College of Science and Technology

AFRICAN CENTER OF EXCELLENCE IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)

P.O.BOX BP 3900, Kigali

CURRICULUM

Master of Science in Renewable Energy Degree

African Center of Excellence in Energy for Sustainable Development

PROGRAMME SPECIFICATION

(*July, 2017)*

Master of Science in Renewable Energy Degree

1. PROGRAMME DETAILS

The table in this section sets out the programme details. It shows the title, which is also the highest qualification obtainable from the programme. The title was selected with the aim to make the programme look both academically sound and useful for employment. In addition, in the table specifies the exit awards, the mode of attendance and the resource group. According to the National Qualification Framework, such a class corresponds to category 5 with a staff /student ratio of 1:15.

1.1 Programme Title	**Master of Science in Renewable Energy**			
1.2 Exit Awards		**Credits**		
	• Postgraduate Diploma in Renewable Energy	120		
	• Master of Science in Renewable Energy	240		
1.3 Modes of Attendance	Part-time	X	Full-time	X
	Distance Learning		Work-based Learning	
	Other (please specify)		Short course	
1.4 Resource group	1		5	X
	2		6	
	3		Other (write in)	
	4			
1.5 First year of presentation	2017-2018			X
1.6 Programme Leader	Prof. Etienne Ntagwirumugara, Director of ACE-ESD			

1.7 Programme Development Team

Name	**School/Institution**
Prof. Ntagwirumugara Etienne	School of Engineering/CST
Prof. Ijumba Nelson	Deputy Vice-chancellor for Academic Affairs/ University of Rwanda
Dr. Ignace Gatare	Principal/College of Science and Technology
Dr. Ernest Mazimpaka	School of Engineering/CST
Dr. Anastase Rwigema	School of Sciences/CST
Dr. Denis Ndanguza	School of Sciences/CST

Dr. Philibert Nsengiyumva	School of Engineering/CST
Prof. Bonfis Safari	School of Sciences/CST
Prof. Wilson Bryan	University of Colorado/USA
Dr. Burnet Mkandawire	Head of Department/ University of Malawi
Odax Ugirimbabazi	School of Engineering/CST
JMV Bikorimana	School of Engineering/CST
Fabien Mukundufite	School of Engineering/CST
Geoffrey Gasore	School of Engineering/CST
Yousufu Singirankabo	School of Engineering/CST
Michael Asinyaka	School of Engineering/CST
Dr. William GBoney	RURA, Expert in Energy Economics
Eng. Alfred Byigiro	RURA, HoD of Energy Department

1.8 School/Centre Administratively responsible for the Program	African Center of Excellence in Energy for Sustainable Development (ACE-ESD)

2. PROGRAMME FUNDING AND NEED FOR RESOURCES

2.1 Programme Development Team

The team is composed of the Programme Leader, eleven academic staff from UR-CST and two experts from Rwanda Utilities Regulatory Authority who were involved in the writing and planning of the module descriptors. Also included were representatives from private and public sector such as Rwanda Energy Group (REG) and Ngali Energy Ltd. The Programme leader who is also the Director of the ACE-ESD will be present throughout the planning process, including the validation meetings. ACE-ESD has partners from Colorado and other institutions in the region (Malawi, Tanzania) who have been involved in the development of the programme by online communication.

2.2 Students numbers:

Intake per year into Level 6: 15 students/intake
Eventual population, all years: 40 students

2.3 Adequacy of Infrastructure

The programme will be resourced from the existing resources of the College of Science and Technology Campuses. The classrooms and computer laboratories are adequate for the program. A special state of the art Micro-Grid laboratory will be set up by the ACE-ESD –World Bank funds to further enhance infrastructure.

2.4 Adequacy of Staff Resource

Here the numbers and level of staff working on the programme in each year are given with the objective to show how the staff resource is adequate in terms of numbers and seniority as well as to cost the programme in financial terms. The staff figures given in the table are full time equivalents.

