

MAKERERE UNIVERSITY

FACULTY OF COMPUTING AND INFORMATION  
TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

P.O. BOX 7062, KAMPALA, UGANDA

REVISED PHD PROGRAMME IN INFORMATION TECHNOLOGY

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# 1. INTRODUCTION

## 1.1 Background to the Faculty of Computing and Information Technology

The rate of growth of Information and Communication Technology (ICT) in Uganda in particular and the African region in general is enormous. In order to sustain its high growth and its usefulness to the economy, there is need for highly skilled and specialized ICT labor force to cater for the sophisticated ICT-jobs. Today Makerere University Faculty of Computing and Information Technology (CIT) is the main ICT training, research and consultancy centre in Uganda. CIT was established by the University Council at its 100<sup>th</sup> meeting held on 15<sup>th</sup> December 2004 by upgrading the Institute of Computer Science into a Faculty with four Departments of Computer Science, Networks, Information Technology and Information Systems. The Institute of Computer Science, which was established by the University Council in 1985, grew out of the University Computer Centre.

**CIT's Value Statement:** The Faculty of Computing and Information Technology is an innovative and industry-oriented Faculty, pursuing excellence in teaching, learning, cutting edge value-added research and consultancy, community outreach, as well as providing a vibrant student life.

**Vision:** To be a leader in Computing and ICT training, research and services internationally.

**Mission Statement:** To provide first class teaching, research and services in computing and ICT responsive to national and international needs.

Department of Information Technology (IT) was established in 2005 as one of the four departments within the Faculty of Computing and Information Technology with the following mission:

1. Teach academic programs that relate to the dynamic and changing needs of graduates in an information society;
2. Advancement of IT knowledge and application through state of the art research;
3. Support IT-based advancements in both the industry and society

In line with the Makerere University strategic plan (2008/09 – 2018/19), the department strives to transform the University into a coherent research oriented institution of the 21<sup>st</sup> century. Therefore we are undertaking this through collaborations with various academic and business world partners to effectively incorporate IT into diverse disciplines. The department offers three degree programs and two diploma (ordinary and graduate) programs, respectively. These are: Bachelor of Information Technology (BIT), Masters in Information Technology (MIT) and a Ph.D in Information Technology (Ph.DIT), Diploma in Information Technology (DIT) and a Post Graduate Diploma in Information Technology (PGDIT). The department undertakes research in IT for culture and society, IT for Management, It for education (e-learning), multimedia technologies, and ICT for development in striving to expand our national reputation.

The Faculty has been running a PhD by research since 2002 and continues to do. Specifically the Department of Information Technology runs the following graduate Programmes:

- PhD in Information Technology (PhDIT)
- Master of Information Technology
- Postgraduate Diploma in Information Technology.

## 1.2 Objectives

The objectives of the PhD in Information Technology by Coursework and Research programme are to: -

- a. Build human resource capacity in the area of information technology in both the public and private sectors, especially in universities;
- b. Develop research capacity in the area of information technology;
- c. Address the increasing demand for PhD holders in the area of Information technology;
- d. Strengthen capacity and institutional building in the area of information technology discipline in tertiary institutions, private and public sectors.
- e. Provide those masters holders with potential for PhD with opportunities to develop skills in formulating, conducting and presenting their own scholarly research through the production of a research-based dissertations and publications.
- f. Foster initiative and potential for independent self-study that will develop the students' motivation and ability to continue updating their knowledge and skills after completion of the course of study in relation to scholarship and research.
- g. Enable the students to be able to demonstrate a critical awareness and reflection on research-based information as a basis for problem solving and practice in professional contexts.
- h. Enable students to be able to demonstrate ability to interpret and report research findings in areas relevant to their field of study.
- i. Enable students to be able to demonstrate the ability to formulate research questions and problems, design and carry out their own small scale research projects and present their findings orally and in writing.
- j. Equip students with research and publication skills to enable them publish research from high quality dissertations in reputable journals and/ or presentation of their research findings at academic conferences.

## 1.3 Justification

Information Technology has become a key requirement to driving organizational businesses and their operations. With dynamic changes in businesses and other enterprises, there is need to constantly upgrade and integrate information technology solutions and business processes to meet the changing information needs. There is also need to revise the curriculum to provide students with the research skills to advanced Information Technology. It is not to forget also that Makerere University is working hard towards establishing a research led institution that

will attract learners from all corners of the world. The design of the new curriculum has given a special emphasis on this university mission.

