UNIVERSITY of GUYANA

FACULTY OF EARTH AND ENVIRONMENTAL SCIENCES
DEPARTMENT OF ENVIRONMENTAL STUDIES

POSTGRADUATE STUDENT

HANDBOOK

THE FACULTY OF EARTH AND ENVIRONMENTAL SCIENCES

The Environmental Studies Unit (ESU) was established in 1993, with technical and financial support from the European Union, for the purpose of promoting teaching and research and providing guidance to decision-makers and national agencies in the areas of natural resources management and environmental conservation. One of the primary objectives if the Unit was to offer a degree of Bachelor of Science in Environmental Studies. The first batch of undergraduate students was enrolled in January 1994. The ESU continued until 2005 when the School of Earth & Environmental Sciences (SEES) was established through a merger of the ESU and the Department of Geography (DoG). In January 2013, the School launched the Master of Science in Environmental Management with two specialisation streams: natural resources management and climate change and disaster management. The School was re-designated to Faculty of Earth and Environmental Sciences (FEES) on October 1, 2016.

The Faculty's overall goal is to provide quality tertiary education in the Earth and Environmental Sciences and to conduct interdisciplinary/multidisciplinary research and extension services (to those who are not enrolled in the regular programmes) in areas such as environmental management, sustainable land use planning, natural resources management, housing and settlement development, and earth surface dynamics. It accomplishes this through two Departments, one of which is that of Environmental Studies.

Mission Statement

To produce graduates with the technical skills, knowledge, and attitudes required to support community and national development in a highly reputable and intellectually stimulating learning environment.

Vision Statement

The vision is for a community of staff and students dedicated to the provision of exciting learning experiences characterised by high-quality teaching, research, and community service that positively impact the development goals of society.

Core Values

- **Excellence** – Performance of staff and students is of the highest standard
- **Sustainability** – Standards and capacity to deliver remain unwavering
- **Stewardship** – Championing responsible use and protection of the environment
- **Integrity –** Professionalism remains unquestionable
- **Leadership –** Trust and reliability are engendered
- **Engagement –** Involvement in the Faculty's/University's interest
- **Visibility -** Tasks handled with confidence and dexterity

ABOUT THE DEPARTMENT OF ENVIRONMENTAL STUDIES

The Department of Environmental Studies seeks to offer programmes that are relevant and current in such a way that it makes a lasting impact on our students. Guyana has a rich diversity of people and natural resources that form part of our environment. Managing our natural resources for economic development that meet this needs of our diverse population today and tomorrow is the impetus driving our programmes. Our programmes therefore utilise active and collaborative learning strategies to engage and motivate our students to adopt practices and action for the environment. In this way, our students are able to experience the challenges and complexities of managing our environment for a people of diverse needs. These experiences are nurtured through critique and reflection to foster an understanding of the importance of exercising evaluative judgement in the design of practical solutions for national development.

Our programmes expose students to learning from the natural and social sciences. From the natural sciences, students learn experimental techniques and methods of analysis needed to make accurate observations, to document change, and to understand the dynamics of healthy landscapes and functioning ecosystems. From the social sciences and humanities, students gain insights into human behaviour as it relates to the natural environment and the workings of social, political, legislative, and economic institutions in the context of environmental and natural resource management.

Our students are taught by fulltime and part-time academics with expertise in the theoretical and practical underpinning of their content. The multidisciplinary and interdisciplinary nature of our courses fosters a team teaching approach which encourages guest lectures from industry professionals/experts which provides our students with a rich and diverse learning experience.

THE DEPARTMENT OF ENVIRONMENTAL STUDIES OFFERS MASTER OF SCIENCE OR MASTER PROGRAMMES IN FOUR SPECIALISED AREAS:

1. **Environmental Management**
2. **Natural Resources Management**
3. **Oil and Gas and Renewable Energy**
4. **Climate Change and Disaster Risk Management**

Goals

The Master of Science and Master programmes are both multidisciplinary and interdisciplinary and aim to build capacity amongst national and regional professionals by equipping them with the knowledge, skills, and technical expertise. The programmes are designed to provide students with a working knowledge of;

i. ecosystem services and valuation,
ii. national, regional, and international environmental law and policy,
iii. environmental management and monitoring tools and techniques,
iv. environmental economics and policy,
v. pollution control and waste management approaches,
vi. environmental policy formulation and appraisal.

The Ideal Graduate

The ideal Master graduate will possess technical competencies in the areas of;

- ✓ data analysis with the use of statistical software,
- ✓ communication through written reports and oral and visual presentations.
- ✓ scientific analysis and writing,
- ✓ Geographic Information System (GIS) Mapping and software application,
- ✓ environmental assessments, and
- ✓ critical thinking skills to solve environmental problems.

The ideal MSc. graduate will possess technical competencies in the areas of;

- ✓ data collection and analysis with the use of statistical software,
- ✓ data collection and analysis with respect to an identified research problem,
- ✓ communication through written reports and oral and visual presentations.
- ✓ scientific analysis and writing,
- ✓ Geographic Information System (GIS) Mapping and software application,
- ✓ research formulation, execution, and report preparation,
- ✓ environmental assessments, and
- ✓ critical thinking skills to solve environmental problems.

PROGRAMME STRUCTURE AND COURSES

The respective Master of Science and Master programmes consists of a combination of core and elective courses which may be completed over two (2) years (4 semesters).

The Master of Science and Master programmes differ on the basis of the research component. Students enrolled in one of the Master of Science programmes will be required to complete a Research Project while those in the Master programmes will be required to complete the courses Scientific Demonstrations in Research and Environmental Leadership.

