblood, N.E. (2012) Multimedia Foundations Core Concepts for Digital Design. Waltham, MA: Focal Press (Elsevier Inc.).
(ii) Ortega, R. et al. (2016). Interaction Design for 3D User Interfaces. Boca Raton, FL: CRC Press (Taylor & Francis Group).

Course Name: **Mobile Applications Development**
Course Code: MID 7206
Year of Study: 1
Semester: 2
Contact Hours: 45
Credit Units: 3

Course Description:
The course introduces mobile application development and gives an overview and comparison of technical approaches by Apple (iOS), Google (Android) and Microsoft (Mobile 8). It then narrows down to Android applications development including front-end mobile application clients, data handling, connectivity to back-end services and cloud hosting. The course also covers market opportunities, challenges, and architectural models.

Course Objectives:
The aim of this course is to develop students' skills and knowledge in native mobile applications development with emphasis to Android platform. This will be achieved by supporting students to acquire skills in:
i) Acquire knowledge in mobile applications development for common platforms with special emphasis on Android platform.
ii) Develop user interfaces for Android platform and other platforms.
iii) Publishing Android Apps in the Google Play Store.

Learning outcomes:
At the end of this course unit, the students will be able to:
   i) Develop advanced applications for the Android platform;
   ii) Write, examine and critique Java program code for Android applications;
   iii) Compare and analyse different types of Model-View-Controller patterns;
   iv) Build and develop a user interface for the Android platform using sound user interface design principles;
   v) Publish an Android application.

Detailed Course Content:
   i.   Introduction to mobile application development, overview and comparison of technical approaches by Apple (iOS), Google (Android) and Microsoft (Mobile 8)   (6 hours)
   ii. Mobile architectures for iOS, Android and Mobile 8 (application layers, security and interfaces)   (6 hours)
   iii. Overview of object oriented programming   (6 hours)
   iv. Review of the Java programming language   (3 hours)
   v.   Java for android developers   (6 hours)
   vi. Android app development (programming concepts, Model-View-Controller (MVC), controls and the user interface, Google APIs, content providers and intents)
                                                                                (12 hours)
   vii. XML for mobile interface design   (3 hours)
   viii. Displaying dialogues   (2 hours)

ix. Publishing Android applications on Google Play (1 hour)

Total   **45 hours**

Study Material
Laptops with a modern operating system for which the student has administrator privileges, a server computer, LCD projector and fast Internet.

Mode of Delivery
Lectures, tutorials and instructor-led seminars will be the main method of instruction. In addition, practical exercises for both the group and individuals will be given based on real life case studies in the context of mobile programming.
Assessment Method: Assessment will categorize as follows:
Progressive assessments 20%
Mobile programming project 20%
Final written Exam 60%

Reading List
(i) Burd, B. (2014). Java Programming for Android Developers for Dummies. Hoboken, NJ: John Wiley & Sons, Inc.
(ii) Horton, J. (2015). Android Programming for Beginners. Birmingham, UK: Packt Publishing.
(iii)Vasconcelos, H. (2016). Asynchronous Android Programming (2nd ed.). Birmingham, UK: Packt Publishing.
(iv)Wei, J. (2012). Android Database Programming. Birmingham, UK: Packt Publishing.

Appendix I: Quality Assurance Strategy

Several activities will be carried out as quality assurance measures so as to:
    (i) Measure the general extent to which the required skills have been achieved.
    (ii) Ensure implementation of the curriculum is adhered to.
    (iii) Create a feedback system for possible future revisions in the curriculum.

The activities in the proceeding headings will be carried out in the process of monitoring and assuring quality in this programme.

Feedback from Students Enrolled

In the current set up, each class has 1 student representative. These representatives are in constant contact with the Head of Department in case there are any quality of teaching and learning related matters in a particular class. This set up is to be maintained.

At the end of the semester, samples of students are given questionnaires to respond to several quality related matters like staff punctuality, delivery mode, course content and the general perceived usefulness of the course unit.

Use of ELearning in Availing Lecture Materials

Currently, Gulu University has MOODLE e-learning platform accessible on the university domain. The MSc students are expected each to have their own laptops on addition to a dedicated lab setup for the MSc class.

Peer Review

All members of staff will enrol (as students) to all classes taught in the department. They will therefore be able to assess content of courses taught by their peers. Staff will be free to advise fellow staff on the content, depth and presentation of materials. Consequently, for every course, students will access the best possible material in the view of all staff in the department not the course instructor

External Examiners' Reports

Like it is everywhere in Gulu University, student results are reviewed every semester by a senior external academician. This is to bring a 'foreign view' of the quality of the programme. External examiners write reports on their view of the curriculum/examinations. Some recommendations can be implemented immediately while others have to be implemented in a longer term. The department will make the maximum possible use of external examiners' reports as a means of assuring quality of student dissertations.

Appendix II: MSc. ICTD Programme Budget

Expected Enrolment = 20

S/N	Item	Unit cost	Quantity	Total
Year 1 Semester I				
Income: 20 x 1,500,000 = 30,000,000				
1	Teaching allowance for 240 contact hours	47,500	240	11,400,000
2	Invigilation of five exams including refreshments	9,000	5	45,000
3	Marking allowance for 20 scripts per course for 5 courses	1,500	100	150,000
4	Computer lab maintenance and software upgrades (10%)			3,000,000
5	Stationary (5 %)			1,500,000
6	Graduate seminars (5 %)			1,500,000
7	Administrative costs (Meetings, marketing, etc) – 10%			3,000,000
	Total			**19,882,500**
	Savings			**10,117,500**
Year 1 Semester II				
Income: 20 x 1,500,000 = 30,000,000				
1	Teaching allowance for 225 contact hours	47,500	225	10,687,500
2	Invigilation of five exams including refreshments	9,000	5	45,000
3	Marking allowance for 20 scripts per course for 5 courses	1,500	100	150,000
4	Computer lab maintenance and software upgrades (10%)			3,000,000
5	Stationary (5 %)			1,500,000
6	Graduate seminars (10 %)			1,500,000
7	Administrative costs (Meetings, marketing, etc) – 10%			3,000,000
Total				**20,595,000**
	Savings			**9,405,000**
Year 2 Semester III and IV				
Income: 20 x 1,500,000 x 2 (semesters) = 60,000,000				
1	Internal dissertation supervision at $100 per dissertation	320,000	20	6,400,000
2	External dissertation examination at $150 per dissertation	480,000	20	9,600,000
3	Stationary (10 %)			6,000,000
4	Graduate seminars (10 %)			6,000,000

5	Student support with research work (10%)			6,000,000
6	Administrative costs (Meetings, marketing, etc) – 10%			6,000,000
Total				**40,000,000**
Savings				**20,000,000**

Note:
From the above table, this programme breaks even with 15 students' enrolment.