Further, the rate of growth of Information and Communication Technology (ICT) in Uganda in particular and the African region in general is enormous. In order to sustain the high growth useful to the economy, there is need for highly skilled and specialized ICT labor force to cater for the sophisticated ICT-jobs. Today Makerere University Faculty of Computing and Information Technology (CIT) is the main ICT training, research and consultancy centre in Uganda.

#### **1.4. Collaboration Partners on PhD by Coursework and Research Implementation**

##### **1.4.1. University of Groningen, Radboud University Nijmegen and Eindhoven University of Technology**

The Netherlands Government through the Netherlands Organization for International Cooperation in Higher Education (Nuffic) provided a 5.7 million euro grant for a project on 'Strengthening ICT Training and Research Capacity in the Four Public Universities in Uganda'. This project commenced on 1<sup>st</sup> June 2007 and will end on 31<sup>st</sup> May 2011. One of the objectives is to build ICT human resource capacity through staff development and implementation of graduate programmes (M.Sc. and Ph.D.) and 30 PhD students (10 registered at the above institutions in the Netherlands and 20 at Makerere University) are supervised by PhD holders from University of Groningen, Radboud University Nijmegen, Eindhoven University of Technology and Makerere University with support from the project. Out of the 5.7 million Euros about 2.5 million Euros is to support 10-15 visits by Professors from the Institutions in Netherlands per year in a bid to support training and research in Uganda.

##### **1.4.2. University of Bergen**

On 18th November 1999 a time frame agreement on research collaboration, scientific competence building, student and staff exchange, and institutional development was signed between University of Bergen and Makerere University in Kampala, Uganda. The agreement has a time frame of fifteen years.

Makerere University Faculty of Computing and Information Technology has an active student and staff exchange with the Department of Informatics and the Department of Information Science and Media at the University of Bergen (UiB) under this collaboration agreement. The staff from UiB has over the years conducted lectures in areas where the Faculty of Computing and Information Technology lacks local expertise.

### 1.4.3. London South Bank University

In 2005 Makerere University and London South Bank University signed a Memorandum of Understanding (MOU) in which the two universities agreed to:

- (a) Develop joint degree programmes (Masters Level) in the following areas: M.Sc. Information Systems; and M.Sc. in Human Resources (International).
- (b) To look at the feasibility of developing a distance learning PhD programme to include a cost model and that the programme will be designed with the view of implementation in the Faculty of Computing and Information Technology, Makerere University initially and then extended to the rest of the University in due course.
- (c) Identify and seek funding for PhD studentships from the Common Wealth Scholarship Fund, British Council and other funding bodies.
- (d) Explore various avenues for research funding, which particularly focus on the development needs of Uganda.
- (e) Identify ways in which best practice can be shared in the areas of Teaching and Learning.
- (f) Collaborate on quality assurance whereby London South Bank University will develop a proposal and costing model to help Makerere University develop mechanisms and procedures to support effective quality assurance and research monitoring at both institutional and subject levels.

A lot has been achieved under the MOU between Makerere University and London South Bank University that is still in force.

### 1.5 Computing Equipment

The Faculty of Computing and IT has put in place specialized research laboratories (e.g. the Multimedia Laboratory, Geographical Information Systems Laboratory, Mobile Computing Laboratory, Networking and Systems Laboratory, Software Incubation Laboratory, Computer Engineering Laboratory and E-learning Laboratory) and plans are under way to establish more laboratories using funds available under donor funded projects and internally generated funds. For example, under the project on 'Strengthening ICT Training and Research Capacity in the Four Public Universities in Uganda' there is approximately 800,000 Euros reserved for specialized equipment and software for the Faculty for Computing and Information Technology Centre of Excellence. This specialized equipment and software will be availed to the PhD students and their supervisors.

Every PhD student in the Faculty of Computing and Information Technology is given a laptop and personal computer for the whole duration of the programme. Each member of academic staff has a laptop and personal computer in the office.

### 1.6 Physical Facilities

The Faculty has sufficient offices for both staff and PhD students, lecture rooms, seminar rooms and computer laboratories in the faculty buildings.