Duration of study:

- ✓ Master of Science and Master – Minimum of two (2) years,
- ✓ Master of Science – Maximum of seven (7) years
- ✓ Master – Maximum of four (4) years

TEACHING METHODS AND APPROACHES

The focus of the Master of Science and Master programmes is the provision and development of the technical knowledge and research skills necessary to enable practicing professionals in both public and private sectors and semi- and non-professionals desirous of upgrading their knowledge and skills in the particular field to participate in the programme. Field projects and practical work will be a major component of the programme which is designed to equip students with research skills to seek solutions to specific environmental management problems across the Caribbean region. Students will be expected to demonstrate greater competence in the theoretical and practical aspects of the discipline, including the application of research methodologies in undertaking their research projects. The modules will be presented using hybrid approaches constituting face-to-face and/or virtual classes via Zoom and the Moodle learning management system.

Modules will be delivered through various teaching strategies, including, lectures, seminars, tutorials, labs, and fieldwork. In addition, resources available to students include the University Library, academic databases such as EBSCO and JSTOR, ARGIS, and CITI.

ASSESSMENT APPROACH AND GRADING SCHEME

All courses will be graded using the ***Continuous Assessment Approach*** as indicated on the course outline(s).

- ✓ No single assessment should have a maximum grade that exceeds 30% of the total course grade, and
- ✓ A minimum of four (4) assessments should be administered per course.
- ✓ The Grading Scheme is as follows:

A = **≥ 80**
B = **70-79**
C = **60-69**
F = **< 60**

For students in the final year of the programme, who fail a course, a re-sit examination will be offered in accordance with the University's regulations. Resits are offered only to those students who fail no more than two (2) courses in their final year. Resits will not be offered in courses for which students were not registered in the final year.

For the Master of Science programme, the research thesis will be graded as Pass/Fail on the basis of the report submission for the course ENV 6401– Research Project. The grading scheme is as follows:

- ✓ Pass: 80 to 100
- ✓ Pass with minor corrections: 70 to less than 80
- ✓ Pass with significant corrections: 60 to less than 70
- ✓ Referred back: 50 to less than 60

GRADUATION REQUIREMENTS

- ✓ Students who complete their full complement of *Core* and *Elective Courses* and a *Thesis Research* (Project) will graduate with a Master of Science Degree.
- ✓ Students who complete their full complement of *Core* and *Elective Courses*, the *Scientific Demonstration in Research* and *Leadership* courses will graduate with a Master Degree.
- ✓ Students will graduate with:
  - ***Distinction***: minimum GPA of **3.4** in the core and elective courses; MSc students will also require a pass with minor corrections in the thesis; or
  - ***Pass***: minimum GPA of **2.0**
- ✓ Number of credits required for graduation:
  - 60 credits

EXIT STRATEGY

A student may exit the programme if he/she has completed a **minimum of 48** credits within the prescribed time. The minimum credits must include all courses with required grade point average minus the thesis - ENV 6401– Research Project (for Master of Science programmes) or minus the ENV 6402 – Scientific Demonstrations in Research and ENV 6201 – Environmental Leadership Courses (for Master programmes).

The student may receive one of the following:

- ✓ Post-Graduate Diploma in Environmental Management
- ✓ Post Graduate Diploma in Natural Resources Management
- ✓ Post Graduate Diploma in Oil and Gas and Renewable Energy
- ✓ Post Graduate Diploma in Climate Change and Disaster Risk Management.

There is no classification of the diploma with the exit strategy.

PROGRAMMES

Environmental Management (EM):

This programme seeks to promote the use of environmental safeguards in organisations and will provide skills and knowledge related to the processes or activities that cause environmental degradation and pollution, and the approaches to effect sustainable change. The programme is designed to equip the aspiring Environmental Manager with the complement of technical skills and expertise which will contribute to the formulation of an efficient, dynamic, safe, and sustainable industries. The programme provides exposure to analytical skills and research, current environmental management systems, green technology approaches, sustainable energy pathways, pollution control mechanism, environmental and occupational health.

ENTRY REQUIREMENTS:

Master of Science

i. An undergraduate degree with a minimum GPA of 2.5 in a relevant area, including Environmental and Earth Sciences, Natural Sciences, Forestry, Agriculture, Engineering, Architecture, Management, Economics, Law or a related field.

ii. An undergraduate degree with a GPA of less than 2.5 in a relevant area with a minimum of 3 years relevant post qualification experience.

iii. A Postgraduate Diploma with a minimum GPA of 2.5 in a relevant *field (approved by the Department of Environmental Studies)*.

Master

I. An undergraduate degree in a relevant area, including Environmental and Earth Sciences, Natural Sciences, Forestry, Agriculture, Engineering, Architecture, Management, Economics, Law, or a related field.

ii. A Postgraduate Diploma in a relevant *field (approved by the Department of Environmental Studies)*.

iii. A mature student (over 26 years) engaged in relevant practice for at least 5 years with Diplomas or Certificates *(approved by the Department of Environmental Studies)*.

iv. Any other qualification deemed by the University to be equivalent to the above.