Year	2017/18	2018/19	2019/20	2020/21	SOURCE OF FUNDS
Academic Staffing					
Full professors	0	1	1	2	UR/ACE-ESD
Associate professors	1	2	3	4	UR/ACE-ESD
Senior lecturers	2	4	5	6	UR/ACE-ESD
Lecturers	3	4	5	6	UR/ACE-ESD
Support Staff	4	4	6	8	UR/ACE-ESD
Technical & Other Staff	2	2	2	2	UR/ACE-ESD

2.5 General accommodation requirements

The figure in this section serves to give an idea on the number and size of rooms that will be needed by the programme.

- Two classrooms and two computer laboratories for at least 30 students are available.
- One smart-grid laboratory,
- One Advanced Photovoltaics System (PV) with one phase synchronization, one Small wind power plant System (off-grid) with battery storage and single-phase sinus-converter 230V, one Industrial Photovoltaics with three phase synchronization, one Wind power plant with DFIG and three phase synchronization, one Micro-grid stand-alone with synchronization, one Smart Grid Distribution, one Energy Management lab**,** one Mini Hydro Power, one High voltage transformers lab, one High voltage transmission line Three phase and DC with line protection lab, one Power electronics for renewable energies lab,
- Students will, however, be encouraged to bring their own devices, thus enabling them to access online materials and lectures.

3. PROGRAMME AIMS AND RATIONALE

This program specification has been produced to conform to the Rwandan National Qualifications Framework for Higher Education Institutions. The programme has well been made after assessing the need of Renewable Energy Engineers referring to Energy skills Assessment report 2015 from National Commission of Science and Technology, and to United

Nations Economic Commission for Africa (UNECA), 2014 Energy Access and Security in Eastern Africa report.

3.1 Programme Rationale

Renewable energy is defined as energy coming from resources which are naturally replenished on a human timescale, such as sunlight, wind, hydropower, tides, waves, geothermal heat and biomass, which is derived from living or recently living organisms, with wood being the largest biomass source today. All these sources are sustainable, because they can be used today without compromising the ability of future generations to use the same sort of sources. A global race is on for finding the best sustainable energy solutions, and the energy sector is facing great challenges and large investment needs. The programme will help the next generation of engineers to solve problems related to energy in Eastern and Southern Africa. Based on Education Indicators in Focus paper of organization for Economic Co-operation and Development 2013/05 (July), engineers and other scientists are forced to go outside of Eastern and Southern Africa to attend Masters level postgraduate courses. While such courses upgrade technical knowledge, they are not appropriate in the socio-industrial circumstances in the countries of training which are very different from the one in Eastern and Southern Africa. This results in a mismatch between training acquired and the needs of East and South Africa. A locally run and well-designed postgraduate programme will upgrade technical knowledge with emphasis on local needs and problems. The proposed Master Degree programme in Renewable Energy will meet the demand of appropriately trained engineers in the field of renewable energy technologies and their applications, because the programme's aim is to train engineers and scientists in the area of renewable energy. The programme will provide the trainees with core skills and knowledge needed in solving the practical challenges facing the energy industry and the community in general with regard to energy development, provision and utilization.

The most important renewable energy options identified as mitigation measures to reduce the level of greenhouse gas emissions caused by over dependency on energy derived from fossil fuel include the development of bio-energy, hydropower, solar and wind energy, while energy intensity consumption reduction would also require the introduction of both energy efficiency and management measures, as well as the application of best design practices in the built environment. The process of developing the curriculum for the course, writing of the proposal seeking for funds and many other activities related to establish the Centre of Excellent of Energy and sustainable development (ACE-ESD) started way back in 2015. The proposal was accepted end of 2016 and the fund was realized in April 2017. Developing the MSc in Renewable Energy curriculum meets the objectives of the ACE-ESD, which are as the follows:

