UNIVERSITY OF RWANDA-COLLEGE OF SCIENCE AND TECHNOLOGY

AFRICAN CENTER OF EXCELLENCE IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)
P.O.BOX BP 3900, Kigali

Master of Science in Energy Economics
Degree

MODULE DESCRIPTIONS
(*July, 2017)*

COLLEGE OF SCIENCE AND TECHNOLOGY – UNIVERSITY OF RWANDA

ACE-IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)

MASTER OF SCIENCE IN ENERGY ECONOMICS.

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Module Description

1. **Module Code: EEC 6161**
2. **Module Title: Power and Energy Systems**
3. **Level : 06 Semester: 01 Credits: 15**
4. **Administering Unit: ACE-ESD**
5. **Core: Core module**
6. **Year of Presentation: 2017-2018**
7. **Pre-requisite or co-requisite modules: N/A**
8. **Allocation of study and teaching hours**

DESCRIPTION	STUDENT HOURS	STAFF HOURS
LECTURES	24	48
SEMINARS/ WORKSHOPS		
PRACTICAL CLASSES/ LABORATORY	18	36
STRUCTURED EXERCISES	6	12
SET READING ETC.		
SELF-DIRECTED STUDY	42	42
ASSIGNMENTS – PREPARATION & WRITING	40	30
EXAMINATION – REVISION & ATTENDANCE	20	44
OTHER: INVIGILATION END OF MODULE		3
TOTAL	150	215

9. BRIEF DESCRIPTION OF AIMS & CONTENT

The course aims to provide students with the knowledge and skills to utilize basic principles to analyze fundamentals of energy sources and systems. It also discusses energy sources and usage, sustainability tools for energy systems analysis. The course will also introduce students to the basics of electrical power generation, transmission, distribution and utilization, with respect to their individual power system elements and their interaction, as well as their technological advancement.

The module will also cover issues related to mini grids and micro grids, and also deal with the characteristics of the following renewable energy technologies, among others: Geothermal, Solar Systems (both grid connected and off-grid), Biomass, Biogas, mini and micro hydropower systems.

10. Learning Outcomes

A. Knowledge and Understanding

Having successfully completed this module, students should be able to:

A1. Carry out technical and economic assessment of off-grid, mini-grid and grid connected power generation systems

A2. Carry out technical and economic assessment of power transmission and generation systems

B. *Cognitive/Intellectual skills/application of knowledge*

Having successfully completed the module, students should be able to:

B1. Apply the knowledge to carry out technical assessment of solar photovoltaic, wind, geothermal, biomass, waste-to-power, Biogas, Micro and pico-hydroelectric power systems, as well as mini and large hydroelectric power systems

B2. Carry out technical assessment of conventional power generation systems

B3. Undertake economic assessment of power generation, transmission and distribution costs.

C. Communication/Analytical techniques/Practical skills

Having successfully completed the module, students should be able to:

C1. Understand the analytical techniques and steps involved in carrying out technical evaluation and economic assessment of energy systems

C2. Communicate effectively the results of the analysis to enable policy makers and power system planners with their investment programme decision making.

D. General transferable skills

Having successfully completed the module, students should be able to:

D1. Apply, and explain the key analytic steps used in technical and economic evaluation of power system projects

D2. Apply the analytical methods to large Greenfield projects, smaller and rehabilitation projects and in policy analysis

D3. Apply to methodology to the determination of levelized cost for wide range of electrification technologies over a matrix of deployment modes and demand levels.

11. Indicative Contents

1. Assessment and evaluation of Renewable Energy (RE) power generation technologies;
2. Assessment and evaluation of conventional power generation technologies;
3. Technical and economic assessment of power delivery systems comprising transmission and distribution facilities;
4. Analysis of grid integration issues;
5. Design of sustainable off-grid electrification power systems;
6. Determination of fuel and carbon dioxide emission savings, compared to separate heat and power plants.

12. Learning and Teaching Strategies

Lectures: Important material from the text and outside sources will be covered in class. Students should plan to take notes as not all material can be found in the texts or readings.

Structured Exercises: This forms the basis of the module teaching. Students will be given hands-on training through lot of exercises. The objective is to keep the students in touch with the real world and to enhance their professionalism.

Assignments: homework problems and readings will be assigned periodically to help support and supplement material found in the text.

Continuous Assessment Tests (CATs): occasional scheduled or unscheduled quizzes/ tests will be given to help ensure that students stay up with the assigned material.

13. Assessment Strategy

The assessment strategy is developed with the aim of testing the module's learning outcomes. In particular, students will be assessed by means of both formative and summative assessment through coursework and examination. Assessment comprises the submission of a coursework portfolio and a seen examination.

14. Assessment Criteria:

For the examination setting and marking the UR generic marking criteria will be used.

15. Assessment Pattern

Component	Weightage (%)	Learning objectives covered
In-course assessment:	**60**	
• Practical assignment • Mini project • Tutorial & Practice • Short practical test	20 20 15 5	A1, A2, B1, B2, B3, C1, C2, D1, D3,
Final assessment	**40**	A1, A2, B1, B2, B3, C1, C2, D1, D3,

16. Strategy for feedback and student support during module

All lecture materials will be delivered to students. When student does not understand material, he/she should ask questions either in class, by e-mail, or come by the lecturer's office as soon as the student realizes that he/ she is having difficulty with the course, contact the lecturer in charge then.

17. Indicative Resources

a. Core Textbook:

1. Technical and Economic Assessment of Off-grid, Mini-grid and Grid Electrification Technologies, ESMAP, 2007
2. Designing Sustainable Off-grid Rural Electrification Projects: Principles and Practices, World Bank Energy and Mining Sector Board, 2008
3. Fuel and Carbon Dioxide Emissions Savings Calculation Methodology for Combined Heat and Power System, USA Environmental Protection Agency, USA.

b. Other References

1. Handbook on Economic Analysis of Investment Operations, by P. Belli, J. Anderson, H, Barnum, J. Dixon and J. Tan, World Bank Operations Policy Department, USA, 1997

2. Cost Benefit Analysis in World Bank Projects. Independent Evaluation Group (IEG), World Bank, 2010.

c. Other resources

Journals:

- IEEE Transactions on Sustainable Energy
- IEEE Power and Energy Society
- Journal of Systems Engineering and Electronics
- IEEE Transactions on Reliability
- IEEE Transactions on Power Systems

Key websites and on-line resource

18. Teaching Team: Dr. William Gboney,
Professor Etienne Ntagwirumugara,

19. Unit Approval

Director and Senior staff contributing to the Program to confirm agreement

Department	Director/Coordinator/Staff	Date
1	Signature:	
	Print Name: Prof. Etienne Ntagwirumugara	
2	Signature:	
	Print Name:	
3	Signature:	
	Print Name:	
4	Signature:	
	Print Name:	

Seen and agreed

Library	Signature:	
	Print Name:	
ICT	Signature:	

	Print Name:	
Teaching and Learning Enhancement	Signature:	
	Print Name:	

COLLEGE OF SCIENCE AND TECHNOLOGY – UNIVERSITY OF RWANDA

ACE-IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)

MASTER OF SCIENCE IN ENERGY ECONOMICS.

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Module Description

1. **Module Code: ENE 6125**
2. **Module Title: MICROECONOMICS OF THE ENERGY SECTOR**
3. **Level 06 Semester: 01 Credits:15**
4. **Administering Unit: ACE-ESD**
5. **Core: Core module**
6. **Year of Presentation: 2017-18**
7. **Pre-requisite or co-requisite modules: N/A**
8. **Allocation of study and teaching hours**

DESCRIPTION	STUDENT HOURS	STAFF HOURS
LECTURES	24	48
SEMINARS/ WORKSHOPS		
PRACTICAL CLASSES/ LABORATORY	18	36
STRUCTURED EXERCISES	6	12
SET READING ETC.		
SELF-DIRECTED STUDY	42	42
ASSIGNMENTS – PREPARATION & WRITING	40	30
EXAMINATION – REVISION & ATTENDANCE	20	44

OTHER: INVIGILATION END OF MODULE		3
TOTAL	150	215

9. Description

The aim of this module is to provide the student with the theory and techniques of industrial microeconomics for application in the energy sector. The module also aims at familiarizing students with conceptual and appropriate mathematical tools in microeconomic theory.The module covers basic microeconomic concepts and applies them to practical issues in the energy sector. Topics covered include demand and supply analysis, market equilibrium and different market structures, international trade, investment and capacity expansion, risk and investment finance, and economic analysis of energy policy including environmental policy. Some additional topics to be covered will include the basis of supply and demand analysis, market equilibrium and public policy analysis.

10. Learning Outcomes

A. Knowledge and Understanding

Having successfully completed the module, students should have the following

A1. Develop transferable analytical and critical skills required to apply economic theoretical analysis in the energy sector, to assist in both policy and regulatory decision making

A2. Have knowledge of recent research in key areas of applied microeconomic theory, as applied in the energy sector

A3. Understanding the core ideas behind applied microeconomic principles and its use in the energy sector

A4. Explain and discuss core principles in microeconomic theory

A5. Use key mathematical techniques common in microeconomic theory

A6. Have experience in applying these techniques to solution of economic problems

B. Cognitive/Intellectual skills/application of knowledge

Having successfully completed the module, students should have the following knowledge:

B1. Apply fundamental methods and theories of applied microeconomics to analyze practical issues in the energy sector;

B2. Apply the theoretical knowledge to understand and analyse papers in microeconomics, as applied in the energy sector

B3. Be able to apply modern techniques and to develop applied microeconomic models to assist in policy, regulatory and long-term investment decision-making in the energy sector.

