

# Natural Resource and Environmental Management Programme

**STUDENT HANDBOOK  
2011-2012**



**Centre for Resource Management  
and Environmental Studies  
Faculty of Pure and Applied Sciences  
The University of the West Indies (UWI)  
Cave Hill Campus  
Barbados**





Location	MAP REF
<b>CARICOM PARK</b>	
Campus Archives	5
Caricom Research Building	2
Cave Hill School of Business	3
Indoor Cricket School	4
Lexicography Projects/Caribbean Law Institute	1
Planning Dept	1
Shridath Ramphal Centre for International Trade Law, Policy and Services (Ground Floor)	2
Sir Arthur Lewis Institute of Social and Economic Studies (SALISES) (2nd Floor)	2
Tertiary Level Institutions Unit	5
UWI Credit Union (Ground Floor)	2
<b>MAIN CAMPUS</b>	
3W's Oval Pavilion	1
Academy of Sport	2
Administration	3
Aquaculture Research Laboratory	4
Arts Lecture Theatre	5
Bursary	3
Business Development Office (Gr'd Floor)	6
Cafeteria Kiosk	7
Campus IT Services	8
Campus mart (Ground Floor CLICO Centre for Teaching Excellence)	45
Campus Pharmacy	10
Campus Records	11
CARDI	12
Centre for Resource Management & Environmental Studies (CERMES)	13
Chemical Sciences Rooms : ML4, NCSR	14
Chemistry Building Rooms : CSR, InorgLab, InorgChem, OrgLab, PhyCmLab	15
CLICO Centre for Teaching Excellence Rooms : LR6, LR7, LR8, LR9, LR10, LR11, LT4	45

Location	MAP REF
CLR James Centre for Cricket Research	16
Cultural Studies Department	17
Dept. of History & Philosophy	17
Dept. of Language, Linguistics & Literature	17
Dept. of Biological Sciences Rooms : BL Down, BL Ext, BSR	18
Dept. of Computer Science, Maths and Physics	19
Dept. of Government, Sociology & Social Work	20
Dept. of Management Studies Rooms : MSR1, MSR2, MSR3	21
E-Commerce Building	22
Errol Barrow Centre for the Creative Imagination	23
Evaluation Centre	24
Faculty of Humanities and Education Rooms : A27, ALT, ASR1, ASR2, SOE Sem	17
Faculty of Law Rooms : LLT, Moot Court	26
Faculty of Law Library	27
Faculty of Medical Sciences Rooms : MMS10, MMS9, MSS1, MSS4, MSS5, MSS6, MSS8, MSTL, MSLT	28
Faculty Medical Sciences (Temporary location)	6
Faculty of Social Sciences Rooms : S6, S7, S8	29
Frank Worrell Hall	30
Gazebo	31
Guard Hut	32
Hard Courts	33
Henry Fraser Lecture Theatre	28
Indoor Cricket School	42
Institute of Gender and Development Studies : Nita Barrow Unit	34
International Office (Ground Floor)	6
Language Laboratory (Ground Floor)	6
Learning Resource Centre (Ground Floor)	6
Main Library	36
Maintenance Department	37

Location	MAP REF
Marketing Office (Ground Floor)	6
Media Centre	38
Mount Restaurant	39
New Administration Building	3
Office of Deputy Principal (First Floor)	6
Office of Humanities	17
Office of Student Services	40
Office of the Guild of Students (First Floor)	10
Open Campus Centre	41
Outdoor / Indoor Cricket Nets	42
Physics Building Rooms : Lab Up, Lab Down, SLT	43
Quality Assurance Office (Upstairs)	11
Roy Marshall Teaching Complex Rooms : TSR1, TSR, LR1, LR2, LR3, LR4, LT1, LT2, LT3	44
Sagikor Centre for Lifelong Learning Rooms : TSR7, TSR8, TSR9, TSR10, TSR11, TSR12, Computer Lab #6, LR12, LR13, LR14	9
Sagikor/WICB High Performance Centre	46
School of Education	47
Security	48
SEED Project	40
Sherlock Hall	49
Sir Frank Worrell Memorial	50
Solutions Centre	39
Staff Lounge	51
Student Affairs	3
Student Health Clinic	10
Student Lounge	52
Students Union (Ground Floor)	10
University Bookshop	54
UWI Cafeteria	55
UWI HIV/AIDS Response Programme (UWIHARP)	10
Walk of Fame	56
<b>PARADISE PARK</b>	
Graduate Teaching Complex	1