- To provide the much needed skilled and fit-for purpose critical mass of MSc graduate holders who will serve as change agents in academic and technological expertise in the achievement of energy objectives in the Eastern and Southern African Region.
- To facilitate inter and trans-disciplinary research as well as capacity development and technology development in inter regional energy trade as well as offering alternative off

grid clean energy technologies, with the main focus of knowledge transfer to rural areas, in a bid to promote the sustainable development in marginalized areas of Eastern and Southern Africa. The developed curriculum will also enhance the implementation of the following Rwandan governmental policy objectives:

- To provide affordable energy access for mineral processing and agro industries,
- To increased electricity access for over 80% of the population by 2020 by generating 500 MW from indigenous resources particularly hydropower, geothermal and methane gas. The MSc in Renewable Energy is the key in for producing well skilled engineers to design and carry out the adequate research related the renewable technologies.
- To work towards an "energy transition" in which energy is more efficiently used and an energy mix that promotes the use of indigenous renewable energy resources to progressively displace biomass in the primary energy mix.

This programme of Masters in Renewable Energy is one a major part of the ACE-ESD projects. The modules of the programme are designed to enable students to demonstrate their skills and ability to solve real-life problems while gaining more detailed knowledge of a particular topic. The modules should be simulation-based or experimental. In all cases, students are expected to show innovation and an ability to come up with their own solutions related to the critical challenges that the regional industries and communities are facing.
As ACE-ESD is a collaborative Project with Regional and International partners from Academia, Industries and Research Institutions funded by World Bank to build in Science Technology and Innovation (STI) capacity in the ESA region, this Masters program will be targeting students from Rwanda, the ESA region and Africa as a whole.

3.2 Educational Aims

The programme aim is to train engineers and scientists in the area of renewable energy by providing them with core skills and knowledge needed in solving the practical challenges facing the Eastern and Southern Africa public and private energy industries and the community as well in general with regard to energy development, provision and utilization.

4. PROGRAMME LEARNING OUTCOMES

A. Knowledge and Understanding

The programme aims to develop the knowledge and understanding in both renewable energy and systems engineering. At the end of the programme, the student should demonstrate knowledge and understanding of the following:

A1. State-of- the-art knowledge in renewable energy technologies, in terms of: the sources, technologies, systems, performance, and applications of all the major types of renewable energy;

approaches to the assessment of renewable energy technologies; the processes, equipment, products, and integration opportunities of biomass-based manufacturing.

A2. State-of- the-art knowledge in process systems engineering methods, in the areas of: modelling and simulation of process systems; mathematical optimization and decision making; process systems design

A3. Knowledge about industrial applications with power electronics, power system dynamic and control theory

A4. Knowledge about design, management and control of future networks with integration of renewable energy.

A5. Knowledge of important aspects of the ESA energy supply systems and interconnected-African power pools, and the international energy situation.

A6. Advanced level of understanding in technical topics of preference, in one or more of the following aspects: process and energy integration, economics of the energy sector, sustainable development, supply chain management.

A7. Specific subject areas and associated research directed towards advanced and emerging technologies, as well as developing an understanding of concepts from a range of areas peripheral to power systems engineering, such as renewable energy sources, power transmission and conventional thermal power plant.

A8. Design as applied to conceptual and system engineering problems.

A9. Codes of practice, standards and quality issues as applicable to a career as a professional engineer, with an awareness of intellectual property issues and of environmental ethical issues within the modern industrial world.

A10. Project management skills appropriate for a career in engineering and an understanding of the application of these skills in a commercial and/or research environment.

A11. The requirement to communicate effectively in both formal report writing and in oral presentations.

B. Cognitive/ Intellectual Skills/ Application of Knowledge

The programme aims to strengthen cognitive skills of the students, particularly in the aspects of problem definition, knowledge and information acquiring, synthesis, and creativity, as collectively demonstrable through the successful completion of the research dissertation. At the end of the programme, the student should be able to:

B1. Identify and define a power engineering problem that may be unfamiliar and generate practical as well as innovative solutions

B2. Apply appropriate methods to model such solutions and assess the limitations of the method.

B3. Successfully undertake a design or a research project, taking into account of constraints such as time, cost, health and safety as well as environmental issues.