## 1.7 Financial Resources

Tuition fee per student shall be 3,000,000 Uganda Shillings per annum for Ugandans and 3000 US Dollars per annum for Non-Ugandans.

## 2. REGULATIONS

### 2.1. Entrance Requirements

To qualify for admission, a candidate must fulfil the general Makerere University entry requirements for a Doctoral Programme. In addition, to be admitted to the PhD (Information Technology) a candidate must be a holder of a Master's Degree in Information Technology, Information Systems or its equivalent.

### 2.2. Duration

The duration of the PhD Programme is four academic years (8 semesters).

### 2.3. Credit Units (CU)

The weighting unit is a credit unit. One credit unit is one contact hour per week per semester.

One contact hour can be defined as equivalent to 2 tutorial hours or 2 practical hours.

### 2.4. Core and Elective Courses

A major is the subject/ field/ programme of specialization. A core course is compulsory course for the major and an elective course is an optional course for the major.

### 2.5 Graduation Requirements

To qualify for the award of the degree of Doctor of Philosophy (Information Technology), a candidate is required to obtain a minimum of 18 credit units for courses passed including all the compulsory courses and the PhD Dissertation within a period stipulated by Makerere University Senate/ Council.

Let LH, CH, and CU stand for Lecture Hour, Contact Hour, and Credit Unit respectively.

## 2.6 Curricula Review

The major changes in the revised curricula include:

- The semester load in first year has been reduced from 12 CU to 9 CU to allow students more time to undertake individual study.
- The MCS 9100- Philosophy of Computing and IT has been merged with MCS 9200-Philosophy of Science and Computing Research to form PCS9101 Philosophy of Computing.
- MCS 9102 - Advanced Research Methods in Computing and IT has been strengthened by including other research methods to form PIT 9201- Advanced Research Methods.
- Three new Specialised Information Technology courses were developed to cater for the specialised research areas within the department

## 2.7. The Curriculum for Doctor of Philosophy (Information Technology)

Code	Name	Assessment Method	LH	CH	CU
<b>Semester I</b>					
PCS9101	Philosophy of Computing	Presentations 40% Scientific review paper -60%	45	45	3
PIT 9101	Advanced Research in Information Technology Management	Presentations 40% Scientific review paper -60%	45	45	3
PIT9102	Advanced Research Methods	Presentations 40% Scientific research proposal -60%	45	45	3
<b>Semester II</b>					
PIS9203	Presentations, Scientific Writing and Research Ethics	Presentations 40% Scientific review paper -60%	45	45	3
PIT9201	Advanced Research in Information Technology for Culture and Society	Presentations 40% Scientific review paper -60%	45	45	3
PIT9202	Advanced Research in Information Technology for Development	Presentations 40% Scientific review paper -60%	45	45	3

In addition to the lecture hours (LH) the students will put in several hours of individual and group study for each course. The proposed curriculum will be a flagship for the faculty, especially towards the presence of a strong research focus.

## 2.8. Grading of Courses



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	
90 - 100	A+	5.0	Exceptional
80---89	A	5.0	Excellent
75 – 79	B+	4.5	Very Good
70 – 74	B	4.0	Good
65 – 69	C+	3.5	Fairly Good
60 – 64	C	3.0	Pass
55 – 59	D+	2.5	Marginal Fail
50 – 54	D	2.0	Clear Fail
45 – 49	E	1.5	Bad fail
40 – 44	E-	1.0	Qualified Fail
Below 40	F	0.0	Qualified Fail

The following additional letters will be used, where appropriate: -

W	-	Withdraw from Course;
I	-	Incomplete;
P	-	Pass;
F	-	Failure.

## 2.9. Minimum Pass Mark

A minimum pass grade for each course shall be 3.0 grade points.

## 2.10. Calculation of Cumulative Grade Point Average (CGPA)

The CGPA shall be calculated as follows: -

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

Where  $GP_i$  is the Grade Point score of a particular course  $i$ ;  
 $CU_i$  is the number of Credit Units of course  $i$ ; and

n is the number of courses so far done.