B4. Apply analytical models of firm behavior and strategic interaction to evaluate various business practices, including tacit collusion, entry deterrence, differentiation, price discrimination and vertical restraints.

C. ***Communication/Analytical Techniques/Practical skills:***

Having successfully completed the module, students should have the following skills:

C1. Communicate effectively using mathematical representation and models different economic phenomenon to explain issues affecting the energy sector

C2. Use graphs, equations and empirical techniques to explain micro-economic concepts, and how these are used in the energy sector to solve practical problems

C3. To manipulate methods and models applied by economists in the analysis of firms and industries and be able to solve analytically, problems relating to industrial economics,

D . General transferable s k i l l :

Having successfully completed the module, students should have the following skills:

D1. Undertake independent research/problem solving and present the results at international energy conferences and also publish papers in international journals

D2. Develop the ability to independently research about an emerging topic or issue in the energy sector

D3. Analyze papers in professional journals and present an independent opinion of issues

D4. Develop the skills in identifying the links between theories, policies, and practice

11. Indicative Contents:

Unit 1: Theory of Production and Supply:

Production sets; Production Costs, Profit maximization and cost minimization; Duality; Aggregation; Efficiency

Unit 2: Market Structure:

Perfect Competition; Monopoly; Monopolistic Competition; Oligopoly, Essential Facilities and application to Access Pricing.

Unit 3: Market Failure and Externalities:

Sources of Market Failure; Mechanisms to address market failure; Externalities; Positive externalities; Negative externalities

Unit 4: Information Asymmetry:

Information asymmetry in Economics; adverse selection and moral hazard; role of quality distribution; mechanisms to address asymmetric information

Unit 5: Market Power, Source and Exercise of Market Power in the Energy Sector: Definition and assessment of market power, market concentration, product differentiation; advertising and related marketing strategies, identifying and measuring market power. Other topics include price discrimination, vertical control, mergers and acquisitions, and strategic behavior between firms.

Unit 6: Pricing Strategies and Market Segmentation in the Energy Sector: Group pricing and personalized pricing, menu pricing, intertemporal price discrimination, bundling

Unit 7: Application of microeconomic principles in setting prices in international power trading/power pools:

Example. Spot Markets, Short Term Energy Markets, Day- Ahead Markets etc.

Unit 8: Economics of the Electricity Sector:

This topic will discuss the determinants of the cost of electricity in different types of networks, the effects of organizing the industry in different ways, the need to encourage sufficient investment in reserve capacity and ancillary services to keep electricity networks operating satisfactorily, as well as operating the network and coordinating supply and demand.

12. Learning and Teaching Strategies

Lectures: Important material from the text and outside sources will be covered in class. Students should plan to take notes as not all material can be found in the texts or readings.

Structured Exercises: This forms the basis of the module teaching. Students will be given hands-on training through lot of exercises. The objective is to keep the students in touch with the real world and to enhance their professionalism.

Assignments: Homework problems and readings will be assigned periodically to help support and supplement material found in the text.

Continuous Assessment Tests: occasional scheduled or unscheduled quizzes/ tests will be given to help ensure that students stay up with the assigned material.

13. Assessment Strategy

The assessment strategy is developed with the aim of testing the module's learning outcomes. The assessment strategy is designed to provide students with the opportunity to demonstrate their skills in microeconomic analysis, as well as their understanding of the appropriate techniques to use. In particular, students will be assessed by means of both formative and summative assessment through coursework and examination. Assessment comprises the submission of a coursework portfolio and a written examination.

14. Assessment Criteria:

For the examination setting and marking the UR generic marking criteria will be used.

15. Assessment Pattern

Component	Weightage (%)	Learning objectives covered
In-course assessment:	**60**	
• Practical assignment • Mini project • Tutorial & Practice	20 20 20	A1, A2-A6, B1, B2, B3, B4, C1, C2, C3, D1, D2, D3, D4
Final assessment	**40**	A1, A2-A6, B1, B2, B3, B4, C1, C2, C3, D1, D2, D3, D4

16. Strategy for feedback and student support during module

All lecture materials will be delivered to students. When a student does not understand any of the content of the material, he/she should can ask questions, either in class, by e-mail, or arrange to come by the lecturer's office as soon as the student realizes that he/ she is having difficulty with the course. The student should then contact the lecturer in charge.

17. Indicative Resources

a. Core Textbook:

1. Mas-Colell, A., M.D. Whinston, and J.R. Green(1995),*Microeconomic Theory,* New York, Oxford University Press
2. Jehle,G.A. and P. Reny (2011),*Advanced Microeconomic Theory3*rd*Edition***,** Prentice Hall Inc**.**
3. Varian, H.R.(1992),*Microeconomic Analysis 3*rd*Edition,* W.W. Norton and Company, New York.

4. Belleflamme Paul, Peitz Martin (2010) *Industrial Organization: Markets and Strategies*. Cambridge University Press, Cambridge, UK.
5. Church, J.R. & Ware, R. (2000). *Industrial Organization: A strategic Approach*. MacGraw-Hill, New York, USA.
6. Cabral, L. (2002). *Introduction to Industrial organization.* 2nd edition. The MIT Press

b. Other References

1. F. (2006), *Microeconomics: Principles and Analysis,* Oxford University Press, New York.
2. Gravelle, H. and Cowell R. Rees (2004), *Microeconomics 3rd Edition* Prentice Hall.
3. Kreps, David, M.(1990), *A Course in Microeconomic Theory* Harvester Wheatsheaf New York

c. Other resources

Journals:

- Economics of Energy & Environmental Policy Journal,
- Energy Economics Journal
- Energy for Sustainable Development Journal

Key websites and on-line resource

18. Teaching Team: Dr. Albert Banal-Estanol,
Dr. Ndemezo Etienne

19. Unit Approval

Director and Senior staff contributing to the Program to confirm agreement

Department	Director/Coordinator/Staff	Date
1	Signature:	
	Print Name: Prof. Etienne Ntagwirumugara	
2	Signature:	
	Print Name:	
3	Signature:	

	Print Name:	
4	Signature:	
	Print Name:	

Seen and agreed

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

COLLEGE OF SCIENCE AND TECHNOLOGY – UNIVERSITY OF RWANDA

ACE-IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)

MASTER OF SCIENCE IN ENERGY ECONOMICS.

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Module Description

1. **Module Code: EEC 6162**
2. **Module Title: ENERGY ECONOMICS I**
3. **Level 06 Semester: 01 Credits: 20**
4. **Administering Unit: ACE-ESD**
5. **Core: Core module**
6. **Year of Presentation: 2017-18**
7. **Pre-requisite or co-requisite modules: N/A**
8. **Allocation of study and teaching hours**

DESCRIPTION	STUDENT HOURS	STAFF HOURS
LECTURES	36	72
SEMINARS/ WORKSHOPS		
PRACTICAL CLASSES/ LABORATORY	28	48
STRUCTURED EXERCISES	8	16
SET READING ETC.		
SELF-DIRECTED STUDY	52	56
ASSIGNMENTS – PREPARATION & WRITING	40	40
EXAMINATION – REVISION & ATTENDANCE	36	56
OTHER: INVIGILATION END OF MODULE		3
TOTAL	200	291

9. **BRIEF DESCRIPTION OF AIMS & CONTENT**

This course introduces students to the fundamentals of energy economics. It will ensure that all students are exposed to the basic core components of energy economics. The module will discuss and examine the key aspects of energy supply, demand, energy pricing. The course will also cover topics such as trading of energy commodities, operation of power pools, energy management, energy efficiency and conservation, energy sustainability, economic evaluation of renewable energy technologies, as well as energy trade policies.

10. Learning Outcomes

A. Knowledge and Understanding

Having successfully completed this module, students should be able to:

A1. Have a good knowledge of the African and world energy situation

A2. Have an understanding of the key issues underpinning the energy industry

B. ***Cognitive/Intellectual skills/application of knowledge***

Having successfully completed the module, students should be able to:

B1. Have an understanding of economic fundamentals underpinning most energy types

B2. Have an in-depth understanding of the theoretical work that define the study of energy economics and natural resources

C. ***Communication/Analytical techniques/Practical skills***

Having successfully completed the module, students should be able to:

C1. Appreciate the importance of energy policy issues and their impact on long-term investment

D. General transferable skills

Having successfully completed the module, students should be able to:

D1. Be able to make significant contributions towards formulation of policies and regulation of the energy sector

11. Indicative Contents

1. Energy supply and demand (i.e. energy balance) and statistics (i.e. Africa and global perspectives)
2. Economic appraisal of energy projects, including renewable energy projects
3. Introduction to the economics of different energy types (Coal, Oil, Gas, Electricity, etc.)
4. Energy policy :the economics of energy, natural resources and the environment
5. Energy and environment policies
6. Energy Pricing (i.e. Electricity, Oil and Gas Sectors)
7. Operation of power pools and types of markets; Designing of transmission and wheeling charges for power pools
8. Energy efficiency and conservation, Energy Management.
9. Seminar on energy policy in Eastern Africa Countries

12. Learning and Teaching Strategies

The learning and teaching strategy is aimed at ensuring that students have a good exposure to the basic core components of energy economics. This will be done through:

Lectures: Important material from the text and outside sources will be covered in class. Students should plan to take notes as not all material can be found in the texts or readings.

Structured Exercises: This forms the basis of the module teaching. Students will be given hands-on training through lot of exercises. The objective is to keep the students in touch with the real world and to enhance their professionalism.