B4. Develop and apply relevant and sound methodologies for analysing the issue, developing solutions, recommendations and logical conclusions, and for evaluating the results of own or other's work

B5. Identify and implement appropriate information and communication technology solutions.

B6. Develop and exercise written and oral communication skills in preparation for a professional engineering career.

C. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

The programme primarily aims to develop skills for applying appropriate methods to analyse, develop, and assess renewable technologies and systems. At the end of the programme, the student should be able to:

C1. Analytically model the available renewable sources systems using mathematics technics.

C2. Optimally design and select appropriate collection and storage, and optimise and evaluate system design

C3. Apply efficiently generic systems engineering methods such as modelling, simulation, and optimization to facilitate the assessment and development of renewable energy technologies and systems

C4. Work effectively as a member of a small team.

C5. Arrange appropriate work schedules to meet specified deadlines.

D. General transferable skills

At the end of the programme, the student should be able to demonstrate appropriate skills in the following:

D1. Provision of training in topics representing current state-of-the-art developments in electrical power engineering, including modern approaches to the analysis of properties, dynamics and limitations of power networks, machines and converters, advanced numerical methods in application to: electrical power engineering problems across various scales; power conversion, transmission, distribution and end-use processes; emerging technologies; cross-disciplinary areas.

D2. Appreciation of the significance of the Renewable Energy system in a wider context including its economic and social development aspects.

D3. Provision of training in teamwork, innovation and scientific communication.

D4. Development of skills in the planning and execution of a tailored research project, which would produce original scientific outcomes suitable for publication in a peer reviewed journal.

D5. Fostering of the ability to work autonomously, and critically assess results in the context of the current state-of-the-art within a particular area.

D6. Organizing, planning of work, reporting and essay writing.

5. PROGRAMME STRUCTURE

Students are required to obtain 240 credits as stated in "Rwandan National Qualification Framework for Higher Education Institutions and University of Rwanda regulation". Duration of the programme is two academic years. As specified in "Rwandan National Qualification Framework for Higher Education Institutions", the academic year will be divided into four semesters of 15 weeks each during two years as indicated in the postgraduate regulation of University of Rwanda. A semester will consist of twelve weeks of learning and teaching, one week for revision and consolidation and two weeks during which examinations take place. Academic work and assessments will be carried out within the month in which the module is taught and completed.

Semester 1					
Module Code	Module	Credits	Contacts hours	Level	Achievement of Programme Outcomes
ENE 6161	Mathematical Analysis and Matrix Theory	10	36	6	A2, A3, A4, A7, A8, A9, B1, B2, B3, C2, C3, D1-D6
ENE 6162	Power and Energy Systems	10	36	6	A1, A2, A4, A5, A6, A7, A8, C1, C2, D1-D6
ENE 6163	Energy Systems modelling and optimization	15	48	6	A1, A2, A3, A4, A5, A6, A7, A8, A9, B1, B2, B3, C1, C2, C3, D1-D6
ENE 6164	Research methodology	10	36	6	A6, A7, A8, A9, A10, A11, B1, B2, B3, B4, B5, B6, C4, C5, D1-D6
ENE 6165	Microeconomics of the energy sector	10	36	6	A4, A5, A6, A7, A10, C3, C4, D1-D6
	Sub-total	55	192	-	
Semester 2					
Module Code	Module	Credits	Contacts hours	Level	Achievement of Programme