## 2.11. Progression

Progression through the programme shall be assessed in three ways:

## 2.12. Normal Progress

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

## 2.13. 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 waved when these conditions cease to hold.

## 2.14. Discontinuation

A student shall be discontinued from the program if

- (i) He/she fails to get a grade point of at least 3.0 from any course unit for three sittings
- (ii) By the end of the third semester, he/she does not have an approved research proposal
- (iii) Without a credible reason, he/she fails to submit the two 6 monthly consecutive progress reports
- (iv) The candidate shows no substantial progress for two academic years
- (v) Overstays on the program for more than two years
- (vi) Fails to pass on the third submission of the dissertation

## 2.15. Re-taking a Course

A Student may re-take any course when it is offered again in order to pass if the student had failed the course. A Student may take a substitute elective, where the Student does not wish to re-take a failed elective.

## 2.16. PhD Dissertation

Students are required to demonstrate their ability to independently formulate a detailed dissertation proposal, as well as develop and demonstrate their dissertation thoroughly.

- a. A candidate shall be allowed to formally start on the dissertation after registration.

- b. A candidate shall submit a dissertation proposal to the Faculty of Computing and Information Technology Higher Degrees Committee during the second semester of the first academic year.
- c. The candidate shall execute the dissertation after acceptance of the dissertation proposal.
- d. The candidate shall submit a dissertation report before the end of the third year (6<sup>th</sup> semester).

### 2.17. Passing of a Dissertation

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

### 2.18. 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 PhD dissertation examinations.

## 3. PHD BY COURSEWORK AND RESEARCH: PHD (INFORMATION TECHNOLOGY)

Advances in Information Technology (IT) have dramatically transformed the way in which our entire society lives, works, learns, communicates, and does business. In particular, the conduct of science and engineering has been profoundly altered, so that it is possible today to work on problems in these areas at unprecedented levels of speed, precision, and detail. In education, IT has the potential to make available in the remotest corners of the earth the highest levels of learning, information, and analysis. To enhance the positive effects of these transformations, the research in IT explores new scientific, engineering, and educational areas in IT that enhance development.

A PhD in Information Technology has a minimum of 18 credit units for the two semesters in Year one.

Year One	Semester I: 3 Core Courses			
Code	Name	LH	CH	CU
PCS 9101	Philosophy of Computing	45	45	3
PIT 9101	Advanced Research in Information Technology Management	45	45	3
PIT 9102	Advanced Research Methods	45	45	3
Year One	Semester II: 3 Core Courses			
PIS 9203	Presentations, Scientific Writing and Research Ethics	45	45	3
PIT 9202	Advanced Research in Information Technology for Culture and Society	45	45	3
PIT 9203	Advanced Research in Information Technology for Development	45	45	3

	Semester III, IV, V, VI, VII and VIII			
	Independent Research, Publication and Dissertation Compilation			

## 4. DETAILED CURRICULUM

### 4.1. PCS 9101: Philosophy of Computing (3CU)

- (a) **Course Description:** This course explores the philosophical foundations of the computing field. It explores the computational understanding of the major parameters that make up and support the computing field. It explores their foundations and philosophical underpinnings.
- (b) **Aims and Objectives:** The aims of the course are to:
- Give students an avenue of exploring the philosophical foundations of computing as an academic field
  - Give students the historical foundation of computational thinking and interpretation
  - Expose students to the philosophical thinkings of the different areas of computing
- (c) **Learning Outcomes:** By the end of the course, the students should be able to explain the:
- Philosophical foundations of computing
  - Foundations of theoretical thinking and interpretations
  - Philosophical thinkings of the different fields of computing
- (d) **Teaching and Learning patterns:** Teaching will be by lectures, group work, group discussions and presentations
- (e) **Indicative content**
- Mind and Artificial Intelligence (AI): The philosophy of artificial intelligence and its critique, computationalism, connectionism and the philosophy of mind
  - Real and virtual worlds: Ontology, virtual reality, the physics of information, physics as a traditional model of the ideal science of the philosophy of science, cybernetics and artificial life
  - Language and knowledge: Information and content, knowledge, the philosophy of computer languages, hypertext.
  - Logic and probability: probability in artificial intelligence, game theory – Nash equilibrium
- (f) **Assessment:** Assessment will be by take-home assignments leading to presentations and a scientific review paper. Students will be given tasks to read and write about then present in class. The lecturer will award marks for each write up of a scientific review paper.