PROGRAMME STRUCTURE

Table 1	
Programme Profile for the MSc/M in Environmental Management	
Year 1 - Semester I	**Year 2 – Semester I**
ENV 5109 – Introduction to Natural Resource Development and the Environment	ENV 6101 – Statistics and Biometry
ENV 5306 – Environmental Law and Policy	ENV 5207 – Environmental Research Methods
ENV 5112 – Research Methods 1: Communication, Ethics and Scientific Writing	***Choose any TWO Electives from the list below:***
ENV 5113 – Geographic Information Systems for Environmental Management	ENV 5208 – Sustainable Energy and Development
Year 1 – Semester II	ENV 6104 – Environmental and Occupational Health
ENV 5301 – Environmental Impact Assessment	ENV 6105 – Cleaner Production
ENV 5213 – Environmental Economics and Policy Analysis	**Year 2 – Semester II**
Choose any TWO Electives from the list below:	ENV 6401– Research Project

ENV 5216 – Life Cycle Assessment	**OR**
ENV 5217 – Environmental Management Systems	ENV 6402 – Scientific Demonstrations in Research
ENV 5218 - Environmental Pollution and Analysis	ENV 6201 – Environmental Leadership

Natural Resources Management (NRM):

This programme is designed to promote the sustainable management of natural resources within Guyana and territories which share a similar geophysical and tropical landscape. While building competencies in the conduct of environmental assessments and the use of geo-spatial technology, the programme also provides exposure to core courses which serve to enhance research and analytical skills. The aspiring Natural Resource Manager can garner specific skills needed for the management of ecosystems, parks, protected areas, and water, forest, land and coastal resources.

ENTRY REQUIREMENTS:

Master of Science

I. An undergraduate degree with a minimum GPA of 2.5 in a relevant area, including Environmental and Earth Sciences, Natural Sciences, Forestry, Agriculture, Engineering, Architecture, Management, Economics, Law, or a related field.

ii. An undergraduate degree with a GPA of less than 2.5 in a relevant area with a minimum of 3 years relevant post qualification experience.

iii. A Postgraduate Diploma with a minimum GPA of 2.5 in a relevant *field (approved by the Department of Environmental Studies).*

Master

I. An undergraduate degree in a relevant area, including Environmental and Earth Sciences, Natural Sciences, Forestry, Agriculture, Engineering, Architecture, Management, Economics, Law or a related field.

ii. A Postgraduate Diploma in a relevant field *(approved by the Department of Environmental Studies).*

iii. A mature student (over 26 years) engaged in relevant practice for at least 5 years with Diplomas or Certificates *(approved by the Department of Environmental Studies).*

iv. Any other qualification deemed by the University to be equivalent to the above.

Table 2

Programme Profile for the MSc/M in Natural Resources Management

Year 1 - Semester I	Year 2 – Semester I
ENV 5109 – Introduction to Natural Resource Development and the Environment	ENV 6101 – Statistics and Biometry
ENV 5306 – Environmental Law and Policy	ENV 5207 – Environmental Research Methods
ENV 5112 – Research Methods 1: Communication, Ethics and Scientific Writing	***Choose any TWO Electives from the list below:***
ENV 5113 – Geographic Information Systems for Environmental Management	ENV 5208 – Sustainable Energy and Development

Year 1 – Semester II	ENV 5103 – Water Resources Management
ENV 5301 – Environmental Impact Assessment	ENV 5308 – Ecotourism, Parks and Protected Areas
ENV 5213 – Environmental Economics and Policy Analysis	**Year 2 – Semester II**
Choose any TWO Electives from the list below:	ENV 6401– Research Project
ENV 5203 – Forest Resources Management	**OR**
ENV 5219 – Land and Coastal Resources Management	ENV 6402 – Scientific Demonstrations in Research
ENV 5220 –Remote Sensing for the Environment	ENV 6201 – Environmental Leadership

(i) Oil and Gas and Renewable Energy (OGRE):

This programme has emerged out of the need to furnish Guyana's Oil and Gas and Renewable Energy Sector with trained personnel possessing industry specific skills to promote the sustainable utilisation of energy resources. The programme offers a unique blend of courses which exposes students to the operations of the dynamic energy sector and while providing tools for the development of research and analytical skills. The programme focuses on the environmental consequences of energy use, the mininisation of the impacts of the sector, and opportunities for use renewable energy and includes courses such as Environmental Management of the Offshore Environment, Energy Economics, Renewable Energy Simulation, and Health, Safety and Environmental Management for the Oil and Gas Sector.

ENTRY REQUIREMENTS:

Master of Science

I. An undergraduate degree with a minimum GPA of 2.5 in a relevant area, including Environmental and Earth Sciences, Natural Sciences, Engineering, Economics or a related science or engineering field.

ii. An undergraduate degree with a GPA of less than 2.5 in a relevant (science or engineering) area with a minimum of 3 years relevant post qualification experience.

iii. A Postgraduate Diploma with a minimum GPA of 2.5 in a relevant science or engineering field (*approved by the Department of Environmental Studies*).

Master

I. An undergraduate degree in a relevant area, including Environmental and Earth Sciences, Natural Sciences, Engineering, Economics or a related science or engineering field.

ii. A Postgraduate Diploma in a relevant science or engineering field (*approved by the Department of Environmental Studies*).

iii. A mature student (over 26 years) engaged in relevant practice for at least 5 years with Diplomas or Certificates in relevant science or engineering areas (*approved by the Department of Environmental Studies*).

iv. Any other qualification deemed by the University to be equivalent to the above.