					Outcomes
ENE 6261	Advanced Power Electronics	10	36	6	A1, A2, A3, A4, A6, A7, A8, A9, B1, D1-D6
ENE 6262	Corporate Finance and Business Communication	10	36	6	A4, A5, A6, A7, A10, C4, C5, D1-D6
REE 6261	Thermal Energy and Bioenergy	15	48	6	A1, A2, A3, A7, A8, C1, C2, D1-D6
REE 6262	Fluid Dynamics and Hydropower	15	48	6	A1, A2, A3, A8, A9, C1, C2, C3, D1-D6
REE 6263	Wind and Solar Energy	15	48	6	A1, A2, A5, A7, A8, C1, C2, D1-D6
	Sub-total	65	216	--	
Semester 3					
Module Code	Module	Credits	Contacts hours	Level	Achievement of Programme Outcomes
REE 6361	Renewable Energy Integration	10	36	6	A1, A2, A3, A4, A5, A6, A7, A8, A9, B1, B2, C1, C2, C3, D1-D6
REE 6362	Power Systems Dynamics	15	48	6	A1, A2, A3, A7, A8, A9, B1, C2, C3, D1-D6
ENE 6361	Smart-grid systems	15	48	6	A1, A2, A3, A4, A5, A6, A7, A8, A9, B1, B2, B3, C1, C2, C3, D1-D6
REE 6461	Dissertation	-	-	6	A1-A11, B1-B6, C1-C5, D1-D6
	Sub-total	40	132	-	
Semester 4					

Module Code	Module	Credits	Contacts hours	Level	Achievement of Programme Outcomes
REE 6461	Dissertation	80	288	6	A1-A11, B1-B6, C1-C5, D1-D6
	Sub-total	**80**	**288**		
	Total	**240**	**828**	**-**	

Programme Mapping

Semester 1																												
Module Code	Module	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	D6
ENE 6161	Mathematical Analysis and Matrix Theory		x	x	x			x	x	x			x	x	x					x	x			x	x	x	x	x	x
ENE 6162	Power and Energy Systems	x	x		x	x	x	x	x										x	x				x	x	x	x	x	x
ENE 6163	Energy Systems modelling and optimization	x	x	x	x	x	x	x	x	x			x	x	x				x	x	x			x	x	x	x	x	x
ENE 6164	Research methodology						x	x	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x
ENE 6165	Microeconomics of the energy sector				x	x	x	x			x										x	x		x	x	x	x	x	x
Semester 2																													
Module Code	Module	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	D6
ENE 6261	Advanced Power Electronics	x	x	x	x		x	x	x	x			x											x	x	x	x	x	x
ENE 6262	Corporate Finance and Business Communication				x	x	x	x			x											x	x	x	x	x	x	x	x
REE 6263	Thermal Energy and Bioenergy	x	x	x				x	x										x	x				x	x	x	x	x	x
REE 6264	Fluid Dynamics and Hydropower	x	x	x					x	x									x	x	x			x	x	x	x	x	x
REE 6265	Wind and Solar Energy	x	x			x		x	x										x	x				x	x	x	x	x	x
Semester 3																													
Module Code	Module	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	D6
REE 6361	Renewable Energy Integration	x	x	x	x	x	x	x	x	x			x	x					x	x	x			x	x	x	x	x	x
REE 6362	Power Systems Dynamics	x	x	x				x	x	x			x							x	x			x	x	x	x	x	x
ENE 6361	Smart-grid systems	x	x	x	x	x	x	x	x	x			x	x	x				x	x	x			x	x	x	x	x	x
REE 6365	Dissertation		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Semester 4																													
Module Code	Module	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	D6
REE 6461	Dissertation	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

6. LEARNING AND TEACHING STRATEGY

The programme will follow a modular based teaching approach with modules offered in a carefully orchestrated instructor-guided teaching. This could be followed by three weeks of guided, e-learning experiences with self-study of reference materials (primary documents whenever possible). At the end of the final week, an interactive seminar should be held to enable students to strengthen their knowledge and understanding by discussing and resolving problems based on real-life situations. All modules might benefit from exploiting different delivery modes adapted by the Lecturer.

For example, the time allocated to a module might be divided between:

- Classroom teaching and physically attended seminars and workshops.
- Case studies, projects and practical exercises which should be included in all modules.
- Instructor-guided remote lectures (live or pre-recorded in some cases).
- Self-study of textbooks and reference material.
- Laboratory experiments.

