University of Technology, Jamaica

Caribbean Sustainable Energy & Innovation Institute
and
Faculty of The Built Environment

Master of Science

SUSTAINABLE ENERGY AND CLIMATE CHANGE

PROGRAMME

INTRODUCTION

The multidisciplinary Masters degree is responsive to the global drivers for sustainable development linked to Energy and Climate Change solutions. The curriculum integrates multiple disciplines such as; engineering, natural and social sciences, humanities and the built environment in keeping with global trends for low carbon economic growth, innovation and green business development.

EXPECTED

OUTCOMES

Upon completion graduates should be:

Critical thinkers who apply scientific principles to develop & implement policies, regulatory frameworks and standards for effective management and governance.

Able to articulate linkages between sustainable energy and climate change for a more holistic approach to energy and find solutions to minimise the region's dependency on fossil fuels.

Able to use the tools and methods learned in the course of studies to set up and develop innovative green businesses.

Be transformative leaders for sustainable development.

COURSE STRUCTURE

Ten (10), Three (3) credit modules consisting of eight (8) compulsory modules and a choice of two (2) from the list based on experience and interest.

1 Research Methodologies

This module will train students in various research methodologies; use of relevant statistical packages in primary research and data analysis. Data interpretation and applied methodologies for action research, relevant to energy and climate issues, business development and market analysis, including interview techniques, focus group and multi-disciplinary team dynamics methods will be introduced.

2 Sustainability of Energy Systems

The module identifies aspects of sustainability and their implications to the viability, affordability, cleanliness and efficiency of energy systems. At the same time, methodologies and tools, from model based integrated assessment to corporate sustainability management will be used to compare and justify policies to achieve sustainability goals.

COURSE STRUCTURE

Ten (10), Three (3) credit modules consisting of eight (8) compulsory modules and a choice of two (2) from the list based on experience and interest.

3 Climate Change and Sustainable Lifestyles

This module explores the science, politics and impacts of climate change. Students will be introduced to techniques for disaster and risk management as well as sector specific tools for climate impact assessment. They will also examine the business operation and lifestyle changes that can serve as climate change mitigation or adaption measures.

4 Energy and Environment Policies, Regulations and Economics

The transformation of the energy system into a sustainable and low-carbon system touches on various conflict cleavages. Energy policies are often in conflict with other national goals such as sustainable development and climate protection. This module intends to pursue an integrated approach in assessing national energy and environmental policies and regulations.

COURSE STRUCTURE

Ten (10), Three (3) credit modules consisting of eight (8) compulsory modules and a choice of two (2) from the list based on experience and interest.

5 Green Business and Green Growth

The module introduces the concept of green economic growth and covers all necessary preconditions for setting up a green business. It provides an introduction into theoretical basics of microeconomic theory as well as into practical aspects of business development, including tools for evaluating sustainable business options and developing business plans.

6 Energy and Environmental Data Management

Knowledge allows people to reach sound judgment in various problem contexts. The module exposes students to the use and challenges of energy and environmental data management and allows the students to apply scientific and technical principles, make sound judgment, to transfer knowledge, demonstrate mastery of managing environmental data, tasks and reporting requirements.

COURSE STRUCTURE

Ten (10), Three (3) credit modules consisting of eight (8) compulsory modules and a choice of two (2) from the list based on experience and interest.

7 Energy Management in Buildings and Industry

The module on energy management in buildings and industry addresses the principles of sustainable energy use in the buildings and industrial sectors. As the two sectors contributing most to emissions, a focus on mitigation technology options, practices and behavioural aspects of the two sectors will not only allow resolving mitigation barriers, but also provide additional benefits such as cost reduction.

8 Energy and Environmental Data Management

Innovation and entrepreneurship are crucial for developing and implementing green production processes and services and consequently necessary to establish a green economy. The module is concerned with the development of green innovation and management processes and their application to the creation and upgrading of green SME in the Caribbean.

ELECTIVES

Students will select any two (2) of the following electives below, based on area of interest, experience, and qualification. Selection will be made after completion of the first six modules.

- **Solar PV Design and Implementation**

Solar PV is one the most widely used form of renewable energy worldwide. The technology, while universally similar, must have its application custom designed to meet the physical, regulatory and operation requirements of the area in which it is to be utilized. This module provides the student with the requisite considerations supported by practical experience from concept to product.