(g) References

- I. Floridi, Luciano (1999) *Philosophy and Computing: An Introduction*. Routledge: London / New York.
- II. Bynum, Terrel Ward; Moor, James H. (2000) *The Digital Phoenix: How Computers are Changing Philosophy*. Blackwell Publishers: Oxford, UK.
- III. Colburn, Timothy R. (2000) *Philosophy and Computer Science*. M.E. Sharpe: Armonk, NY, USA.

#### 4.2. PIT 9101 Advanced Research in Information Technology Management (3CU)

(a) Course Objectives: the objectives of this course are to provide students with:

- An understanding of advanced management theory and practice with key information technology planning and delivery strategies, offering the knowledge and leadership skills you need to pioneer innovative solutions to complex information technology issues within today's fast-moving business environment
- Knowledge and skills for improving efficiency and quality of Information management through the use of Information Technologies by undertaking research that focuses on effective security, storage, usage, provision, and maintenance of information
- An avenue to apply core principles of the Information Technology Management plus their own firsthand experience, generating valuable academic and business-related knowledge necessary for emerging markets.

(b) Learning Outcome: At the end of the course students are expected to develop competencies in organizational and system requirements, evaluate and manage the implementation of technologies to meet these requirements, choose appropriate technologies to suit a given information management problem, develop an appreciation for the implications of system implementations in light of emerging technologies and practice trends for good information management. To undertake information technology planning, delivery of strategies and exercise leadership skills for the purpose of managing information. To develop necessary skills to make sound business decisions related to information technology and information systems.

(c) Course Content: Theoretical, concepts, and techniques for developing, managing, and evaluating advanced information technologies to meet specific information needs for information management. Application of theoretical constructs in the provision of advanced information technology resources organizational management. Organizational and information system management requirements, implementation of technologies to meet management demands and needs, selection of appropriate technologies with respect to the organizational vision and mission, exploring merging technologies and their impact to information management and organizational growth, putting to use well managed information for organizational competitiveness. Key information technology planning and delivery strategies, offering the knowledge and

leadership skills necessary for appropriate information management. Aligning business strategies with IT strategies and plans.

- (d) **Teaching and Learning pattern:** A mixture of lectures, workshops and case studies shall be used. Students will be required to review case studies, critique them and write reports. Individual presentations during workshops and class will be undertaken on the allocated research areas. Review, critique of research papers plus writing research papers will be greatly encouraged.
- (e) **Assessment methods:** Progressive assessment shall be used which will include participation in class, presentations, and scientific review paper writing. Final assessment will be based on one group research paper including a presentation plus one individual research paper.
- (f) **References**
- I. Turban, E., Wetherbe, J., McLean, E., Leidner, D. and Wetherbe (2007). *Information Technology for Management: Transforming Organizations in the Digital Economy*. Publisher: Wiley, John & Sons, Incorporated, ISBN-13: 9780471787129, Vol. 6, pp. 752.
  - II. Fernandes, A. (2001). *Information Technology and Management*. Mittal Publications, ISBN: 8170997984, 9788170997986
  - III. Khosrowpour, M. (1999). *Success and pitfalls of information technology management: CASES ON INFORMATION TECHNOLOGY SERIES*, Group Inc (IGI), ISBN: 187828956X, 9781878289568, pp. 238.

#### 4.3. PIT 9102 Advanced Research Methods (3 CU)

- (a) **Course Objectives:** the objectives of this course are to provide:
- Philosophical underpinnings of research in computing and IT
  - Practical aspects on doing research
- (b) **Learning outcome:** At the end of the course the students will be able to apply computing and IT research methods in their research
- (c) **Course Content:** The first part of the course is devoted to the philosophical underpinnings of research, which crucially influence choice of research methods and interpretations of data. The course then moves on to the more practical aspects of 'doing research' - looking at developing a research strategy as well as ways of collecting data, analysing data and communicating research findings. This course will also give guidance to students on how to identify a research problem. Students will be presented with various research paradigms and models of methodology and assisted with designing an appropriate method for their research. Students will

be trained in the analysis and presentation of results, exposition of processes and methods used and conclusions drawn.