Assignments: Homework problems and readings will be assigned periodically to help support and supplement material found in the text.

Continuous Assessment Tests (CATs): occasional scheduled or unscheduled quizzes/ tests will be given to help ensure that students are abreast with the assigned materials.

13. Assessment Strategy

The assessment strategy is developed with the aim of testing the module's learning outcomes. It is designed to provide students with the opportunity to demonstrate that they have acquired a basic understanding of the energy system in terms of the accounting, economics and technology. Students will be assessed by means of both formative and summative assessment through coursework and examination. Assessment comprises the submission of a coursework portfolio and a seen examination. 60% based on individual assignments, quizzes, tutorials/practice, 40% - written examination.

14. Assessment Criteria:

For the examination setting and marking the UR generic marking criteria will be used.

15. Assessment Pattern

Component	**Weightage (%)**	**Learning objectives covered**
In-course assessment:	**60**	
• Practical assignment • Mini project • Tutorial & Practice	20 20 20	A1, A2, B1, B2, C1, D14
Final assessment	**40**	A1, A2, B1, B2, C1, D14

16. Strategy for feedback and student support

All lecture materials will be delivered to students. When student does not understand material, he/she should ask question, either in class, by e-mail, or come by the lecturer’s

office as soon as the student realizes that he/ she is having difficulty with the course, contact the lecturer in charge then.

17. Indicative Resources

a. Core Textbook:

1. Bhattacharyya, Subhes, C (2011), Energy Economics: Concepts, Issues, Markets and Governance
2. Weyman-Jones, Thomas (1986), The Economics of Energy Policy
3. Banks, Ferdinand, E (2000), Energy Economics: A Modern Introduction

b. Other References

1. Hunt, Lester C; Evans, Joanne (2009), International Handbook on the Economics of Energy
2. Energy Policies of IEA Countries (2012), International Energy Agency
3. BP Statistical Review of World Energy, 2013

c. Other resources

Journals:

- Economics of Energy & Environmental Policy Journal,
- Energy Economics Journal
- Energy for Sustainable Development Journal

Key websites and on-line resource

18. Teaching Team: Professor J. Perez-Arriaga,
Dr. William Gboney

19. Unit Approval

Director and Senior staff contributing to the Program to confirm agreement

Department	Director/Coordinator/Staff	Date
1	Signature:	
	Print Name: Prof. Etienne Ntagwirumugara	
2	Signature:	
	Print Name:	
3	Signature:	

	Print Name:	
4	Signature:	
	Print Name:	

Seen and agreed

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

COLLEGE OF SCIENCE AND TECHNOLOGY – UNIVERSITY OF RWANDA

ACE-IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)

MASTER OF SCIENCE IN ENERGY ECONOMICS

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Module Description

20. Module Code: EEC6163
21. Module Title: ECONOMETRICS I
22. Level 06 Semester: 01 Credits: 15
23. Administering Unit: ACE-ESD
24. Core: Core module
25. Year of Presentation: 1.
26. Pre-requisite or co-requisite modules: N/A

27. Allocation of study and teaching hours

DESCRIPTION	STUDENT HOURS	STAFF HOURS
LECTURES	24	48
SEMINARS/ WORKSHOPS		
PRACTICAL CLASSES/ LABORATORY	18	36
STRUCTURED EXERCISES	6	12
SET READING ETC.		
SELF-DIRECTED STUDY	42	42
ASSIGNMENTS – PREPARATION & WRITING	40	30
EXAMINATION – REVISION & ATTENDANCE	20	44
OTHER: INVIGILATION END OF MODULE		3
TOTAL	150	215

28. BRIEF DESCRIPTION OF AIMS & CONTENT

This module is designed to provide students with basic knowledge in statistics and econometrics. The module will equip the student with the ability to undertake, understand, and critically assess empirical work in economics, with a view to enabling the student to use econometrics to analyze and describe empirical regularities and test various propositions. Students will be taught how to apply statistical concepts and techniques to analyze economic data and test economic theories. The techniques are applied to real data making use of the econometric packages (i.e. EViews and/or Stata). The classroom lectures will therefore be complemented with computer laboratory sessions to afford students the opportunity to apply the tools discussed in lectures with data.

29. Learning Outcomes

A. Knowledge and Understanding

Having successfully completed this module, students should be able to:

A1. Understand the principles of estimation and hypothesis testing in a multivariate setting
A2. Know the properties of different estimators and tests
A3. Be able to use econometric techniques to actual data using computer packages to solve real like problems

B. *Cognitive/Intellectual skills/application of knowledge*

Having successfully completed the module, students should be able to:

B1. Be aware of the assumptions made in developing econometric models

B2. Analyze results of a study of an economic problem that includes econometric analysis

C. Communication/Analytical techniques/Practical skills

Having successfully completed the module, students should be able to:

C1. Use time series testing and estimation capabilities of a range of econometric packages

D. *General transferable skills*

Having successfully completed the module, students should be able to:

D1. Acquire the skills in preparing briefing papers based on econometric analysis and models and communicate the results to policy makers and regulators
D2. Have the skills in identifying the links between theory, policy, and practice

30. Indicative Contents

i. Multiple Regression analysis using cross sectional and time series data;
ii. Asymptotic properties of Ordinary Least Squares;
iii. Regression analysis using qualitative information;

iv. Functional form;
v. Autocorrelation;
vi. Heteroskedasticity;
vii. Instrumental variables estimation;
viii. Econometric models with time series.

31. Learning and Teaching Strategies

The learning and teaching strategies is aimed at giving students the theoretical tools they need to be able to analyze real world situations, encourage rigour in their approach to problems and encourage hands-on study of empirical problems. This will be achieved through:

Lectures: Important material from the text and other outside sources, will be covered in class. Students should plan to take notes as not all material can be found in the texts or readings.

Structured Exercises: This part of the assessment will be practical and would be based on the use of econometric and statistical packages in the form of the computer laboratory, in which students are asked to analyze real economic and financial data. Students will be given hands-on training through lot of exercises. The objective is to keep the students in touch with the real world and to enhance their professionalism.

Assignments: Homework problems and readings will be assigned periodically to help support and supplement material found in the text.

Continuous Assessment Tests (CATs): occasional scheduled or unscheduled quizzes/ tests will be given to help ensure that students stay up with the assigned material.

32. Assessment Strategy

The assessment strategy is developed with the aim of testing the module's learning outcomes. The assessment strategy is therefore designed to provide students with the opportunity to demonstrate their ability to understand and carry out econometric techniques. Students will be assessed by means of both formative and summative assessment through coursework and examination. Assessment comprises the submission of a coursework portfolio and written examination. 60% based on individual assignments, quizzes, tutorials/practice, 40% - written examination.

33. Assessment Criteria:

For the examination setting and marking the UR generic marking criteria will be used.

34. Assessment Pattern

Component	Weightage (%)	Learning objectives covered
In-course assessment:	**60**	

• Practical assignment • Mini project • Tutorial & Practice	20 20 20	A1, A2, A3, B1, B2, C1, D1, D2
Final assessment	**40**	A1, A2, A3, B1, B2, C1, D1, D2

35. Strategy for feedback and student support during module

Students will be encouraged to actively participate during lecture sessions. All lecture materials will be delivered to students. When a student does not understand material, he/she should ask questions, either in class, by e-mail, or come by the lecturer's office as soon as the student realizes that he/ she is having difficulty with the course, and should contact the lecturer in charge then.

36. Indicative Resources

a. <u>Core Textbook</u>

i. Jeffrey M. Wooldridge (2016), Introductory Econometrics
ii. Damodar N. Gujarati, Dawn C. Poprter (2009). Basic Econometrics
iii. William Greene, Econometric Analysis, 7th Edition,

b. <u>Background text (Other Text Books)</u>

i. Thomas, R. L. (1997), Modern Econometrics: An Introduction, Addison-Wesley: Harrow
ii. Gujarati, D.N. (1995), Basic Econometrics, McGraw-Hill, New York

c. <u>Journals</u>

- **All relevant Statistics, Econometric and Economic Journals**

Visit NUR e resources websites: Blackwell, JSTOR, Cambridge, Oxford and EBSCO.

- **All relevant Statistics, Econometric and Economic Journals**

Visit UR e- resources websites: Blackwell, JSTOR, Cambridge, Oxford and EBSCO.

- **Laboratory space and equipment**
- **Computer lab**

Required as per students number

- **Computer requirements**

37. Teaching Team: Dr. Martin Mugenzi,
Dr. Richard Kabanda
Dr. Charles Ruhara

38. Unit Approval

Director and Senior staff contributing to the Program to confirm agreement

Department	Director/Coordinator/Staff	Date
1	Signature:	
	Print Name: Prof. Etienne Ntagwirumugara	
2	Signature:	
	Print Name:	
3	Signature:	
	Print Name:	
4	Signature:	
	Print Name:	

Seen and agreed

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

COLLEGE OF SCIENCE AND TECHNOLOGY – UNIVERSITY OF RWANDA

ACE-IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)

MASTER OF SCIENCE IN ENERGY ECONOMICS

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Module Description

1. **Module Code: ENE 6164**
2. **Module Title: RESEARCH METHODOLOGY**
3. **Level: 06 Semester: 01 Credits:15**
4. **Administering Unit: ACE-ESD**
5. **Core: General module**
6. **Year of Presentation: 2017-2018**
7. **Pre-requisite or co-requisite modules: N/A**
8. **Allocation of study and teaching hours**

DESCRIPTION	STUDENT HOURS	STAFF HOURS
LECTURES	24	48
SEMINARS/ WORKSHOPS		
PRACTICAL CLASSES/ LABORATORY	18	36
STRUCTURED EXERCISES	6	12
SET READING ETC.		
SELF-DIRECTED STUDY	42	42
ASSIGNMENTS – PREPARATION & WRITING	40	30
EXAMINATION – REVISION & ATTENDANCE	20	44
OTHER: INVIGILATION END OF MODULE		3
TOTAL	150	

9. BRIEF DESCRIPTION OF AIMS & CONTENT

This course focuses on the conceptualization of research issues in the field of management, the various management research paradigms in use, and the

methodological approaches employed in management research. It discusses the nature and use of quantitative and qualitative methods in academic management research. This includes the development of research questions within a theoretical system informed by management and organization theories, and with a view to the appropriate methods of data collection and analysis, as well as the reporting and communication of research results.