- **Ocean Resources Management**

Although ocean energy is still in its early stage of development, it offers the potential for long-term carbon emission reduction, and energy supply security in the Caribbean region. This module aims to look at the theoretical potentials of ocean energy in supplying electricity as well as the potential socio-economic and environmental impacts of utilizing ocean energy.

ELECTIVES

Students will select any two (2) of the following electives below, based on area of interest, experience, and qualification. Selection will be made after completion of the first six modules.

- **Sustainable Transport**

Because mobility is a major development priority, transportation issues need to be included in any sustainable urban environment planning. Ensuring the sustainability of the transportation sector brings co-benefits in other areas such as health, job security and economic development. This module introduces the concept and components of sustainable transportation with focus on policy, system and technology as well as existing and emerging real planning issues.

- **Smart Grid and Grid Management**

Provide a thorough understanding of the analysis, design and operation of smart grids, addressing in-depth some of the major issues such as active network management, the integration of distributed energy resources and enabling technologies.

ELECTIVES

Students will select any two (2) of the following electives below, based on area of interest, experience, and qualification. Selection will be made after completion of the first six modules.

- **Integrated Water Resources Management**

The module underscores the significance of water resources management is an important component of sustainable development of human settlement, especially in developing countries. The principles of Integrated Management are introduced as spin-offs from integrated development planning and are taken to mean, the multidisciplinary approach to water resources management. The module places this approach as parallel with considerations for mainstreaming concerns of energy, waste water, conservation, land use, ecological footprints and climate change within the development debate.

- **Bio-Based Economy**

The module critically reflects on the economic development potential of the bio-economy, comprising of those parts of the economy that use renewable biological resources from land and sea to produce food, materials and energy. It focuses on bio-energy and business opportunities for the Caribbean arising from the entire bio-economy.

ELECTIVES

Students will select any two (2) of the following electives below, based on area of interest, experience, and qualification. Selection will be made after completion of the first six modules.

- **Climate Change and Sustainable Planning**

The module examines the correlation among developmental forces driving contemporary human settlement socio-demographic dynamics and spatial morphogenesis within the intellectual understandings of sustainability and ecological management. The course brings together in a systematic manner the application of sustainability concepts, principles of natural resources management, energy conservation and climate change along with related aspects of knowledge gained socio-spatial sciences in fundamentally interpreting and assessing the impacts of multiple development options on socio-ecological structures and systems.

- **Sustainable Community Development**

This module aims to look at how to develop, advocate, and implement fundamental changes in communities' access to basic services like energy supply to promote sustainable development. The theory and practice of sustainable community development (SCD) are discussed, focusing on social enterprises and development of community schemes for service provision.

160 HOURS OF **INTERNSHIP**

Students will undertake four weeks of internship having completed their core modules and electives which would have grounded them in the theoretical and practical aspects of green business development. Placement will be aligned to their thesis topic. They will provide insights to the industry assigned based on their new knowledge while gaining operational experience, and mentored further in preparing their Research Project. An assessment will be done by their internship supervisor. The credit value of the internship is two (2).

INNOVATION FOCUSED **RESEARCH PROJECT**

Students will prepare a research proposal on a specific area of innovation interest. The purpose is to produce a document which contains all the elements of an implementable green business idea. Students will be guided by a team comprising academics and industry practitioners, who will assess the merits of the proposal and provide direction. The research will be written in compliance with the standards of the University. The credit value of the research project is four (4).

FINANCIAL INFORMATION

TUITION

Local	**USD 18,000 plus ancillary fees**
CARICOM Students	**USD 20,000 plus ancillary fees**
Extra-CARICOM	**J 1,600,000 plus ancillary fees**

STUDENTS CAN EITHER:

1) Pay their fees in full on or before the commencement of the course **or**

2) Pay in installments as follows:

Local Students

Deposit 1	**J $400,000 plus ancillary fees**
Deposit 2	**J $400,000**
Deposit 3	**J $400,000 plus ancillary fees**
Deposit 4	**J $400,000**

Extra-CARICOM Students

Deposit 1	**US $5000 plus ancillary fees**
Deposit 2	**US $5000**
Deposit 3	**US $5000 plus ancillary fees**
Deposit 4	**US $5000**