## OBJECTIVES

The overall objective of the Masters Programme in Natural Resource and Environmental Management is to contribute to sustainable development in the Caribbean region by training professionals in environmental and natural resource management. The Programme seeks to provide graduate students with advanced training in techniques, mechanisms and policies for sustainable use and management of natural resources in the Caribbean.

## PROGRAMME STRUCTURE AND CONTENT

The MSc consists of three University-wide core courses; four CERMES core courses, three specialization streams of four courses each, and a research paper. Core courses are worth three credits each and consist of 24 hours of lectures and an average of 12 hours of practical work. Specialization courses are worth four credits each and consist of 36 hours of lectures and an average of 18 hours of practical work. The research paper is worth eight credits. Students must therefore obtain the appropriate number of credits to complete the Programme (Table 1). Students may be exempted from one or more core courses depending on their qualifications on entry to the Programme.

## PROGRAMME IMPLEMENTATION AND DURATION

### Duration

The Programme is to be delivered in 13 months. This includes approximately a nine-month period for course delivery and examination, and a four-month period for the research project. Courses are taught as two to three week modules with examination following the completion of each module, where applicable.

### Part-Time Students

It should be noted that part-time students are expected to complete the programme over two (2) years, as follows:

They are required to complete the first two (2) courses delivered in Semester I (i.e., ENVT6002 – Professional Skills for Environmental Managers and ENVT6000 – Concepts and Issues for Environmental Managers). They then have the option of choosing any of the courses over the two (2) years, and four (4) semesters, by completing half of the courses in the first year and the remainder in the second year.

Students should contact the Programme Coordinator when working out their schedules and the courses they could take. Once all courses are completed, students are then expected to complete their four (4) month Research Project.

It should be noted that all CERMES courses are typically delivered during the day from anywhere between 8:00 a.m. to 4:00 p.m.

### Admission Requirements

A Bachelor's degree in a discipline appropriate to the MSc with a minimum Grade Point Average of 2.8 or Lower Second Class Honours or its equivalent is required. The minimum level of the degree required may be re-assessed for candidates with extensive professional experience in an appropriate discipline.

### Application Procedures

Candidates should apply through the School for Graduate Studies and Research, Office of Graduate Studies, of the University of the West Indies, Cave Hill Campus or University Representatives in the non-campus countries. Prospective graduate students can apply online via the website <http://cavehill.uwi.edu/gradadmissions>. Alternatively, application forms can also be downloaded from this website or collected from the Graduate Studies Offices on any of the three Campuses or the University's Representative in any of the non-campus countries.

## Assessment Procedures

Courses are typically assessed by a combination of course assignments and a final examination or by a set of course assignments. For the research paper, assessment will be based on the examination of the paper and student performance (please refer to the Guidelines for ENVT 6900 Research Projects). The degree can be awarded with either **Distinction** or a **Pass**. To be awarded a Distinction, a student must maintain an 'A' average for all courses and obtain an 'A' for the Research Paper. The grading system applied for all courses and the research paper is:

MARK (%)	GRADE
70-100	A
60-69	B+
50-59	B
0-49	Fail

**Table 1 Course credits for Natural Resource and Environmental Management Programme**

Course	Coastal and marine	Climate change	Water resources
ENVT 6000 -- Concepts and issues for environmental managers	3	3	3
ENVT 6001 -- Introduction to environmental planning and management	3	3	3
ENVT 6002 -- Professional skills for environmental managers	3	3	3
ENVT 6100 -- Environmental impact assessment	3	3	3
ENVT 6120 -- Measurement and analysis in natural resource management	3	3	3
ENVT 6101 -- Geographic information systems	3	3	3
ENVT 6102 -- Resource economics	3	3	3
ENVT 6122 -- Fisheries biology and management	4		
ENVT 6123 -- Sustainable tourism in the coastal zone	4		
ENVT 6124 -- Coastal ecology and dynamics	4		
ENVT 6125 -- Managing coastal and marine resources and biodiversity	4		
ENVT 6130 -- Climate dynamics and modeling		4	
ENVT 6131 -- Policy response to climate change		4	
ENVT 6132 -- Vulnerability to climate change and impact assessment		4	
ENVT 6133 -- Climate change impacts, adaptation and mitigation		4	
ENVT 6220 -- Water and wastewater management			4
ENVT 6210 -- Groundwater resources			4
ENVT 6230 -- Water management and the environment			4
ENVT 6200 -- Hydrology			4
ENVT 6900 -- Research Project	8	8	8
<b>Total</b>	<b>45</b>	<b>45</b>	<b>45</b>

## CERMES FACULTY

<b>Director</b>	Prof. Robin Mahon
<b>Programme Coordinator</b>	Ms. Neetha Selliah
<b>Academic Staff</b>	Dr. Adrian Cashman Dr. Janice Cumberbatch Dr. Patrick McConney Dr. Leonard Nurse Prof. Hazel Oxenford
<b>Affiliated Staff</b>	Ms. Kimberly Baldwin Mr. Shawn Boyce Mr. Darren Browne Dr. Vernese Inniss Mr. Antonio Joyette Dr. Smail Mahdi Mr. Rawleston Moore Mr. Karl Payne Ms. Cherie Pounder Dr. Roger Pulwarty Dr. Michael Roth Dr. Peter Schuhmann Ms. Norma Shorey-Bryan Mr. Anthony Headley
<b>Specialist Support Staff</b>	
IT Technician	Mr. Dale Benskin
Research Assistant	Ms. Katherine Blackman
Dive Officer/Field Technician	Ms. Renata Goodridge
Project Assistant	Ms. Maria Pena
<b>Administrative Assistant</b>	Dr. Jennifer Hurley
<b>Secretary</b>	Ms. Lisa-Ann Rollins

The core and elective courses being offered at Cave Hill are:

CODE	UNIVERSITY-WIDE COURSES	CREDITS
ENVT 6000	Concepts and Issues for Environmental Managers	3
ENVT 6001	Introduction to Environmental Planning and Management*	3
ENVT 6002	Professional Skills for Environmental Management	3
<b>CERMES CORE COURSES</b>		
ENVT 6100	Environmental Impact Assessment	3
ENVT 6120	Measurement and Analysis in Natural Resource Management	3
ENVT 6101	Geographic Information Systems	3
ENVT 6102	Resource Economics*	3
<b>COASTAL AND MARINE RESOURCE MANAGEMENT</b>		
ENVT 6122	Fisheries Biology and Management	4
ENVT 6123	Sustainable Tourism in the Coastal Zone	4
ENVT 6124	Coastal Ecology and Dynamics	4
ENVT 6125	Managing Coastal and Marine Resources and Biodiversity	4
<b>CLIMATE CHANGE</b>		
ENVT 6130	Climate Dynamics and Modeling	4
ENVT 6131	Policy Response to Climate Change	4
ENVT 6132	Vulnerability to Climate Change and Impact Assessment	4
ENVT 6133	Climate Change Impacts: Mitigation and Adaptation	4
<b>WATER RESOURCES MANAGEMENT</b>		
ENVT 6200	Hydrology	4
ENVT 6210	Groundwater Resources	4
ENVT 6220	Water and Wastewater Management	4
ENVT 6230	Water Management and the Environment	4
<b>RESEARCH PROJECT OR RESEARCH INTERNSHIP</b>		
ENVT 6900	Research Project (July – September)	8