Key philosophical and epistemological bases for research are explored, and alternative methodologies are examined in relation to varied theoretical approaches. Selected sets of methods and techniques are critically appraised, while the range and scope of techniques with which students are familiar is extended. The structure of the course aims to achieve a balance between theory and practice. Considerable emphasis is therefore placed upon the logistics of setting-up, doing and disseminating research. The course not only introduces a range of research ideas and skills central to sound socio-environmental enquiry in general, but also acts as a critical and practical research forum where discussion and preparation for the PhD dissertation takes place.

- (d) **Teaching and Learning pattern:** Classes are held as a group discussion. Reading material which includes journal papers is distributed a week in advance, and students take it in turns to research and present new topics. The lecturer addresses questions to the students to encourage them to think about and understand the material. Each student undertakes a review of the different research methodologies and makes a presentation before the class. 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 be required to build on their proposals on a weekly basis in line with the new concepts that will be taught. The students will make presentations of their draft proposal for critique and feedback from both the students and the lecturer.
  
- (e) **Assessment method:** Evaluation shall be based on presentations from a variety of reviewed papers and a research proposal produced by the end of the semester.
  
- (f) **References**
  - I. Qualitative research and evaluation methods; By Michael Quinn Patton; Edition: 3, illustrated; Published by SAGE, 2002; ISBN 0761919716, 9780761919711; 598 pages.
  - II. Research Design & Statistical Analysis; Third Edition; By Jerome L. Myers, Arnold D. Well, Arnold D. Well, Robert F. Lorch, Jerome L. Myers; Pages: 736; Published by: Routledge; Publication Date: 1st November 2002; ISBN: 978-0-8058-4037-7
  - III. *Are Your Lights On? How to Figure out what the Problem Really Is*, by Donald C Gause and Gerald M Weinberg, Dorset House, USA, 1990. A brilliant book about getting ready to make decisions.
  - IV. Bordens, K.S. & Abbott, B.B. (1988) Research design and methods: A process approach. Mayfield.

#### 4.4. PIT 9202 Advanced Research in Information Technology for Culture and Society (3CU)

- (a) **Objective:** The objectives of this course are to

- Give students an awareness and skills on how technology affects society and how society can affect the developments that occur with technology
- Give students an awareness and understanding of how social groups use, adapt and interpret information and communication technologies within their societal settings
- Give students skills on how they can relate design of technologies in relation to the existing policies and usage
- Understand the implications of technologies on the creation, storage, transmission and transformation of organizations plus the society, funding, ethical and theoretical values of technology
- An understanding of the different policies that are linked society and technology adoption and use

(b) **Learning Outcome:** At the end of the course the students will have acquired skills on the social consequences of the technology breakthroughs in relation to their societal settings which will greatly help them to appreciate the technology advancements, how technology influences society and how society plays a role in the development of better technologies. They will also understand the implications of these new technologies on the educational, society, policy, funding, ethics and theory of IT.

(c) **Course Content:** Technological exploration in relation to quantitative improvements in information processes and storage capability creating qualitative changes in the nature and boundaries of privacy. Appropriate inputs of standards from social science research in effective systems design and development, Understanding of online activity relationships and their extension beyond corporate and geographic boundaries, how these characteristics succumb to these relationships changes, Possibilities of online interaction not reinforced by employment, political or other affinities, Formulation of information infrastructure and its impact to a broader or a more constricted network of online social relationships, How do organizations achieve a proper balance among the alternative goals for the development and use of information technologies.

Ways for using advanced information technology uniquely in different institutional contexts, public and private in relation to societal norms, Understanding who are the innovators, the non adopters, the resisters, the adapters and the alienated. Boundary mechanisms in the New Information Society that create community, if online arenas displace ongoing communal activities or fill social voids and if technology can be reconstituted within the local context or imported without alteration. How do information-seeking patterns fostered by advanced information technologies authorize new voices, persons and concerns and call existing ones into question? How do cultural constructions of legitimacy, knowledge and authority affect developing information technologies? Relationship between cognition and communications technology as it relates to public discourse and modes for conducting public conversation invite or grant a privilege to certain linguistic or conceptual forms of dialogue?