CARICOM Students:

Deposit 1	US $4500 **plus ancillary fees**
Deposit 2	**US $4500**
Deposit 3	**US $4500 plus ancillary fees**
Deposit 4	**US $4500**

Kindly Note:

1. *Where full payment is made on or before commencement of the course; students will receive a discount of J$40,000, US$450, US$500, respectively.*

2. *The latter three payments are due on the dates outlined below:*

i. October 02, 2017

ii. January 03, 2018

iii. April 02, 2018

3. *A late payment charge of JA$10,000 (local students) or US$250 (Overseas students) is applicable where fees are not paid in full after the first month of commencement of the Course.*

4. *Fee Payments should be completed by month 12 of the Course. However, students may be given an extension to settle all fees by the 16th month, at which time an additional charge of JA$5,000 or US$150 (local and overseas students respectively) will be applied for late payment.*

SOME OF OUR FACULTY

Sustainability of Energy Systems

Dr. Ruth Potopsingh is Associate Vice President–Sustainable Energy, at the University of Technology, Jamaica where she heads the Caribbean Sustainable Energy and Innovation Institute. She is a Commonwealth scholar and holds a PhD in Sustainable Development, an MBA and MSc in Urban Development Planning.

She has lead several key national energy initiatives and a former Group Managing Director of the Petroleum Corporation of Jamaica. She is the conceptualizer of the MSc in Sustainable Energy and Climate Change. She is actively engaged in the global community on matters relating to energy, Climate Change, the environment and women in energy. Her mission is to empower the next generation to be on the cutting edge of innovation and entrepreneurship within the context of sustainable development.

SOME OF OUR FACULTY

Green Entrepreneurship & Innovation

Dr. Paul W. Ivey has been a science educator and higher education administrator for more than 30 years. He is currently Associate Professor and Associate Vice President for Graduate Studies, Research & Entrepreneurship in the School of Graduate Studies, Research & Entrepreneurship (SGSRE), University of Technology, Jamaica. He holds Doctor of Philosophy and Master of Science degrees from Louisiana State University, Baton Rouge, USA; a Master of Education in Adult Education/Lifelong Learning from Mount St. Vincent University, Halifax, Canada; and a Bachelor of Science from The University of the West Indies, St. Augustine, Trinidad &Tobago. He is founding member and President of the Caribbean Research & Innovation Management Association (CabRIMA), which is the professional body for Research & Innovation Management Practitioners in the Caribbean region. Dr. Ivey has also authored and co-authored several papers on research and innovation management that have been published in leading journals in the field, such as The Journal of Research Administration and Research Management Review.

SOME OF OUR FACULTY

Ocean Resource Management

Dr. Devon Gardner is the Programme Manager for Energy and Head of the Energy at the CARICOM Secretariat. Previous to his appointment at the Secretariat, Dr. Gardner was a Technical Adviser to the GEF-UNEP Energy for Sustainable Development (ESD) Project and the SIDS DOCK Island Energy Initiative. He also served as an Adjunct Professor in the Sustainable Energy Management Programme at the Arthur Lok Jack Graduate School of Business, University of the West Indies in Trinidad and Tobago; Associate Professor of Physical Chemistry at the College of The Bahamas and Northern Caribbean University (Jamaica); Visiting Professor and Senior Research Fellow in Chemical Physics at the University of Iceland and the University of Leiden in The Netherlands respectively. He has published over fifty peer-reviewed articles and studies and received his Ph.D. in Physical Chemistry with specialization in numerical analysis from the University of the West Indies, Mona.

SOME OF OUR FACULTY

Ocean Resource Management

Professor Albert Binger, former Professor and Director for the University of the West Indies Centre for Environment and Development, is currently the Interim-Executive Director of the Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE) Dr. Binger is also the Energy Science Advisor of the Caribbean Community Climate Change Centre, and SIDS DOCK Coordinator. He is a member of the United Nations Framework Convention on Climate Change Technology Executive Committee and a the former Science Advisor and Technical Coordinator to the Alliance of Small Island States (AOSIS) and Visiting Professor at Saga University, Saga, Japan, in Ocean Thermal Energy Conversion (OTEC). He is the former Chair, Strategic Planning and Director the Global Environment Division, Rockefeller Foundation, in New York, USA; and founding Director of the Biomass Users (BUN) Network, San Jose, Costa Rica. He was Director, Bioenergy Division, responsible for identifying and promoting opportunities for public private partnership private investments in non-food agriculture at Agro 21, Office of the Prime Minister, Kingston, Jamaica; and former Director for Research and Development at the Scientific Research Council, Kingston, Jamaica.