Table 3

Programme Profile for the MSC/M in Oil and Gas and Renewable Energy

Year 1 - Semester I	Year 2 – Semester I
ENV 5110 - Introduction to the Oil and Gas Industry	ENV 6101 – Statistics and Biometry
ENV 5208 – Sustainable Energy and Development	ENV 5207 – Environmental Research Methods
ENV 5112 – Research Methods 1: Communication, Ethics and Scientific Writing	ENV 6102 - HSE for the Oil and Gas Industry
ENV 5113 – Geographic Information Systems for Environmental Management	ENV 6103- Renewable Energy Simulation
Year 1 – Semester II	**Year 2 – Semester II**
ENV 5301 – Environmental Impact Assessment	ENV 6401– Research Project
ENV 5214 - Energy Economics	**OR**
ENV 5215 - Environmental Management of the Offshore Environment	ENV 6402 – Scientific Demonstrations in Research
Choose ONE Elective from the list below:	ENV 6201 – Environmental Leadership
ENV 5221 - Climate Change and Carbon Management	
ENV 5220 –Remote Sensing for the Environment	

(ii) Climate Change and Disaster Risk Management (CCDRM):

This is a specialized Programme designed to address Climate Change and Disaster Risk Management issues in Guyana and the wider Caribbean. The programme is multidisciplinary in structure merging the streams of Climate Change and Disaster Risk Management. As such students are able to make clear linkages between the impacts of climate change and the implementation of disaster risk management approaches. The programme consists of core courses such as an Introduction to Climate Change Science and Modelling, Climate Change Policy and Negotiations, Climate Change Impacts, Mitigation and Adaptation, Community-Based Disaster Risk Management and Disaster Risk Management in the Caribbean.

ENTRY REQUIREMENTS:

Master of Science

i. An undergraduate degree with a minimum GPA of 2.5 in a relevant area, including Environmental and Earth Sciences, Natural Sciences, Forestry, Agriculture, Engineering, Economics or a related science or engineering field.

ii. An undergraduate degree with a GPA of less than 2.5 in a relevant (science or engineering) area with a minimum of 3 years relevant post qualification experience.

iii. A Postgraduate Diploma with a minimum GPA of 2.5 in a relevant science or engineering field (*approved by the Department of Environmental Studies*).

Master

I. An undergraduate degree in a relevant area, including Environmental and Earth Sciences, Natural Sciences, Forestry, Agriculture, Engineering, Economics or a related science or engineering field.

ii. A Postgraduate Diploma in a relevant science or engineering field (*approved by the Department of Environmental Studies*).

iii. A mature student (over 26 years) engaged in relevant practice for at least 5 years with Diplomas or Certificates in Climate Change or related areas (*approved by the Department of Environmental Studies*).

iv. Any other qualification deemed by the University to be equivalent to the above.

Table 4	
Programme Profile for the MSc/M in Climate Change and Disaster Risk Management	
Year 1 - Semester I	**Year 2 – Semester I**
ENV 5111 – Climate Change Science and Modelling/Introduction	ENV 6101 – Statistics and Biometry
ENV 5105 – Disaster Risk Management in the Caribbean	ENV 5207 – Environmental Research Methods
ENV 5112 – Research Methods 1: Communication, Ethics and Scientific Writing	ENV 5210 – Community-Based Disaster Risk Management
ENV 5113 – Geographic Information Systems for Environmental Management	ENV 5309 – Emergency Planning and Management
Year 1 – Semester II	**Year 2 – Semester II**
ENV 5211 – Climate Change Policy and Negotiations	ENV 6401– Research Project
ENV 5212 – Resilience: Coping with Disasters	**OR**
ENV 5209 – Climate Change Impacts, Mitigation and Adaptation	ENV 6402 – Scientific Demonstrations in Research
Choose ONE Elective from the list below:	ENV 6201 – Environmental Leadership
ENV 5221 - Climate Change and Carbon Management	
ENV 5222 – Climate Finance	

POSTGRADUATE COURSE DESCRIPTIONS

ENV 5103 – Water Resources Management

This course equips Environmental Managers with the essential knowledge and tools to understand the complex problems and techniques to manage the water resources. Case studies and a field visit will show how these are applied to real-world water-related issues. In this course, students will explore a variety of management issues related to water resources including water legislation, water policies, water resource economics, water sovereignty and global issues with water shortages and water distribution.

ENV 5105 – Disaster Risk Management in the Caribbean

The course will examine the dynamic interaction between the earth, ocean and atmosphere in which natural hazards occur and their potential social, economic and environmental impacts.

Students will be introduced to the origin and characteristics and impact of hydrometeorological and geologic hazards such as hurricanes, floods, droughts, landslides, earthquakes and volcanoes, as well as biological hazards such as such as bacteria and viruses. The interconnection between these hazards and options for reduction of disasters risks will also be examined and the interdependence of physical, social and economic characteristics in determining vulnerability will be considered in past disasters and for future planning. The importance of hazard and risk management in a comprehensive emergency management program will also be presented. The legislative framework and organizational relationships of the Caribbean Disaster Emergency Management Agency and the Caribbean Public Health Agency will be discussed and contrasted to other sectors within the Caribbean.

ENV 5109 – Introduction to Natural Resource Development and the Environment

This course introduces students to the general concepts that would be covered in the rest of the programme. It provides an insight into the complex interactions among social, political, cultural, economic and ecological factors associated with development of natural resources. As one of the first courses in the programmes, Introduction to Natural Resource Development and the Environment will develop students' knowledge in the areas of environmental management and resource management, especially for persons who may not have a strong background in environmental and resource studies. Additionally, students will be exposed to governance systems that promote prudent and sustainable management, of natural resource and protection of our environment. Importantly, the course also underscores the importance of thinking about environmental issues in a holistic way. Students will be provided with opportunities to explore these issues through lectures, tutorials and field-work activities.

ENV 5110 - Introduction to the Oil and Gas Industry

Since Guyana gained its independence in 1966, the country's chief economic assets have been its natural resources. In May, 2015 Guyana added to its wealth of natural resources with the discovery of high quality hydrocarbons, including crude oil. The exploration of oil, like the exploitation of Guyana's other natural resources, comes with both positive and negative impacts. This course provides an overview of the environmental issues and the technical and management approaches necessary to achieve effective environmental management in the exploration and production of oil and gas. It introduces the student to the different stages of the oil & gas sector (upstream, midstream & downstream); management systems and practices, technologies and procedures as well as the role of government in setting and enforcing regulations that prevent and minimize impacts.