The impacts of technology use on the: freedom of speech and censorship; on information available to individuals; and on the capacity of individuals and organizations, in order to participate in public discourse. Ways through which global information technology infrastructure can help address the borderless problems concerning the Millennium Goals of environmental degradation, overpopulation and refugee movements. The social and cultural barriers to and enablers for using online resources and capabilities. The effects of new information technologies whether cellular telephones, satellite direct-broadcast television or computer-mediated communication—on indigenous populations. Ethical issues and impact which surround the use and development of information technology in society; the culture and society challenges in the development of information technology.

- (d) **Teaching and Learning pattern:** A mixture of lectures, workshops and case studies shall be used. Students will be required to review case studies, critique them and write reports. Individual presentations during workshops, class will be undertaken on the allocated research areas. Review, critique of research papers plus writing research papers will be greatly encouraged.
- (e) **Assessment method:** Progressive assessment shall be used which will include participation in class, presentations, and scientific review paper writing. Final assessment will be based on one group research paper including a presentation plus one individual scientific review paper.
- (f) **References**
- I. Beniger, J. R. (1989). *The Control Revolution: Technological and Economic Origins of the Information Society*. Harvard University Press, ISBN: 9780674169869.
  - II. Hassan, R. (1999). Globalization: information technology and culture within the space economy of late capitalism. *Information, Communication & Society*, 1468-4462, Volume 2, Issue 3, 1999, Pages 300 – 317
  - III. Wang, M. R. (2008). *Technological Empowerment: The Internet, State, and Society in China* (review) *Technology and Culture*, Volume 49, pp. 1089-1090.

#### 4.5. PIT 9203 Advanced Research in Information Technology for Development (3CU)

- (a) **Course Objective:** The objective of this course are to:
- Give students an understanding of how ICT can be effectively and strategically utilized as a tool to achieve the stipulated Millennium Development Goals (Poverty Eradication, Education for all, Health Society etc...)
  - Offer students skills on what work and why in terms of ICT for Development and a deeper understanding of the enabling conditions and success factors in ICT development initiatives
  - Provide students with proponents of ICT-for-development that can provide more rigorous evidence, strategies, benchmarks, indicators, and good practices in the attainment of the Millennium Development Goals

- Demonstrate the effectiveness of integrating ICT in Education for the purpose of improving learning
- Enable students learn, appreciate, and develop applications of ICT for use to meet development goals.

(b) Learning Outcome: At the end of the course the students will be able to:

- Analyse and develop policies towards development and social issues.
- Intensively undertake research, analysis, evaluation, impact monitoring, implementation based on case study experience with a particular focus on mainstreaming and scaling up successful ICT approaches and applications for Development especially in developing countries.

(c) Indicative Content: Innovative, transformative or dysfunctional effects of ICTs in attainment of Millennium Development Goals. Formulation and implementation of national ICT policies which promote equitable access to ICTs and information doe socio-economic development. Development and adoption of affordable and ICT functionally relevant technical solutions for the developing world. Enhancement of software development for the effective application of ICTs for development in developing countries. In-depth analysis, critical thinking, research, and scholarly writing with skill development in advanced teaching techniques and curriculum design; and Existing partnership for ICT for development, case studies and problems.

(d) Teaching and Learning pattern: A mixture of lectures, workshops and case studies shall be used. Students will be required to review case studies, critique them and write reports. Individual presentations during workshops, class will be undertaken on the allocated research areas. Review, critique of research papers plus writing research papers will be greatly encouraged. Students will be encouraged to write a research proposal in the area of ICT for development and identify a funding agency for it.

(e) Assessment method: Progressive assessment shall be used which will include participation in class, presentations, and scientific review paper writing. Final assessment will be based on one group research paper including a presentation plus one individual research paper and well written research proposal on ICT for development.

(f) References

- I. Thioune, R. M. (2003). Information and communication technologies for development in Africa: Opportunities and Challenges for Community Development, Vol 1, ISBN 1-55250-001-2, pp. 220.
- II. Multani, S. K. (2007). ICT in Rural Development: An Overview. Icfai University Press,
- III. Melamed, U. (1999). What the evaluation of ICT really evaluates, in: Aviram, A. & Richardson-Deberghes, J. (eds.).
- IV. Scardamalia, K. and Bereiter, C. (1994). Computer support for knowledge building communities, Journal of the Learning Sciences, 3, 3, 265-283.