10. Learning Outcomes

A. Knowledge and Understanding

Having successfully completed the module, students should have the following knowledge:

A1. Demonstrate an understanding of competing research philosophies and paradigms.
A2. To develop a literature driven research question.
A3. Demonstrate an understanding of qualitative and quantitative research methodologies.
A4. Demonstrate an understanding of qualitative and quantitative data analysis techniques.
A5. Be able to interpret the results of data analysis.
A6. Be able to critically assess research articles and reports that use qualitative and quantitative methods.
A7. Be able to write a research proposal for a defined audience.

B. Cognitive/Intellectual skills/application of knowledge

Having successfully completed the module, students should have the following knowledge:

B1. To demonstrate in-depth knowledge and understanding of current theoretical concepts and frameworks within their major discipline.
B2. To think logically, analytically and critically with respect to the academic literature in their major discipline.
B3. To plan and carry out a supervised programme of academic research that shows a sound understanding of ethical practice.

B4. To synthesize academic or professional literature and effectively communicate research orally and in written form.

B5. To have knowledge on various kinds of research questions and research designs

B6. Develop suitable methodology for research questions

C. *Communication/Analytical techniques/Practical skills:*

Having successfully completed the module, students should have the following skills:

C1. To formulate research questions and develop a sufficiently coherent research design;

C2. Describe a range of quantitative research and identify the advantages and disadvantages associated with these designs.

C3. Design an appropriate mixed-method research study to answer a related research question.

C4. Choose appropriate quantitative or qualitative method to collect data.

C5. Write a research proposal suitable for submission to a research funding body

D . General transferable s k i l l :

Having successfully completed the module, students should have the following skills:

D1. Define research; explain and apply research terms; describe the research process and the principal activities, skills and ethics associated with the research process.

D2. Undertake a literature survey

D3. Describe and compare the major quantitative and qualitative research methods in mass communication research.

D4. Propose a research study and justify the theory as well as the methodological decisions, including sampling and measurement.

D5. Understand the importance of research ethics and integrate research ethics into the research process.

D6. Be able to assess and critique a published journal article that uses one of the primary research methods in the field.

D7. Be able to construct an effective questionnaire that employs several types of survey questions.

11. Indicative Contents:

Unit-1: Introduction

1. Introduction to philosophy of science and research methodology
2. Research Design: Need for research design, Features of a good research design, Different research designs
3. Experimental survey: Basic principles of experimental design
4. Case studies-problems and limitations.
5. Planning and implementing research projects: planning a research project, problem formulation, research strategy and methods
6. Research Proposal Writing
7. Reviewing literature

Unit-2: Data Collection

1. Methods of Data Collection: Direct method and Indirect methods

2. Data collection through questionnaires and schedules
3. Problems in data collection
4. Data processing: Operations and Problems in data processing
5. Sampling design: meaning and its applications
6. Measurement and scaling techniques: Measurement Scales and Sources of errors in measurement

Unit-3: Data Analysis

1. Analysis of Data: Measures of and analysis Central Tendency, Dispersion, Skewness and Kurtosis
2. Theoretical Distributions: Normal, Poisson and Binomial
3. Statistical Estimation and Testing of hypothesis

Unit-4: Methods of data Analysis

1. Methods of Analysis: Simple and Multiple Regression
2. Time series analysis
3. Problems in econometric estimation

Unit-5: Writing up

1. Documentation-writing the research report
2. The use of various Econometric software; STATA, Eviews…, etc.

12. Learning and Teaching Strategies

Lectures: Important material from the text and outside sources will be covered in class. Students should plan to take notes as not all material can be found in the texts or readings.

Structured Exercises: This forms the basis of the module teaching. Students will be given hands-on training through lot of exercises. The objective is to keep the students in touch with the real world and to enhance their professionalism.

Assignments: homework problems and readings will be assigned periodically to help support and supplement material found in the text.

Continuous Assessment Tests: occasional scheduled or unscheduled quizzes/ tests will be given to help ensure that students stay up with the assigned material.

13. Assessment Strategy

The assessment strategy is developed with the aim of testing the module's learning outcomes. The assessment strategy is aimed at providing students with the opportunity to demonstrate their ability to undertake a literature survey, develop a suitable methodology for research questions, develop the ability to collect relevant data (if contribution is an empirical analysis) as well as develop the ability to apply a specific analytical technique

Students will be assessed by means of both formative and summative assessment through coursework and examination. Assessment comprises the submission of a coursework portfolio and a seen examination. 60% based on individual assignments, quizzes, tutorials/practice, 40% - written examination.

14. Assessment Criteria:

For the examination setting and marking the UR generic marking criteria will be used.

15. Assessment Pattern

Component	**Weightage (%)**	**Learning objectives covered**
In-course assessment:	**60**	
Assignments	20	A1, A2- A7, B1, B2-B6, C1, C2-C5, D1- D7
Tests	20	A1, A2- A7, B1, B2-B6, C1, C2-C5, D1- D7
Group work	20	A1, A2- A7, B1, B2-B6, C1, C2-C5, D1- D7
Final Examination	40	A1, A2- A8, B1, B2-B8, C1, C2-C5, D1- D7

16. Strategy for feedback and student support during module

All lecture material will be delivered to students. When student does not understand any aspect of the material, he/she should ask question, either in class, by e-mail, or come by the lecturer's office as soon as the student realizes that he/ she is having difficulty with the course, and should contact the lecturer in charge then.

17. Indicative Resources

a. Reference Books

1. Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods
2. Greenlaw, Steven (2006). Doing Economics: A Guide to Understanding and Carrying out Economic Research
3. Ghosh, B.N., Scientific Methods and Social Research, New Delhi: Sterling Publishers Pvt. Ltd., 1982.
4. Geweke, J. (2005) Contemporary Bayesian Econometrics and Statistics published by Wiley
5. Lancaster, T. (2004).An Introduction to Modern Bayesian Econometrics published by Blackwell.

6. Poirier, D. (1995).Intermediate Statistics and Econometrics: A Comparative Approach published by The MIT Press.
7. Koop, G. (2003).Bayesian Econometrics published by Wiley.

b. Other references

- Research Methodology by Reddy
  Publisher: APH Publishing Corporation (1 Dec 2004)
  Language English
  ISBN-10: 8176486728
  ISBN-13: 978-8176486729
- Research Methodology by Khan
  ISBN: 9780761935896
  Publisher SAGE international
- Research Methodology: Techniques & Trends by V. V. Khanzode
  ISBN: 8170246482ISBN-13: 9788170246480, 978-2008
  Publisher: APH Publishing Corporation
- Research Methodology by Debashis Chakraborty
  Published: Saurabh Publishing House
  ISBN: 9788189005276
- Research Methodology: A Step by Step Guide for Beginners by Ranjit Kumar
  Publisher: Sage Publications Ltd (28 Jan 1999)
  ISBN-10: 076196214X
  ISBN-13: 978-0761962144
- Research Methodology by Bhattacharyya D K
  Publisher: Excel
  ISBN: 8183234972
- Research Methodology: Methods and Techniques by C. R. Kothari
  Publisher: Wiley Eastern Limited (1985)
  ASIN: B000KWR1TG
- Management Research Methodology: Integration of Principles, Methods and Techniques by K. N. Krishnaswamy, Appa Iyer Sivakumar, M. Mathirajan
  Prentice Hall, 2009
  ISBN: 8177585630
  ISBN-13: 9788177585636, 978-8177585636
- Research Methodology by Thanulingam, N
  Himalaya Publishing House
- Research Methodology by Manoharan
  Publisher: APH Publishing Corporation (January 1, 2009)
  ISBN-10: 8131305295
  ISBN-13: 978-8131305294

- Research Methodology by Rohilla
  Publisher: PHI
  ISBN: 8120324528
  EAN: 9788120324527

Journals:

- International Journal of Social Research Methodology

Laboratory space and equipment

For group work sessions a room is required with a level floor with furniture that can be arranged for students to sit in groups. A black or white board is also required. A computer lab with 30 terminals is required for assisting students in research and presentation of seminar.