The 10/15 credits modules will be taught within four and five weeks respectively. The project shall span for over a period of six to eight months with supervision and no classroom teaching until otherwise advised by supervisor in advance.

Category 1: Theory course with Practical's or 10/15 credit modules

1) 36/48 contact hours (lectures, tutorials, discussions, seminars, case studies)
2) 26/42 hours of self-study
3) 38/60 hours' work on written assignments, practical's and mini project (mandatory)

Category 2: Dissertation with 80 credits

800 hours of practical work includes field survey and all previous modules to be passed as the project carried out shall involve the requirement / design / analysis / testing /. Provided in all modules taught in semester I, II, and III to link up to a particular working project at the end of this module with Practise oriented to Students thesis.
Note*
(This means that meaning is the student shall be provided tentatively with a research project after Research Methodology module, which has to be, carried forward with all other modules as assignment or mini project whatever is applicable depending on theoretical or practical nature of the modules)

7. ASSESSMENT STRATEGY

Apart from the in-class formative assessment, the module evaluation will be based upon individual assessment submitted by the Lecturer at the end of the module. The special tools/software's and strategies will be used to avoid plagiarism, cheating and other malpractices. The specific marking criteria for each module will be provided in individual module descriptions. The Final Exam shall be of 3 hours following general master's programme format as already followed. A tentative guide is provided for lecturer to use for continuous assessment but may vary with different module but at least 2 different elements shall be covered. All submission of assignments and theses/dissertations will be done through Turnitin.

Category 1: Theory course with Practical's or 10/15 credit module

The assessment shall include 60% of continuous tests and 40% of the final examination.
The assessments shall be made 50% each for practical and theoretical aspects. A completed module will be considered passed only if a minimum score of 60% or above is achieved during evaluation.
For Example:
One/two practical assignment (20%), one research seminar or mini project for presentation (20%), one tutorial session (15%) and short practical test (5%) followed by final assessment (40%) of End of Module Examination divided equally into practical viva-voce and theoretical examination.

Category 2: Dissertation with 80 credits

The final projects/dissertations will be evaluated by a written report, presentation and oral examination by the external examiner(s) during the Project Defence. The guidelines shall be provided during Research Methodology module.

• Examination.
To evaluate the accomplishment of the module learning outcomes, an examination could be used to assess a complete module, especially the foundation modules where students are either physically present face-to-face or electronic (on-line) tools can be used. However, this method may not be flexible enough to cover advanced modules, where understanding demonstrated through projects and exercises will be much more important
• Essays.
An essay will be used to demonstrate a student's understanding of the content of a particular module. This would demonstrate a student's ability to assimilate a subject in depth and objectively analyze the material that has been provided. However, marking of essays can be time consuming for the course tutor and lead to a degree of subjective assessment which depends, for example, on the student's knowledge of English rather than on their level of knowledge of the subject.

• Projects.
A project can be set which requires the student (or a group of students) to research a subject in more depth than has been provided in the course. The thoroughness with which a project has been completed and the adequacy of the results obtained could be an excellent way to assess whether a student has fully understood the concepts and methods used in the module. Ideally, around 50% of the marks for a particular module should be based on the results of projects or interactive exercises if these can be set in the required context and timescale.
• Research seminars.
Every module will have a component called Research seminar. The seminar topic relates to the content of the study course. The students shall work on the topic on their own and then present it for discussion.
• Interactive exercises.
These can be a fun way of quickly allocating marks to a student or a group of students. A problem can be outlined and the student or group of students asked to work out the best way of solving it. Enough scope shall be given to allow the student to come up with innovative ways of solving the problem. An option of online assessment can be considered if possible.

8. STUDENT PROFILE

This degree Masters (MSc in Renewable Energy) shall be taken by any professional who has previously graduated with a first-level University degree (e.g. BSc) in the field of Mechatronics, Mechanical Engineering, Electrical Engineering, Electro-Mechanical Engineering, Energy Engineering or Renewable Energy Engineering.