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SOME OF OUR FACULTY

Energy and Environmental Policies, Regulations & Economics

Dr. Ariel Macaspac Hernández is a senior scientific fellow at the Fraunhofer MOEZ. He belongs to the group “Stakeholder Dialogue and Societal Acceptance. He achieved his M.A. in Political Science, Sociology and Education from the Ludwig-Maximilian-University (LMU) in Munich. At the European University of Frankfurt / Oder, a Master's degree in mediation followed. He pursued his doctoral studies in Political Philosophy as well as in Economics and Social Sciences at the University of Vienna (summa cum laude) and University of Cologne (summa cum laude) respectively: "Strategic Facilitation of Complex Decision-Making - How Process and Context Matter in Global Climate Change Negotiations" at the University of Cologne and "Nation-building and Identity Conflicts. Between 2008 and 2010 he was a co-ordinator and researcher in the "Program on International Negotiations" of the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria as a research assistant at the Institute for Infrastructure and Resource Management at the University of Leipzig In the fifth edition of the Intergovernmental Panel on Climate Change (IPCC).

SOME OF OUR FACULTY

Green Business and Green Growth

Professor Dr. Utz Dornberger is the head of the Leipzig Fraunhofer Center group focusing on "knowledge-intensive services and business development policies" at the Fraunhofer Center Leipzig's Knowledge and Technology Transfer Division. He studied biology at various universities in Jena, Bilbao (Spain) and Paris (France) and graduated with a PhD in biochemistry from Friedrich Schiller University in Jena. He then took a postgraduate course in Small Enterprise Promotion and Training (SEPT) at Leipzig University, which he completed with a Master's degree in Small Business Studies. He worked at Leipzig University as a research assistance and lecturer until 2004. Professor Dornberger was active as a project manager for international research projects in the area of development and promotion strategies for high-tech industries. Professor Dornberger was appointed head of the international SEPT program (SEPT – Small Enterprise Promotion & Training) at Leipzig University in 2004. He is a professor for business development, especially the development of small and medium-sized enterprises. His key responsibilities include analyzing, advising, implementing, training and coaching in the area of small and medium-sized enterprise promotion and support.

SOME OF OUR FACULTY

Energy & Environmental Data management

Mr Omar Alcock is the Senior Technical Officer (Mitigation) Climate Change Division in the Ministry of Economic Growth and Job Creation. He holds a Bachelor degree in Mathematics and a Master of Science degree in Economics both from the University of the West Indies (UWI), Mona. Mr Alcock's specialist areas include economics and statistical analysis, forecasting, research, research methodologies, energy sector analysis, commodity market analysis, strategic planning, computer technology and general business consultancy. He is a former Senior Economist in the Energy Economics and Planning Unit (EEPU) of the Energy Division of the Ministry of Science, Energy and Technology (MSET) a post he held for ten years. During his tenure he was deeply involved in energy modelling, research, data analysis, energy planning, the production of publications and several related projects and programs.

SOME OF OUR **FACULTY**

Solar PV Design & Implementation

SOME OF OUR FACULTY

Climate Change & Sustainable Planning

SOME OF OUR **FACULTY**

Climate Change & Sustainable Lifestyles

SOME OF OUR FACULTY

Energy Management in Buildings & Industry

SOME OF OUR FACULTY

Research Methodologies

SOME OF OUR FACULTY

Research Methodologies

FOR ADDITIONAL INFORMATION

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APPLICATION

INFORMATION

In addition, please find the links to our Admissions webpage, Graduate application process and graduate application form below.

https://www.utech.edu.jm/admissions

https://www.utech.edu.jm/admissions/how-to-apply/graduate

https://www.utech.edu.jm/forms/graduate-application-form/view

http://www.utech.edu.jm/academics/cseii/msc-sustainable-energy-and-climate-change