- **Key websites and on-line resource**

18. Teaching Team: Professor Etienne Ntagwirumugara,
Dr Birasa,
Dr. Charles Ruhara

19. Unit Approval

Director and Senior staff contributing to the Program to confirm agreement

Department	Director/Coordinator/Staff	Date
1	Signature:	
	Print Name: Prof. Etienne Ntagwirumugara	
2	Signature:	
	Print Name:	
3	Signature:	
	Print Name:	
4	Signature:	
	Print Name:	

Seen and agreed

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

COLLEGE OF SCIENCE AND TECHNOLOGY – UNIVERSITY OFRWANDA

ACE-IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)

MASTER OF SCIENCE IN ENERGY ECONOMICS

Module Description

1. **Module Code: ENE 6262**
2. **MODULE TITLE: Corporate Finance and Business Communication**
3. **LEVEL : 06 SEMESTER: 02 CREDITS: 10 Credits**
4. **FIRST YEAR OF PRESENTATION : 2017-2018**
5. **ADMINISTERING UNIT: AFRICAN CENTER OF EXCELLENCE IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)**
6. **CORE: General Module**
7. **PRE-REQUISITE OR CO-REQUISITE MODULE, EXCLUDED COMBINATIONS : N/A**
8. **ALLOCATION OF STUDY & TEACHING HOURS:**

DESCRIPTION	STUDENT HOURS	STAFF HOURS
LECTURES	18	36
SEMINARS/ WORKSHOPS		
PRACTICAL CLASSES/ LABORATORY	14	24
STRUCTURED EXERCISES	4	8
SET READING ETC.		
SELF-DIRECTED STUDY	26	28
ASSIGNMENTS – PREPARATION & WRITING	20	20
EXAMINATION – REVISION & ATTENDANCE	18	28
OTHER: INVIGILATION END OF MODULE		3
TOTAL	100	147

9. **BRIEF DESCRIPTION OF AIMS & CONTENT**

The module will teach students to know the key drivers of investment decisions of corporations, cost of capital determination, valuation of stock, bonds and options and how investments are financed in the energy sectors, and how to communicate the results of the analysis to investors and stakeholders. The module will thus cover topics in business modelling and planning, business communication, marketing and networking, entrepreneurship**,** project design and management, as well as the use of Public-Private Partnership (PPPs) as a vehicle for investment in the energy sector in African countries.

On completion students will be able to apply their skills in areas including valuation, investment and financial decision-making, risk management and derivatives, financial instruments and markets, mergers and acquisitions, and corporate restructuring in

developed and emerging markets.

10. LEARNING OUTCOMES

A. KNOWLEDGE AND UNDERSTANDING (A1, A2, A3)

Having successfully completed this module, students should be able to:

A1. Understand issues related to mergers, demergers, acquisitions

A2. Have a good understanding of take-overs of public companies, including public-to-private deals

A3. Understand equity issues including floatation of energy companies on a stock exchange in order to raise capital

B. COGNITIVE/INTELLECTUAL SKILLS/APPLICATION OF KNOWLEDGE (B1, B2, B3)

Having successfully completed the module, students should be able to:

B1. Apply skills to raise capital via the issue of equity, debt and related securities for refinancing and restructuring of business

B2. Raise capital for corporate investment finds such as private equity, venture capital and infrastructure funds

B3. Manage practical issues related to financing of joint ventures, project finance, infrastructure finance, public-private partnerships (PPPs) and privatization

C. Communication/Analytical Techniques/Practical Skills (C1, C2, C3)

Having successfully completed the module, students should be able to:

C1. Assist companies to raise debt and restructure debt

C2. Deal with secondary equity issues through private placing or further issues on stock market

C3. Publish results of financial analysis and present/communicate the results to stakeholders

D. General transferable skills (D1, D2, D3)

Having successfully completed the module, students should be able to:

D1. Provide support on project evaluation

D2. Provide advisory services on public-private partnerships (PPPs)

D3. Provide corporate finance and debt advice

11. Indicative Contents

Unit 1: Tools for Financial Analysis:

Foundations of accounting principles and financial analysis, Principles of Financial Management, Financial statement analysis and interpretation of accounts, financial planning for investment decisions, cost of capital modelling and estimation

Unit 2: Corporate Financial Decision-Making:

Key financial decisions which companies face, methods for optimizing value of a firm, link between a firm's decision and impact on a firm's value.

Unit 3: Significance and Impact of Global Capital Market:

Impact of different markets around the world, risk management of companies/corporations; Examination of exchange, inflation, interest rates and impact on the performance of firms

Unit 4: Methods for Valuation of Stocks and Investment:

Asset and investment valuation for decision making, alternative valuation techniques

Unit 5: Project finance: Financing approaches and tools in the market

Unit 6: Project Evaluation Techniques:

Techniques for evaluating and assessing power sector projects.

12. Learning & Teaching Strategies

Lectures: Important material from the text and outside sources will be covered in class. Students should plan to take notes as not all material can be found in the texts or readings.

Structured Exercises: This forms the basis of the module teaching. Students will be given hands-on training through lot of exercises. The objective is to keep the students in touch with the real world and to enhance their professionalism.

Assignments: homework problems and readings will be assigned periodically to help support and supplement material found in the text.

Continuous Assessment Tests (CATs): occasional scheduled or unscheduled quizzes/ tests will be given to help ensure that students stay up with the assigned material.

13. Assessment Strategy

The assessment strategy is developed with the aim of testing the module's learning outcomes in the area of corporate finance and investment and application in the energy sector. In particular, students will be assessed by means of both formative and summative assessment through coursework and examination. Assessment comprises the submission of a coursework portfolio and a seen examination.

60% based on individual assignments, quizzes, tutorials/practice, 40% - written examination.

14. Assessment Criteria:

For the examination setting and marking the UR generic marking criteria will be used.

15. Assessment Pattern

Component	Weightage (%)	Learning objectives covered
In-course assessment:	**60**	
• Practical assignment • Mini project • Tutorial & Practice • Short practical test	20 20 15 5	A1, A2, A3, A4, B1, B2, B3, B4, B5, C1, C2, C3, C4, D1, D3, D4
Final assessment	**40**	A1, A3-A5, B1, B3, B4, C1, C2, C5, C6, D1, D2

16. Strategy for feedback and student support during module

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple practical exercises.
- Marked summative assessments (assignment) handed back to students, with comments.
- Opportunities to consult Lecturer during working hours

17. INDICATIVE RESOURCES

a. Reference books

- Fundamentals of Corporate Finance, P. Moles (2011), John Wiley and Sons
- Corporate Finance, S. Roo, W. Randolph, W. Westerfield, J. Jaffe (2004), Irwin/McGraw-Hill
- Fundamentals of Corporate Finance, (2006), R. Randolph, Westerfield, Bradford, Jordan, Irwin-McGraw
- Principles of Corporate Finance, (2006), R. Brealey, S. Myers, F. Allen (2006), McGraw/Irwin
- Corporate Finance: Theory and Practice, (2003), AswathDamodaren, Wiley.
- Valuation: Measuring and Managing the Value of Companies (2005), T. Koller, T. Copeland, M. Goedhart, D, Wessels, John Wiley & Sons.
- Quality Financial Reporting (2002), P. Miller, P. Bahnson, McGraw-Hill.
- Analysis, Valuation and Restructuring (2000), B. Steyn, B. Warren, W. Jonker. Renall.

b. Other resources

Journals:

- Economics of Energy & Environmental Policy Journal,
- Energy Economics Journal
- Energy for Sustainable Development Journal

Key websites and on-line resource

18. TEACHING TEAM:

- **IAN ALEXANDER,**
- **1 Lecturer from CBE (UR)**

19. UNIT APPROVAL

Director and Senior staff contributing to the Program to confirm agreement

Department	Director/Coordinator/Staff	Date
1	Signature :	
	Print Name :	
2	Signature :	
	Print Name :	
3	Signature :	
	Print Name :	
4	Signature :	
	Print Name :	

Seen and agreed

Library	Signature:	
	Print Name:	
ACEESD	Signature:	
	Print Name:	
Quality Office	Signature:	
	Print Name:	

COLLEGE OF SCIENCE AND TECHNOLOGY – UNIVERSITY OF RWANDA

ACE-IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)

MASTER OF SCIENCE IN ENERGY ECONOMICS

MODULE DESCRIPTION

1. **Module Code: EEC 6261**
2. **Module Title: Risk Management in the Energy Sector**
3. **Level: 06 Semester: 02 Credits: 15**
4. **Administering Unit: ACE-ESD**
5. **Core: core module**
6. **Year of Presentation: 2017-18**
7. **Pre-requisite or co-requisite modules: N/A**
8. **Allocation of Study and Teaching Hours**

DESCRIPTION	STUDENT HOURS	STAFF HOURS
LECTURES	24	48
SEMINARS/ WORKSHOPS		
PRACTICAL CLASSES/ LABORATORY	18	36
STRUCTURED EXERCISES	6	12
SET READING ETC.		
SELF-DIRECTED STUDY	42	42
ASSIGNMENTS – PREPARATION & WRITING	40	30
EXAMINATION – REVISION & ATTENDANCE	20	44
OTHER: INVIGILATION END OF MODULE		3

TOTAL	150	215

9. BRIEF DESCRIPTION OF AIMS AND CONTENT

This module aims to provide students with deep understanding of quantitative risk management techniques used in the energy sector. Some of the topics to be covered include inter alia, real options, value at risk and use of derivatives for trading and hedging. At the end of this module, students would be expected to know how to measure and manage risk-adjusted returns of asset portfolios.

The extent to which an investor can derive benefits from investments in the energy sector depends on the quality of managing the risks inherent in business transactions in the sector. This module aims at equipping students with the knowledge of the risks in the sector and exposing them to the techniques of managing the risks.

10. Learning Outcomes

A. Knowledge and Understanding:

After completing this course, students should be able to:

A1. Understand the risks associated with the energy sector

A2. Apply the techniques and strategies for managing risks in the energy sector

A3. Apply the risk management tools available to energy companies

B. Analytical/Cognitive /Intellectual/ Skills

After completing this course, students should be able to

B1. Know how to measure and manage risk-adjusted returns of asset portfolios

B2. Understand how to manage the risks inherent in business transactions in the sector.