ENV 5111 – Climate Change Science and Modelling/Introduction

As climate records have grown longer, humans' understanding of the Earth's climate system has improved and climate models have become more reliable and evidence of change in the global climate has mounted. It is widely accepted that both developed and developing countries will be affected and need to respond to climate change. However, the policy responses have so far had little or no impact on the build-up of emissions. As a result, it is necessary to acquire the scientific basis for understanding climate change, as well as the societal implications in order to analyse and critique policy issues related to climate change. To this end, this course provides an understanding of the science of global climate change and skills in the use of models to simulate climate and interpret the results from climate models.

ENV 5112 – Research Methods 1: Communication, Ethics and Scientific Writing

The purpose of this course is to introduce students to the fundamentals of the scientific process and delve into the principles behind the dissemination process of research. The course will give students the theoretical and practical skills to plan, conduct, analyse and present, orally and in written form. During this course, students will be exposed to effective communication for scientists, the ethical considerations in research design and dissemination including the evolution of ethical guidelines and the techniques and style used in scientific writing. Students are expected to attend weekly lectures and tutorials as these topics will unfold over the duration of the semester.

ENV 5113 – Geographic Information Systems for Environmental Management

This introductory course is designed for persons who have never used GIS software, as well as for persons who received past training through short courses but need to strengthen their knowledge and technical skills.

Students will learn to synthesize GIS techniques and environmental knowledge to respond specifically to environmental issues. This learner-centred course uses a combination of interactive lectures and computer-based practical laboratory sessions. This course also prepares students for the Semester II elective, Remote Sensing of Environment, by introducing spatial data processing, interpretation, and raster-based analysis.

ENV 5203 – Forest Resources Management

This course provides a theoretical and practical synthesis and overview of principles of forest management and how such management can and is being used to address various issues surrounding forest resources and the sustainable use and management of forest resources. The primary objective of the course is to provide students with a broad understanding of forest management and how it impacts various other land uses, such as coastal forest management, watershed management, forest soil management, non-timber forest (NTFP) management, wildlife management and forest ecology and dynamics. An overview of the direct and indirect benefits of forests will be offered, and students will be introduced to a range of forest management issues and techniques. The application of resource economics to forest resources will also be explored. The course will consist of readings and case studies with an emphasis on systems scale thinking and the identification/implementation of principles. Adaptive management concepts (systemic learning at the large scale) will be introduced as an organisational theme. A common thread throughout will be discussion of governance/political/socio-economic/ environmental/ cultural realities that may constrain or modify forest resource management strategies.

ENV 5207 – Environmental Research Methods

This course aims to offer students an overview of the principles and practices of scientific research, with particular reference to investigations into the natural and social environments of Guyana and the Caribbean.

Students will be introduced to all aspects of the research process, including the identification of research topic, the theoretical, methodological and ethical considerations of research design, data collection and analysis, and the dissemination of research and its findings. Students will attend lectures and tutorials on a weekly basis.

ENV 5208 – Sustainable Energy and Development

The aim of this course is to explore the potential and feasibility of sustainable energy sources in the Caribbean region. Fossil fuels and renewable energy sources, such as solar, wind, hydropower, and biofuels, and the economic, social, and environmental issues surrounding these sources will first be explored. The course will then move onto considering sustainability issues surrounding renewable and non-renewable sources of energy.

Cost-benefit analyses of energy sources with respect to the Caribbean will be undertaken.

The course will end by considering issues of energy conservation and management, including issues in transport (e.g., public transport systems, fuel-efficient cars, etc.) and building design.

ENV 5209 – Climate Change Impacts, Mitigation and Adaptation

As climate records have grown longer and humans' understanding of the Earth's climate system has improved, and as climate models have become more reliable, evidence of change in the global climate has mounted. While both developed and developing countries are being and will be affected by climate change, the developing countries, in particular the low-lying states and islands, are the most vulnerable and will be subject to the most damaging and potentially irreversible impacts. This course provides an understanding of the most important aspects climate change impacts, adaptation and mitigation.

ENV 5210 – Community-Based Disaster Risk Management

Disaster Risk Reduction (DRR) is a new approach aimed at reducing risk by empowering individuals and communities that face disaster. This course will demonstrate to students that disasters are a consequence of natural and/or social factors and that through capacity building individuals and communities are better able to cope with hazards. The course gives special focus to Community Based Disaster Risk Management (CBDRM) through the development of community disaster management plans. Additionally, the use of indigenous knowledge alongside scientific knowledge is also explored, and the importance of indigenous knowledge in decision-making is emphasised.

ENV 5211 – Climate Change Policy and Negotiations

Global climate is widely recognized as one of the most significant existential threats to humans and the environment in the 21st century.

This course will provide an overview of the climate science and the need to address the climate change problem through policy, explore issues (for example, ethics, politics and economics) influencing and affecting climate negotiations, and promote experiential learning to focus on the climate change policy making processes and climate diplomacy. The latter will involve the drafting of text for interventions, decisions and other written outcomes of the negotiating process, with the aim of building students' capacity to participate effectively in the negotiating process.

ENV 5212 – Resilience: Coping with Disasters

The world has witnessed a steady increase in the occurrence of natural hazards and disasters, as well as a significantly larger increase in associated economic-social impacts and loss of human lives. There is an urgent need for disaster resilience through structural and non-structural measures to safeguard the health of individuals, households, communities, countries, and the environment.