- V. White, J. (1997). Education and the end of work. Cassell, London. Wiburg, K.1994, "Teaching science with technology: Telecommunication and multimedia", Computing teacher, 27, 7, 6-8.
- VI. Majumdar, S. and Kumar Pain, A. (2009). ICT for Development: Prospects and Problems, Icfai University Press, pp. 260.

#### 4.6. PIS 9203 Presentation Scientific Writing and Research Ethics (3CU)

- (a) **Course Description:** Most PhD students struggle with scientific writing and presentations in English, and normally much time in a PhD study is spent revising papers and preparing for conference talks. Given the amount of time that PhD students spend writing and preparing to present, students should invest in a systematic study of scientific writing and presentations. The course deals with the publication process from the perspectives of the author of a scientific paper and the editor of a scientific journal. It is intended for PhD students in the fields of computing and Information technology, engineering and natural sciences.
- (b) **Course Objective:** The aim is to give the students:
  - awareness of the importance of scientific writing,
  - motivation to write scientific papers, and
  - Prerequisites for publishing in first-class scientific journals.
- (c) **Learning outcome:** At the end of this course, students will be able to:
  - Make a quality conference presentation
  - Write a quality journal article
  - Appreciate ethics-related issues when writing a scholarly/scientific paper.
  - Understand the prerequisites for choosing the market for publishing
- (d) **Course Content:**
  - Science and writing. Reports and scientific publications. The IMRAD format. Scientific journals. Why, what, when, with whom and where publish?
  - Structure of a scientific paper. The different parts of a scientific paper. Language and style. The publication process. Writing a paper. Dealing with editors, reviewers and publishers.
  - Critical review of scientific papers by groups of participants.
  - General principles of expository writing, pre-writing and planning. Typical formats, structure and language for scientific writing, emphasis on scientific articles as published in (primary) international scientific journals. English grammar essential to scientific papers. Designing tables, figures and graphs for scientific papers. Good style for readability. The refereeing and publishing process, what referees

are looking for, how to deal with editors. Paragraphing, linking paragraphs to make the logic clear.

Writing informative abstracts and crafting clear titles.

- Ethics: Honesty and credibility in scientific writing.

(e) **Teaching and Learning Pattern:** Classes are held as a group discussion. Reading material which includes books and journal papers on scientific writing and ethics are distributed a week in advance, and students take it in turns to research and present. The students are also given reading material on how to make excellent presentations. The lecturer addresses questions to the students to encourage them to think about and understand the material. The classes will also include viewing of recorded seminar presentations by leading academics in the field.

(f) **Assessment method:** Progressive assessment will be based on the quality of presentations in class by each student. The final assessment will be based on a scientific review paper.

(g) **References**

- I. How to write and publish a scientific paper, Robert A. Day and Barbara Gastel, ISBN:0-313-33027-1, 6TH Edition, 2006.
- II. Research ethics, edited by Anna Smith Iltis, 1st Edition, 2006.
- III. The student's guide to research ethics, Oliver, 2003.

## 5. BUDGET

Income: 5 students each paying UGX 3,000,000 => UGX 15Million.

Expenditure:	UGX	15,000,000
Teaching Materials	UGX	1,250,000
Research Materials	UGX	2,500,000
Teaching allowances	UGX	6,750,000
Administrative allowances	UGX	750,000
Attending conferences	UGX	2,500,000
Expenditure at the centre	UGX	1,250,000

## 6. STAFF

Code	Name	Assessment Method	Staff
PCS9100	Philosophy of computing	Presentation 40% Scientific Review Paper – 60%	Dr. John Ngubiri
PIT 9101	Advanced Research in Information Technology Management	Presentation 40% Scientific Review Paper – 60%	Dr. Joseph K. Ssewanyana
PIS9203	Presentations, Scientific Writing and Research Ethics	Presentations 40% Scientific Review Paper – 60%	Dr. Agnes Rwashana Ssemwanga
PIT9102	Advanced Research Methods	Presentation 40% Scientific Review Paper – 60%	Dr. Josephine Nabukenya
PIT 9201	Advanced Research Information Technology for Culture and Society	Presentation 40% Scientific Review Paper – 60%	Dr. Jude Lubega
PIT 9202	Advanced Research in Information Technology for Development	Presentation 40% Scientific Review Paper – 60%	Prof. Irina Ya. Zlotnikova