C. Communication /Application Skills

Having successfully completed the module, students should be able:

C1. Understand the major risks associated with energy trading and in other energy sectors.

C2. Understand the various risk types inherent to the energy business

D. General transferable skills

Having successfully completed the module, students should be able to:

D1. Provide support on project evaluation

D2. Provide advisory services on public-private partnerships (PPPs)

D3. Provide corporate finance and debt advice

11 INDICATIVE CONTENT

1. An Overview of Business Risks in the energy sector, including how to determine the risk, return and opportunity cost of capital
2. Risks in Oil and Gas and Geothermal Exploration, and Production.
3. Oil Market Volatility.
4. Joint venture Risks.
5. Safety and Security Risks in Oil and Gas Transactions.
6. Due Diligence and Risks in the Energy Sector.
7. Techniques for Managing Oil, Gas Operations Business Risks and power sector risks.
8. Legal Framework for Managing Risks in the energy sector, particularly Oil and Gas Business Transactions.
9. Challenges in Managing Oil and Gas Business Risks and in the other energy sectors.
10. Risk management in power markets

12 LEARNING AND TEACHING STRATEGY

The module is conducted through the following teaching and learning methods

a) Lectures by the teaching team in order to impart essential knowledge relating to the above aims and outcomes.
b) Guest speakers from institutions involved in industrial/firm regulation and policy will be invited to share their practical experience with students.
c) Students will be given time for preparation of written assessments, and for group works

13 ASSESSMENT STRATEGY

The assessment of student's performance shall be based on continuous assessment, assignments and formal examination, as shown below:

a) Individual tests, quizzes and written assignments and reports submitted

b) Group assignments and class presentation

c) Students participation and contribution to the learning environment

60% based on individual assignments, quizzes, tutorials/practice, 40% - written examination.

14. Assessment Criteria:
For the examination setting and marking the UR generic marking criteria will be used.

15. ASSESSMENT PATTERN

Component	Weightage (%)	Learning objectives covered
In-course assessment:	**60**	
• Practical assignment • Mini project • Tutorial & Practice	20 20 20	A1, A2, A3, B1, B2, C1, C2, D1, D2, D3,
Final assessment	**40**	A1, A2, A3, B1, B2, C1, C2, D1, D2, D3,

16. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

Students will be encouraged to participate during the class by asking questions and providing contributions during the teaching. Assignments will be given and presentations made, which will indicate the student's understanding of the course.

17. INDICATIVE RESOURCES

a. Core Textbook

1. Foundations of Energy Risk Management: An Overview of the Energy Sector and its Physical and Financial Markets (2008), GARP, Wiley
2. Handbook of Risk Management in Energy Production and Trading (2013), Kovacevic, R., Plung, G., Vespucci, M.
3. Energy Trading and Risk Management: A Practical Approach to Hedging, Trading and Portfolio Diversification (2014), Marie Mack, Wiley.

b. Background text (Other Text Books)

1. Financial Risk Management in the Renewable Energy Sector: Cooperative Analysis between EU and Turkey, Apak, S, Atay, E., Tuncer, G. (2011)
2. Risk Quantification and Risk Management in Renewable Energy Projects, (2011), Altram GmBH and Co. KG, Germany.

c. Other resources

Journals:

- Economics of Energy & Environmental Policy Journal,
- Energy Economics Journal
- Energy for Sustainable Development Journal

Key websites and on-line resource

18. TEACHING TEAM: Dr. Oliver Massol,

1 Lecturer from CBE (UR).

19. UNIT APPROVAL

Director and Senior staff contributing to the Program to confirm agreement

Department	Director/Coordinator/Staff	Date
1	Signature:	
	Print Name: Prof. Etienne Ntagwirumugara	
2	Signature:	
	Print Name:	
3	Signature:	
	Print Name:	
4	Signature:	
	Print Name:	

Seen and agreed

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

COLLEGE OF SCIENCE AND TECHNOLOGY – UNIVERSITY OF RWANDA

ACE-IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)

MASTER OF SCIENCE IN ENERGY ECONOMICS

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Module Description

1. **Module Code: EEC6262**
2. **Module Title: Energy Economics II**
3. **Level: 06 Semester: 02 Credits: 20**
4. **Administering Unit: ACE-ESD**
5. **Core: core module**
6. **Year of Presentation: 2017-18**
7. **Pre-requisite or co-requisite modules: N/A**
8. **Allocation of study and teaching hours**

DESCRIPTION	STUDENT HOURS	STAFF HOURS
LECTURES	36	72
SEMINARS/ WORKSHOPS		
PRACTICAL CLASSES/ LABORATORY	28	48
STRUCTURED EXERCISES	8	16
SET READING ETC.		
SELF-DIRECTED STUDY	52	56
ASSIGNMENTS – PREPARATION & WRITING	40	40
EXAMINATION – REVISION & ATTENDANCE	36	56
OTHER: INVIGILATION END OF MODULE		3
TOTAL	200	291

9. **Description**

This module builds on Energy Economics I and will provide in-depth analysis of very important topics in the energy sector such as energy supply and demand modelling, energy security, drivers of commodity prices, spot market pricing of power pools, types of markets operated by power pool, models of storable energy commodities. It provides a deeper discussion of a variety of topics in energy modeling, with attention given to data analysis

and the approaches taken for solving market-oriented problems faced in the energy sector. Topics will also include models of storable energy commodities, energy demand by end-use sector, energy security, as well as fundamental drivers of commodity prices and energy sector regulation.

10. Learning Outcomes

A. Knowledge and Understanding

Having successfully completed this module, students should be able to:

A1. Analyse business and policy issues in energy markets

A2. Examine the economic determinants of the industry structure and evolution of competition in the energy sector

A3. Understand the theoretical and empirical perspectives on individual and industrial demand for energy, energy supply, energy markets and public policy affecting energy markets

B. ***Cognitive/Intellectual skills/application of knowledge***

Having successfully completed the module, students should be able to:

B1. Understand the basics of energy sector regulation, particularly price regulation

B2. Apply knowledge in developing renewable energy, energy efficiency and climate change policies for controlling emission

C. ***Communication/Analytical techniques/Practical skills***

Having successfully completed the module, students should be able to:

C1. Apply knowledge to develop energy sector policies

C2. Develop Renewable energy and energy efficiency policies

D. **General transferable skills**

Having successfully completed the module, students should be able to:

D1. Model energy demand for different end-users

D2. Determine the energy demand with respect to short-run and long-run price and income elasticities.

11. Indicative Contents

1. Electric Power Market Analytics: Regulation, Energy law, Energy tariff Modelling; Modelling energy demand by end-use sector (power purchase agreements).
2. Drivers of Commodity prices
3. Energy sector regulation
4. Energy supply and economics of deplorable resources

5. Energy and climate change
6. Energy efficiency policies
7. Renewable energy policies

12. Learning and Teaching Strategies

Lectures: Important material from the text and outside sources will be covered in class. Students should plan to take notes as not all material can be found in the texts or readings.

Structured Exercises: This forms the basis of the module teaching. Students will be given hands-on training through lot of exercises. The objective is to keep the students in touch with the real world and to enhance their professionalism.

Assignments: homework problems and readings will be assigned periodically to help support and supplement material found in the text.

Continuous Assessment Tests (CATs): occasional scheduled or unscheduled quizzes/ tests will be given to help ensure that students stay up with the assigned material.

13. Assessment Strategy

The assessment strategy is developed with the aim of testing the module's learning outcomes. In particular, students will be assessed by means of both formative and summative assessment through coursework and examination. Assessment comprises the submission of a coursework portfolio and a seen examination.

60% based on individual assignments, quizzes, tutorials/practice, 40% - written examination.

14. Assessment Criteria:

For the examination setting and marking the UR generic marking criteria will be used.

15. Assessment Pattern

Component	**Weightage (%)**	**Learning objectives covered**
In-course assessment:	**60**	
• Practical assignment • Mini project • Tutorial & Practice	20 20 20	A1, A2, A3, B1, B2, C1, C2, D1, D2
Final assessment	**40**	A1, A2, A3, B1, B2, C1, C2, D1, D2

16. Strategy for feedback and student support during module

All lecture materials will be delivered to students. When student does not understand material, he/she should ask questions, either in class, by e-mail, or come by the lecturer's office as soon as the student realizes that he/ she is having difficulty with the course, and contact the lecturer in charge then.