This course is designed to provide students with an understanding of the theoretical underpinnings regarding the multifaceted nature of disasters and their associated impacts, the underlining factors that give rise to vulnerability, policy and institutional responses to resilience building, and decision support tools for resilience building. Students will evaluate case studies and will design resilient projects, using their newly acquired knowledge and skills.

ENV 5213 – Environmental Economics and Policy Analysis

This course provides a theoretical and practical overview of various economic issues surrounding environmental and natural resources and the sustainable use of natural resources. Different policies and mechanisms to facilitate economic efficiency in economies and industries dependent on natural resources are examined. The application of resource economics to the Guyanese and Caribbean context in particular will be explored, with reference to resource-dependent industries such as tourism, fisheries, and forests. This course will provide an introduction to the economic value of environmental assets and costs of environmental problems, thus aiding in the formulation of sound economic and environmental policies to enhance the process of sustainable development. It will provide students with the basic theory in environmental and natural resource economics and how this underpins environmental management policy and decision making.

ENV 5214 - Energy Economics

The course provides an introduction to the international energy industry, inclusive of the new and emerging energy producers, and in-depth analysis of the fundamental contemporary energy economic issues faced by today's global energy industries, such as the oil and gas industries, and renewable energy sources.

ENV 5215 - Environmental Management of the Offshore Environment

The global economy will rely on hydrocarbon production for the next few decades as the world seeks to balance the need for this resource with the impacts that the oil and gas industry has on the environment. Proper environmental management of this sector is crucial for the benefits of exploring hydrocarbons to be recognised.

The oil and gas sector over the years has developed and utilised a number of strategies including the use of technology and best practices to help keep the environment safe. This course focuses on the major forms of waste streams produced from the oil and gas sector, the current technologies and the practical application of managing the major waste streams in an offshore environment. It also outlines the international regulations and best practices for managing these wastes.

ENV 5216 – Life Cycle Assessment

Life Cycle Assessment, or LCA, is a "cradle-to-cradle" approach for assessing the environmental impacts of products, services or systems. LCA allows for consistent comparisons of products, services or systems with respect their environmental performance.

This course is designed to provide students with knowledge on the fundamentals of LCA and an understanding of its relevance to environmental management. More specifically the course aims to: provide students with an understanding of the methodology and applications of LCA; expose students to a range of examples and LCA case studies to demonstrate the process; and teach students to use available tools and techniques to conduct simple LCAs.

ENV 5217 – Environmental Management Systems

The primary objective of this course is to provide skills in designing and implementing an Environmental Management System (EMS) as well as environmental audits, given the importance in identifying and managing environmental risks in a systematic manner at the organizational level. Students will be able to acquire knowledge about EMS usage in Guyana and internationally, have practice in the introduction of EMS, and reflect on the benefits and limitations of EMS. This course introduces students to the wide range of tools used in environmental management, with emphasis on the framework for the development of an EMS to inform environmental decisions. The ISO standards will be examined along with case studies to highlight key factors related to the implementation of EMS. This course also reviews health and safety management systems to reinforce concepts of management systems as well as the procedures and guidelines to conduct environmental audits.

ENV 5218 - Environmental Pollution and Analysis

The environment is subject to anthropogenic change. Pollution poses significant risks to nature and the built environments, with serious consequences for health and well-being. Pollution, therefore, must be addressed within a sustainable development framework, particularly for Guyana which is in transition to an oil producing economy. This course aims to provide an understanding of environmental pollution. It provides an overview of the structure of the environment and deals with the major problems of atmospheric, water and soil pollution by focusing on the types of pollutants, the causes responsible for the occurrence and release of the pollutants in the environment, the effects of the pollutants as well as control measures. The course also provides an overview of and practical sessions in the measurement of selected environmental quality parameters.

ENV 5219 – Land and Coastal Resources Management

The primary objective of this course is to provide the underlying approaches and conceptual premises that inform discourse on land and coastal resources from an environmental, historical and socio-economic context. Students will be provided with the knowledge and skills in concepts, policies, tools and techniques necessary for land and coastal management. This course will focus on anthropogenic interactions with land and coastal resources and an examination of coastal and land management tools. This course will examine current issues together with the legislation and management structures designed to counter these threats. The processes involved in managing change in land and coastal environment and understand the Environmental Impact Assessment process (local and regional case studies) will be examined.

ENV 5220 –Remote Sensing for the Environment

Remote Sensing of the Environment introduces the science and principles of remote sensing for Earth observation, monitoring, and analysis. Students will develop a working knowledge of the use of remote sensing technologies and workflows to process and interpret images obtained from satellite sensors. Students will understand the concepts of matter-energy interactions and image processing techniques, then apply tools for examining planetary features at intermediate to global scales. They will learn to manipulate multispectral datasets, interpret spectral signatures of common surface features, and select the right sensors, satellite bands, and resolutions for their scientific applications. Spatial analysis and thematic map preparation are key skills that students will develop to critically examine environmental issues such as vegetative stress and landscape change detection. The skills acquired in this course can applied to projects such as flood risk assessment, disaster management, hydrology, climate change, and Natural Resources Management.

ENV 5221 - Climate Change and Carbon Management

In recognition of the need for global action to combat climate change, Guyana became a Non-Annex I party to the United Nations Framework Convention on Climate Change and has since made significant progress in the implementation of the Convention's principles to combat global climate change. This includes preparation of National Communication containing the national Greenhouse Gas (GHG) Inventory. Hence the need for capacity building in this specific area of competency, thus this course will focus on the procedural aspects of GHG accounting framework, including the technical analysis of emission mitigation to support projects, companies and countries in reducing their GHG emissions and increasing removals. To this end this course intends to provide an understanding of GHG accounting, project analysis and market mechanisms and instruments used in the field of climate change.