9. SPECIFIC ADMISSION CRITERIA

To be admitted to MSc. Degree Programme in Renewable Energy, the student must:
Have a Bachelor's degree in the areas mentioned in the section eight or other related fields with at least a second class, upper division;
A Bachelor's degree in the same areas/specialisations as above, with second class, lower division, with at least a 2-year working experience;
Demonstrate sufficient ability in English to undertake masters-level work.

10. STRATEGY FOR STUDENT SUPPORT

Each student will be allocated a supervisory team. The students will meet their supervisors on the regular basis in the face-to-face mode (in the case of local lecturers) or in the blended mode - face-to-face and communication through Internet (in case of visiting lecturers). The meetings will take place at least once a week with record keeping as per UR/CST guidelines.

In case of a suspected conflict, bias, discrimination, harassment or any other issues, students are advised to address the Head of Department or the Programme Coordinator. Alternatively, the Director of Research, Innovation and Postgraduate Studies (DRIPGS) shall serve the final verdict in case of any disputes after seeking prior order from the higher authorities being well informed on any such instance if it occurs on individual basis.

All students shall be provided with study materials, assignments, exercises, necessary guidelines, templates and supplementary materials. Those materials will also be posted on e-learning systems of UR/CST. Students will be given an opportunity to interact with lecturers through communication tools embedded into the e-learning system currently under progress. The programme coordinator shall form a committee to monitor the performance of students including quality of supervision.

11. PROGRAMME-SPECIFIC NEED FOR RESOURCES AND UNUSUAL DEMANDS ON UNIVERSITY RESOURCES

In UR-CST currently there are a number of scholars possessing academic qualifications (PhD) and expertise in the relevant areas (namely Electronics and Electrical Engineering, Mechanical & Physics Departments). There are four (4) PhD holders with relevant areas of expertise lecturing/co-lecturing on this programme. There are consulted experts during curriculum development from our partner Institution of ACE-ESD such as Makerere University, Uganda and Nelson Mandela – African Institute of Science and Technology, Dar-es-Salaam, Tanzania, Colorado State University from USA, University of Agder in Norway, CMU-Africa and much more. PhD students under the centre shall be involved in tutorials, exercises, labs, etc. in collaboration with module leaders.

For each module, the space required includes one lecture room accommodating 15 students or one computer lab with 15 computers. Dedicated Masters' classroom and 2 dedicated labs with 30 computers each are available at UR-CST with the needed LCD projector, smart board, printer and scanner.

12. STRATEGIES FOR CONTINUOUS ENCHANCEMENT AND FUTURE DEVELOPMENT

At the end of each module students will be given evaluation forms and requested to give their feedback on teaching and course content. The student evaluation of modules as well as their performance will be a subject of the discussion on the programme review meeting at the end of the academic year. This may involve changes to the content and timing of the module, the sequence of module delivery, prerequisite courses, the methods of teaching, learning and assessment, and, in some cases, replacement of lecturers/ teaching assistants.

13. STAFF DEVELOPMENT PRIORITIES

Visiting lectures will be invited to boost up manpower in case local staffs are insufficient to handle any of the modules in the programme. The members of the academic staff in the department with relevant Master's degree acting as Teaching Assistants will under study the local and visiting lecturers, thus building their academic capacity. All academic staffs on the programme to pursue higher academic qualification. It is mandatory that academic staff teaching on this programme have a PhD. Resource persons from industry shall be engaged due to their experience. In four years the centre will train five University of Rwanda staff to PhD level who will be module leaders.

14. PROVISIONAL APPROVAL

Members of Approval Panel

Role/ Location	**Dean /Director**	**Date**
1 Principal	Signature	
	Print Name : Dr. Ignace Gatare	
2 ACE Director	Signature	
	Print Name: Prof. Etienne Ntagwirumugara	
3 Master's Coordinator	Signature	
	Print Name	
4	Signature	
	Print Name	
	Print Name	

Seen and noted

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Teaching and Learning Enhancement	Signature	
	Print Name	
Finance	Signature	
	Print Name	