17. Indicative Resources

a. Core Textbook:

1. Slade, M., C. Kolstad, and R. Weiner. "Buying Energy and Nonfuel Minerals." Chapter 20 in Handbook of Natural Resource and Energy Economics. Vol. 3. Edited by A. Kneese and J. Sweeney. San Diego, CA: Elsevier Science Publishers, 1993. ISBN: 0444878009.

b. Other References:

1. Review of the Basics of Supply, Demand and Price Formation in Competitive Markets, Pindyck and Rubinfeld. 2005, chapter 2
2. Smil, V. "Energy in the Twentieth Century: Resources, Conversions, Costs, Uses and Consequences." Annual Review of Energy and the Environment 25 (2000): 21-51.
3. Krautkraemer J., and M. Toman. "Fundamental Economics of Depletable Energy Supply." Resources for the Future, Discussion Paper 03-01 (2003).
4. Kaufman, R., S. Dees, P. Karadeloglou, and M. Sanchez. "Does OPEC Matter: An Econometric Analysis of Oil Prices." The Energy Journal 25, no. 4 (2004): 67-90.
5. Pindyck, R. "Gains to Producers from Cartelization of an Exhaustible Resource." Review of Economics and Statistics 60, no. 2 (1978): 238-251
6. Intergovernmental Panel on Climate Change (IPCC). "Climate Change 2007: The Physical Science Basis: Summary for Policymakers" (February 2007).
7. Palmer, K., and D. Bullaw. "Cost-Effectiveness of Renewable Electricity Policies." Energy Economics 27 (2005): 873-894.

b. Other resources

Journals:

- Economics of Energy & Environmental Policy Journal,
- Energy Economics Journal
- Energy for Sustainable Development Journal

Key websites and on-line resources

18. Teaching Team: Professor J. Perez-Arriaga,
Dr. William Gboney

19. Unit Approval

Director and Senior staff contributing to the Program to confirm agreement

Department	Director/Coordinator/Staff	Date
1	Signature:	
	Print Name: Prof. Etienne Ntagwirumugara	
2	Signature:	
	Print Name:	
3	Signature:	
	Print Name:	
4	Signature:	
	Print Name:	

Seen and agreed

Library	Signature:	
	Print Name:	
ICT	Signature:	
	Print Name:	
Quality Office	Signature:	
	Print Name:	

COLLEGE OF SCIENCE AND TECHNOLOGY – UNIVERSITY OF RWANDA

ACE-IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)

MASTER OF SCIENCE IN ENERGY ECONOMICS

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Module Description

1. **Module Code: EEC 6263**
2. **Module Title: Advance Econometrics**
3. **Level: 06 Semester: 02 Credits: 15**
4. **Administering Unit: ACE-ESD**
5. **Core: Core module**
6. **Year of Presentation: 2017-2018**
7. **Pre-requisite or co-requisite modules: N/A**
8. **Allocation of study and teaching hours**

DESCRIPTION	STUDENT HOURS	STAFF HOURS
LECTURES	24	48
SEMINARS/ WORKSHOPS		
PRACTICAL CLASSES/ LABORATORY	18	36
STRUCTURED EXERCISES	6	12
SET READING ETC.		
SELF-DIRECTED STUDY	42	42
ASSIGNMENTS – PREPARATION & WRITING	40	30
EXAMINATION – REVISION & ATTENDANCE	20	44
OTHER: INVIGILATION END OF MODULE		3
TOTAL	150	215

9. Description

This module builds on Econometrics I by focusing on Applied Econometrics. The module will provide students with advanced knowledge of applied econometrics in the energy sector. This module will expose students to the econometric techniques relevant for the estimation of a range of models including those with either qualitative or limited dependent variables, models for survival analysis, and panel data models. A strong emphasis is placed on the empirical applications of these techniques and their intuition. The module is expected to provide students with the practical econometric skills necessary to understand an applied economics literature that uses these techniques to undertake competent empirical research.

10. Learning Outcomes

A. Knowledge and Understanding

A1. Analyse business and policy issues in Advance Econometrics.

A2. Examine the econometrics determinants of the industry structure and evolution of competition in the energy sector.

A3. Understand the theoretical and empirical perspectives on individual and industrial demand for energy, energy supply, energy markets and public policy affecting energy markets

B. Cognitive/Intellectual skills/application of knowledge

Having successfully completed the module, students should have the following knowledge:
B1. Be able to explain the concepts used for the qualitative and limited dependent variables methods and to apply them to simple situations.

C. *Communication/Analytical techniques/Practical skills:*

Having successfully completed the module, students should have the following skills:
C1. Be able to use Stata or other econometric software package to develop further understanding of the syllabus material

D . General transferable s k i l l s :

D1. Be able to use econometric software package in undertaking such empirical analysis for both policy and regulatory decision making.

11. Indicative Contents

1. Maximum Likelihood Principle,
2. LP and Logit, Probit Models
3. Truncated and Censored Regression Models, Duration Models
4. Panel Data Models

12. Learning and Teaching Strategies

The learning and teaching methods are aimed at making the students understand the ideas behind the methods analysed, as well as enabling the students to apply these methods to simple situations. Additionally, this is expected to equip students to be able to respond to questions in lectures and in computing workshops. This is achieved through:

Lectures: Important material from the text and outside sources will be covered in class. Students should plan to take notes as not all material can be found in the texts or readings.

Structured Exercises: This forms the basis of the module teaching. Students will be given hands-on training through lot of exercises. The objective is to keep the students in touch with the real world and to enhance their professionalism.

Assignments: Homework problems and readings will be assigned periodically to help support and supplement material found in the text.

Continuous Assessment Tests: occasional scheduled or unscheduled quizzes/ tests will be given to help ensure that students stay up with the assigned material.

13. Assessment Strategy

The assessment strategy is developed with the aim of testing the module's learning outcomes. The assessment strategy is thus designed to provide students with the opportunity to demonstrate their understanding of the statistical concepts associated with the methods studied, and ability to use econometric package to solve simple problems. In particular, students will be assessed by means of both formative and summative assessment through coursework and examination. Assessment comprises the submission of a coursework portfolio and a seen examination.

60% based on individual assignments, quizzes, tutorials/practice, 40% - written examination.

14. Assessment Criteria:

For the examination setting and marking the UR generic marking criteria will be used.

15. Assessment Pattern

Component	Weightage (%)	Learning objectives covered
In-course assessment:	**60**	
• Practical assignment • Mini project • Tutorial & Practice	20 20 20	A1, A2, A3, B1, C1, D1

Final assessment	**40**	A1, A2, A3, B1, C1, D1

16. Strategy for feedback and student support during module

All lecture materials will be delivered to students. When student does not understand material, he/she should ask questions, either in class, by e-mail, or come by the lecturer's office as soon as the student realizes that he/ she is having difficulty with the course.

17. Indicative Resources

a. Reference Books

1. Econometrics by example - Damodar N. Gujarati (2015)
2. Econometric analysis - William H. Greene (2012)
3. Basic econometrics - Damodar N. Gujarati, Dawn C. Porter (2009)

b. Other References:

1. Econometric Analysis of Cross Section and Panel Data - Jeffrey M. Wooldridge (2002)

c. Other resources

Journals:

- Economics of Energy & Environmental Policy Journal,
- Energy Economics Journal
- Energy for Sustainable Development Journal

Key websites and on-line resource

18. Teaching Team: Dr. Albert Banal-Estanol,
Dr. Richard Kabanda
Dr. Charles Ruhara

19. Unit Approval

Director and Senior staff contributing to the Program to confirm agreement

Department	Director/Coordinator/Staff	Date
1	Signature:	
	Print Name: Prof. Etienne Ntagwirumugara	
2	Signature:	
	Print Name:	
3	Signature:	

	Print Name:	
4	Signature:	
	Print Name:	

Seen and agreed

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

COLLEGE OF SCIENCE AND TECHNOLOGY – UNIVERSITY OF RWANDA

ACE-IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)

MASTER OF SCIENCE IN ENERGY ECONOMICS

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Module Description

1. **Module Code: EEC6264**
2. **Module Title: Macroeconomics**
3. **Level : 06 Semester: 02 Credits: 15**
4. **Administering Unit: ACE-ESD**
5. **Core: core module**
6. **Year of Presentation: 2017-2018**
7. **Pre-requisite or co-requisite modules: N/A**
8. **Allocation of study and teaching hours**

DESCRIPTION	STUDENT HOURS	STAFF HOURS
LECTURES	24	48
SEMINARS/ WORKSHOPS		
PRACTICAL CLASSES/ LABORATORY	18	36
STRUCTURED EXERCISES	6	12
SET READING ETC.		
SELF-DIRECTED STUDY	42	42
ASSIGNMENTS – PREPARATION & WRITING	40	30
EXAMINATION – REVISION & ATTENDANCE	20	44
OTHER: INVIGILATION END OF MODULE		3
TOTAL	150	215

9. Brief Description of Aims & Content

The module aims to expose students with to the study of macroeconomic theory and the theory of macroeconomic policy. The module will ensure that students are familiar with modern methods in Macroeconomics, starting from a range of theoretical assumptions, as well as providing an understanding of a variety of different macroeconomic models. The module approaches macro-economic modelling from micro-foundations. The module will also aim to introduce students to dynamic stochastic general equilibrium (DSGE) modelling along with related numerical applications, and apply these models to solution of macroeconomics problems.

10. Learning Outcomes

A. Knowledge and Understanding

Having successfully completed the module, students should have the following knowledge:
A1. Give students an understanding of a variety of different macroeconomic models.
A2. Equip students with the experience in manipulating formulae and deriving results from the macroeconomic models

B. Cognitive/Intellectual skills/application of knowledge

Having successfully completed the module, students should have the following knowledge:
B1. To be able to use key mathematical techniques common in macroeconomic theory
B2. Acquire sufficient knowledge and technique to be able to analyze macroeconomic issues in a robust manner

C. *Communication/Analytical techniques/Practical skills*

Having successfully completed the module, students should have the following skills:
C1. Be able to undertake study, research and for practical application of macroeconomic principles

D . General transferable s k i l l s

Having successfully completed the module, students should have the following skills:
D1. Be able to work with macroeconomic models to produce results which can help to solve practical problems

D2. Ensure familiarity with modern methods in Macroeconomics, which encompasses a range of theoretical assumptions

11. Indicative Content

1. Growth Models (Sollow and Ramsey)
2. Real Business Cycle Models
3. New Keynesian Models
4. Monetary Policy
5. Fiscal Policy
6. Models of investment with credit constraints
7. Models of decentralized trade (applied both to labour and financial markets)

12. Learning and Teaching Strategies

The assessment strategy is designed to provide students with the opportunity to demonstrate a good understanding of different macroeconomic models and their properties the ability to manipulate models to derive results, demonstrate properties and solve problems. This is achieved through the following approaches:

Lectures: Important material from the text and outside sources will be covered in class. Students should plan to take notes as not all material can be found in the texts or readings.