ENV 5222 – Climate Finance

The course aims to provide students with an overview of the global climate finance architecture. Students will be exposed to climate mitigation and adaptation projects developed to address specific climate challenges and policy frameworks. The course will highlight climate finance schemes formulated and managed by international development partners and provide a unique and timely learning product to build the capacity of students in planning, accessing, delivering, and monitoring climate finance at the national level. Emphasis will also be given to the significance of transparency and accountability in reporting economic performance.

ENV 5301 – Environmental Impact Assessment

Environmental Impact Assessment (EIA) is a response to demands for environmental effects to be formally considered in development planning. This tool, which was first introduced in the USA, assesses the environmental effects of proposed development projects or policies.

It is now widely established in both developed and developing countries, usually as a legal requirement of the development control process. As a result, understanding the nature of the EIA process and being able to select, and use, suitable techniques to conduct an EIA is a necessity. This course is designed to provide an understanding of the principles of EIA and its role in environmental management and a working knowledge of the methods and applications of EIA. In addition, the students should be able to organise a team to conduct EIAs and review the quality of EIAs.

ENV 5306 – Environmental Law and Policy

This course aims to offer an overview of the various environmental laws and policies that support environmental management in the Caribbean. Students will be introduced to the wide variety of environmental challenges environmental laws attempt to address and the policy issues surrounding environmental problems at the national and international levels. Students will explore these issues through lectures and tutorials which will examine case reports and case studies.

ENV 5308 – Ecotourism, Parks and Protected Areas

This course aims to offer students an overview of the principles and practices of ecotourism, parks and protected areas, with particular reference to the definition, types, scope, rationale as well as the administrative, financial and policy frameworks for their formation, operation and sustainability. Students will be introduced to ecotourism, parks and protected areas as universally accepted ways to conserve nature, biodiversity, and the services nature provides to humankind. The role of parks and protected areas in extant and emerging global issues will be emphasised.

ENV 5309 – Emergency Planning and Management

The geographical, geological, and locational characteristics of Guyana and the countries of the Caribbean render them extremely vulnerable to natural hazards and their effects, including hurricanes, earthquakes, volcanoes, landslides, flooding, tsunami and drought.

Indeed, in recent decades, there has been a significant increase in the frequency, magnitude and duration of natural disasters worldwide and regionally. Consequently, the field of emergency planning and management is of paramount importance. Students will be introduced to risk analyses as well as the main considerations, principles and practices involved in emergency planning and Continuity of Operations Planning. This course will require that students plan, design, and execute an emergency preparedness and response plan as well as implement disaster recovery strategies and programmes.

ENV 6101 – Statistics and Biometry

This course provides a theoretical and practical overview of the scope of statistics examining the pure statistical theory and training in data management and statistical analysis of environmental data. It introduces students to the basic elements of statistics, including univariate and bivariate analysis. Experimental design of ecological studies and the application of basic parametric and non-parametric statistics to simple environmental datasets will be covered. Focus will be placed on determination of effective sample size for study, data exploration techniques prior to analysis, indices related to species richness and abundance, and multivariate statistical techniques for environmental datasets. Applications in running statistical analysis through the use of software such as R, followed by interpretation of analysis results which leads to sound decision making in practical cases and examples.

ENV 6102 - HSE for the Oil and Gas Industry

Safety is a core value for the oil and gas industry, which is potentially one of the most hazardous sectors globally. Guyana is swiftly becoming a leader in offshore energy development; thus, it is of paramount importance to the petroleum industry that the country strengthens its capacity on safety, health and sustainability. This course is designed to ensure that students who are potential employers, consultants and advisors within the oil & gas industry are aware of the factors that are likely to impinge on the health

and safety of all concerned and how they might be avoided, thereby reducing the likelihood of their occurrence. Students will leave this course with an enhanced expertise in creating and encouraging the maintenance of a healthy and safe working environment within this sector.

ENV 6103- Renewable Energy Simulation

There is a global demand to develop energy sources from renewable energy sources due to concerns about climate change and its impact; renewable energy sources being a cleaner form of energy. Although there are significant hydrocarbon resources globally, greenhouse gases released into the environment from the oil and gas sector has seen an exponential growth in the development of energy from renewable energy sources in order to prevent full utilisation of our carbon budget. This course gives an introduction to the different forms of renewable energy sources and the workflows for the development and optimization of different renewable energy systems.

ENV 6104 – Environmental and Occupational Health

This course introduces students to public health issues in the workplace that are derived from the nature of the work (occupational) and the environmental space in which work takes place (the natural and man-made environments). The course begins by developing the idea of prevention rather than control in public health and develops an epidemiology of occupational environmental health and safety. The course is relevant to the many natural resource-intensive work activities in which large sections of the population are involved. In Guyana, these include mining, agriculture, forestry, transportation, and manufacturing among others. There are also clear intersects with other aspects of environmental studies, especially in terms of exposure to pollution in air, water, soil etc. all of which can eventually take a toll on productivity and jeopardize sustainable development in the long term.

ENV 6105 – Cleaner Production

Cleaner production is a preventative approach to environmental management. It refers to how goods and services are produced with minimum environmental impacts under current technological and economic limitations. This course introduced the concept of Cleaner Production and environmental management in process and manufacturing industries.

The production process from raw materials through processing to outputs are considered in the context of wastes, process efficiency, waste minimisation, material recycling, as well as the challenges of cleaner production. waste identification and minimisation, and cleaner production assessment methodologies are considered, as well as the legislative and economic aspects of cleaner production.

ENV 6201 – Environmental Leadership

This course explores the concept of environmental leadership in the face of national, regional, and international development. It encompasses a wide range of theory and practice, including ethical leadership and environmental issues, and links international examples to local context. The course will challenge students to critically reflect on past and present approaches to environmental leadership. Students will be introduced to theoretical concepts and methods of leadership and will conduct assignments that utilise these concepts and methods.

ENV 6401– Research Project

This course is the cornerstone of the Master of Science degree in which students undertake a scholarly treatise that aims to either make a new and original contribution to knowledge or be a significant expansion of existing knowledge. The research involves individual, in-depth empirical research on a relevant topic of specific interest to a student, or in a field in which a student may wish to pursue a career. Students conduct this independent field research through self-directed learning and enquiry.

The course involves progression through the various stages in the execution of research, such as data collection and data analysis, and culminates with the submission of a thesis. The research proposal which forms the basis of the research is carried forward from ENV 5207: Research Methods. Each student is assigned a maximum of two supervisors who will guide their research. Initially, the student fine-tunes and operationalizes the research design and methodology of the project, before conducting primary data collection.

The student consults with his/her supervisors for advice and guidance throughout the research process; data collection, data analysis, and drafting the thesis.

ENV 6402 – Scientific Demonstrations in Research

This course is the culmination of the Masters programme in which students refine their scientific writing skills. Students will therefore undertake a number of exercises to demonstrate their writing and communications skills as a scholarly practitioner inclusive of exercises to evaluate quantitative and qualitative research articles, to create literature grids to organize their content for easier retrieval and seamless construction of cohesive arguments in their writing. Students will also be required to produce a manuscript on a research problem of interest to them. The manuscript will be prepared in five stages: state of the problem and research questions, larger and local context, literature review, methodology, results, and discussion.

It is a facilitated rather than a taught course and as such course content and assignments will be available via Moodle. Students will be provided with general guidance by course facilitator(s) before being required to engage in self-directed learning and enquiry. Constructive criticism will be provided on all submissions to aid the improvement process.

MODES OF DELIVERY

Courses will be delivered through face-to-face, blended, and/or hybrid modes.

Online Delivery Mode:

Technology Requirements and Skills Needed

In the online delivery mode, students will require access to a computer or a device with:

- Internet access, preferably with a high-speed connection
- A web browser (For the best experience, use Chrome, Mozilla Firefox, or Safari. Internet Explorer is not recommended.)
- Adobe Acrobat Reader (free)
- Adobe Flash Player (free)
- Microsoft Office, or the ability to work with Word, Excel, and PowerPoint documents
- Skype/Zoom video conferencing software for potential use during office hours (free at http://www.skype.com/http://www.zoom.us)
- Speaker, microphone, and webcam
- Access to technology to create and upload videos for assessment and feedback
- Sending and receiving emails and/or attachments via emails

Minimum Software Requirements

- Windows 8 or Above
- OS 19.13 or Above
- Additional software may be required (See the course syllabus)

Technology Backup

It is the students' responsibility to have a backup mechanism to secure their work and ensure that course assignments are saved at all times.

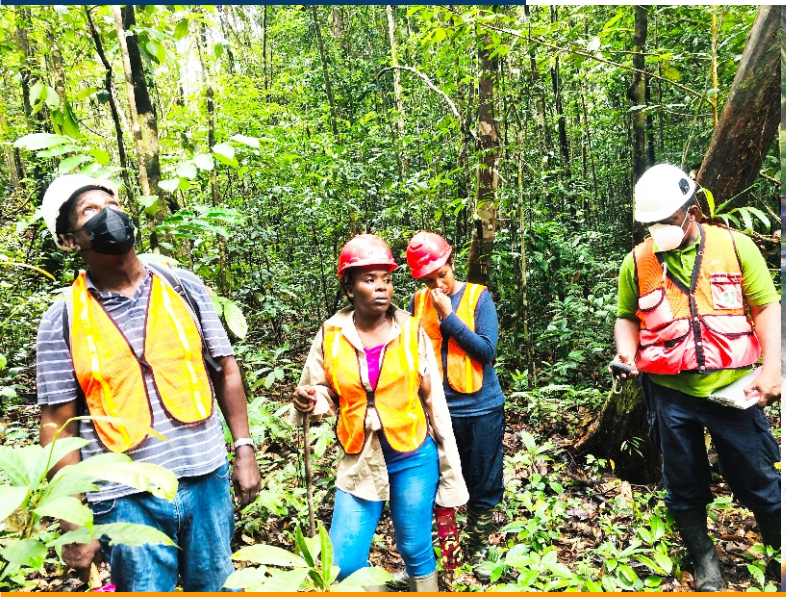
Plagiarism

The University of Guyana has a zero tolerance policy on plagiarism. Students who engage in plagiarism may be placed before the disciplinary committee where the penalty of expulsion is a possibility (see p. 25 of The University of Guyana Student Guide). The Faculty supports this policy and requires lecturers to make use of the software Turnitin which reviews student assignments and provides a similarity report. A similarity report with a score of above 10% that demonstrates clear evidence of plagiarism will be penalised using a three (3) strikes rule:

- ✓ **Strike 1**
  The University of Guyana Student Guide and the Course Outline will serve as a warning.

- ✓ **Strike 2**
  The assignment that is above the limit will earn zero.

- ✓ **Strike 3**
  If this recurs again, then the student will be placed before the Disciplinary Committee of the Faculty of Earth and Environmental Sciences.



Contact Information

Head of Department
hodes.fees@uog.edu.gy
+592 640 1573

Coordinator, Postgraduate Programmes
gspes.fees@uog.edu.gy
+592 623 9060

Secretary
does.fees@uog.edu.gy
+592 624 6218