Structured Exercises: This forms the basis of the module teaching. Students will be given hands-on training through lot of exercises. The objective is to keep the students in touch with the real world and to enhance their professionalism.

Assignments: homework problems and readings will be assigned periodically to help support and supplement material found in the text.

Continuous Assessment Tests: occasional scheduled or unscheduled quizzes/ tests will be given to help ensure that students stay up with the assigned material.

13. Assessment Strategy

The assessment strategy is developed with the aim of testing the module's learning outcomes. In particular, students will be assessed by means of both formative and summative assessment through coursework and examination. Assessment comprises the submission of a coursework portfolio and a seen examination.
60% based on individual assignments, quizzes, tutorials/practice, 40% - written examination.

14. Assessment Criteria:

For the examination setting and marking the UR generic marking criteria will be used.

15. Assessment Pattern

Component	**Weightage (%)**	**Learning objectives covered**
In-course assessment:	**60**	
• Practical assignment • Mini project • Tutorial & Practice	20 20 20	A1, A2, B1, B2, C1, D1, D2
Final assessment	**40**	A1, A2, B1, B2, C1, D1, D2

16. Strategy for feedback and student support during module

All lecture materials will be delivered to students. When student does not understand material, he/she should ask question, either in class, by e-mail, or come by the lecturer's office as soon as the student realizes that he/ she is having difficulty with the course.

17. Indicative Resources

a. Reference books

1. Advanced macroeconomics - Romer, David (2012)
2. Introducing Advanced Macroeconomics: Growth and Business Cycles - Sørensen, Peter Birch, Whitta-Jacobsen, Hans Jørgen (2010)
3. Introduction to economic growth - Jones, Charles I. (2002)
4. Macroeconomics - Mankiw, N. Gregory, Taylor, Mark P. (2008)

b. Other References

1. Macroeconomics: imperfections, institutions, and policies - Carlin, Wendy, Soskice, David W. (2006)
2. Foundations of modern macroeconomics - Heijdra, Ben J. (2009)
3. Economic growth - Weil, David N. (2009)
4. Foundations of international macroeconomics - Obstfeld, Maurice, Rogoff, Kenneth (1996)

c. Other resources

Journals:

- Economics of Energy & Environmental Policy Journal,
- Energy Economics Journal
- Energy for Sustainable Development Journal

Key websites and on-line resource

18. Teaching Team: 2 Lecturers from UR (CBE)

19. Unit Approval

Director and Senior staff contributing to the Program to confirm agreement

Department	Director/Coordinator/Staff	Date
1	Signature:	
	Print Name: Prof. Etienne Ntagwirumugara	
2	Signature:	
	Print Name:	
3	Signature:	

	Print Name:	
4	Signature:	
	Print Name:	

Seen and agreed

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

MODULE DESCRIPTION FORM

1. **MODULE CODE : EEC6461**
2. **MODULE TITLE : MASTER'S DISSERTATION**
3. **LEVEL : 06 SEMESTER: 03 & 04 CREDITS: 80**
4. **FIRST YEAR OF PRESENTATION : 2017-2018**
5. **ADMINISTERING UNIT: AFRICAN CENTER OF EXCELLENCE IN ENERGY FOR SUSTAINABLE DEVELOPMENT (ACE-ESD)**
6. **CORE: Core Module**
7. **PRE-REQUISITE OR CO-REQUISITE MODULE, EXCLUDED COMBINATIONS: NA**
8. **ALLOCATION OF STUDY & TEACHING HOURS :**

Learning format	**Activity**	**Hours**
Faculty Hours	Faculty-student feedback sessions	**200**
Student Hours	Self-paced learning (mostly online), individual research and project execution	600

Total	**800**

9. BRIEF DESCRIPTION OF AIMS & CONTENT:

This project work/dissertation is aimed at creating confidence in the learners to do independent project development and management / research work by applying the knowledge they have gained over the previous two semesters. The learners have the option to choose either a project work or Dissertation individually of his/her choice in consultation with the allotted supervisor.

10. LEARNING OUTCOMES :

A. KNOWLEDGE & UNDERSTANDING: (A1, A2, A3, A4, A5)

At the end of the program students should be able to demonstrate knowledge and understanding of:

A1. Concepts of communications and management at an advanced level

A2. Application of advanced concepts, principles and theories of energy economics to solve practical problems

A3. The awareness of standards of practice in design and development

A4. The professional, legal and ethical engineering responsibilities

A5. Quality and benchmarks in System development

B. COGNITIVE/ INTELLECTUAL SKILLS/ APPLICATION OF KNOWLEDGE: (B1, B2, B3, B4)

Having successfully completed the module, students should be able to:

B1. Identify and apply appropriate mathematical methods for modelling and analysis in energy economics

B2. Use scientific and systems design principles in the development of solutions to problems

B3. Apply energy economics knowledge, professional software and bench marks to produce innovative designs of systems and components

B4. Critically assess energy economics conditions

C. COMMUNICATION/ NUMERACY/ ANALYTIC TECHNIQUES/ PRACTICAL SKILLS (C1, C2, C3, C4, C5, C6)

Having successfully completed the module, students should be able to:

C1. Specify, plan, manage, conduct and report on development and research projects

C2. Prepare technical reports and deliver technical presentations at an advanced level

C3. Use competently and safely standard instrumentation and systems

C4. Observe and record skilfully and accurately data as well as experimental evidence in development or research work

C5. Critically analyse, evaluate and interpret data and apply them to the solution of development problems

C6. Demonstrate an awareness of advanced and practical skills especially in analysis and design of energy system.

D. GENERAL TRANSFERABLE SKILLS: (D1, D2, D3, D4, D5, D6)

Having successfully completed the module, students should be able to:

D1. Have the capacity for self-learning

D2. Undertake lifelong learning with active involvement in research and development

D3. Carry out independently a sustained investigation and research in the relevant areas

D4. Communicate the development documentation/research findings effectively (written, verbal, drafting, sketching etc.)

D5. Demonstrate general problem-solving skills

D6. Use competently all available system modelling/prototyping techniques

11. INDICATIVE CONTENT

The problem to be addressed will require the student to draw from theories and techniques studied in the course.

The module will also cover the following project work topics:

- Information search, retrieval and evaluation
- Project definition and planning
- Use of conceptual models and frameworks
- Research methodology
- Problem solving
- Design
- Action planning
- Report writing
- Oral presentation
- Project management
- Evaluation

12. LEARNING & TEACHING STRATEGY:

Learning by practical work includes field survey, analysis and design after passing all the previous modules. The project to be done shall involve professional software aspects like

requirement / design / analysis / testing tc. In addition, appropriate laboratory works will be conducted for better implantation of some research projects. Teaching strategy will be based on coaching, guidance, facilitation, research team and supervision approaches.

13. ASSESSMENT STRATEGY :

100% based on individual research and dissertation work done on the project with special emphasis on the contribution to knowledge.

The final projects/dissertations will be evaluated for quality and contribution to knowledge based on the written project report/dissertation, presentation and oral examination by the external examiner(s).

Assessment Criteria:

- For the examination setting and marking the UR generic marking criteria will be used.
- For the assessment of the practical exercises, the UR assessment criteria will be used.

14. ASSESSMENT PATTERN :

Component		**Weighting (%)**	**Learning objectives covered**
In-course assessment:		**100**	
Practical defence	Internal examiner	25 project implementation	A1, A2, A3, A4, A5, B1, B2, B3, B4, C1, C2, C3, C4, C5, C6,D1, D2, D3, D4, D5, D5
	External examiner	25 project implementation	A1, A2, A3, A4, A5, B1, B2, B3, B4, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D5
Final assessment	Internal examiner	20 viva	A1, A2, A3, A4, A5, B1, B2, B3, B4, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D5
	External examiner 1	15 thesis/project	A1, A2, A3, A4, A5, B1, B2, B3, B4, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D5
	External examiner 2	15 thesis/project	A1, A2, A3, A4, A5, B1, B2, B3, B4, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D5

15. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE :

Student Feedback:

Feedback to students shall be in form of report prepared after each assessment strategy. It shall also refer and indicate any changes required to be done for the presentation etc.

Student feedback forms shall be provided to evaluate the process, and module as a whole.

Student Support:

Each supervisor shall individually assist the student with their project/ dissertations etc. the student and concerned supervisor shall both keep record of their meeting and record discussions as required.

Students shall be provided with relevant computer equipment reference books journal and other resources as required

16. INDICATIVE RESOURCES :

As determined by the supervisor

- Journals
- All publications relevant to the area of research
- Key websites and on-line resources

Teaching/Technical Assistance

17. TEACHING TEAM :

Supervisors Staff

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18. UNIT APPROVAL :

Director and Senior staff contributing to the Program to confirm agreement

Department	Director, Coordinator, Staff	Date
1	Signature :	
	Print Name : Prof. Etienne Ntagwirumugara	
2	Signature :	
	Print Name :	

3	Signature :	
	Print Name :	
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Library	Signature:	
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	Print Name:	
Teaching and Learning Enhancement	Signature:	