Semester I courses



Semester II courses



Semester I and II course

\*

Online courses

## COURSE DESCRIPTIONS

### UNIVERSITY-WIDE CORE COURSES



#### **ENVT 6000 Concepts and Issues for Environmental Managers**

This course provides an overview of the key concepts and issues that students are expected to be knowledgeable about, and may consider in greater detail later in their academic work and careers. The topics are examined largely from a Caribbean perspective within the global context. These topics, which may vary from year to year as new ideas and issues arise, include: environmental statistics, social-ecological system concepts, ecosystem-based management, global and regional governance through multilateral agreements, sustainable development, poverty and globalization. Specific areas of attention include biodiversity, fisheries and coastal management, environmental impact assessment, climate change, sustainable tourism, law and various environmental management and planning tools.

#### **ENVT 6001 Introduction to Environmental Planning and Management**

The purpose of this course is to introduce environmental planning and management in the Caribbean. It therefore explores the nature of the inter-relationship between environmental systems and human systems, and examines the complexity of environmental policy, planning and management. Topics include perspectives on environmental management and planning, international and regional agreements and administrative arrangements for environmental planning, policy design, physical planning, spatial planning and management, implementation and evaluation of management strategies, issues and dynamics, and people-centered practices in planning and management.



#### **ENVT 6002 Professional Skills for Environmental Managers**

This course equips students with a portfolio of skills that will allow them to present themselves, and to conduct and present their work, in a professional manner. It starts by addressing fundamental issues of verbal and non-verbal communication geared at enhancing the students' ability to share information in a range of settings. The improvement of writing skills, an introduction to research, data handling, the preparation of well-structured technical proposals and reports, and the delivery of professional and persuasive presentations are all topics covered in this course.



### CERMES CORE COURSES

#### **ENVT 6100 Environmental Impact Assessment**

This course introduces students to the practice of EIA in the Caribbean. Topics covered include: what is EIA; steps in an EIA; preparation of terms of reference; baseline studies; mitigation measures; comparison of alternatives; public involvement and the review process.

#### **ENVT 6120 Measurement and Analysis in Natural Resource Management**

This course will provide hands-on practical experience in field data collection techniques, laboratory procedures and statistical analysis and interpretation of biological and socio-economic data relevant to the management of natural resources. Measurement and analysis experience will cover the full range from broad-scale rapid assessment, and expert judgment through to detailed fine-scale, long-term monitoring using standard protocols. Topics covered include design and implementation of a conservation and monitoring programme for an endangered species (sea turtles); rapid assessment techniques (gully ecological survey); guidelines for socio-economic data collection; marine and potable water quality assessment and monitoring techniques; long-term



monitoring of marine community health and productivity (coral reefs, sea grasses, mangroves); and parametric and non-parametric statistical testing and interpretation.



### **ENVT 6101 Geographic Information Systems**

This course focuses on the application of GIS in natural resource management. It seeks to give students an understanding of the key principles of GIS and a practical understanding of the application of GIS for visualization and analysis through both theoretical and practical activities. Additionally, students will get a functional understanding of at least one GIS software package. Topics include: data capturing techniques, spatial data and data models, cartographic techniques, GIS design, implementation and the issues associated with managing a GIS project.

### **ENVT 6102 Resource Economics**

This course surveys a wide range of economic issues relating to natural resource and environmental policy. It commences with an introduction to elementary concepts of economic theory, i.e. the consumer, the firm, supply and demand and criteria for economic efficiency. This is followed by consideration of: environmental economic efficiency, environmental economics, the economics of natural resource depletion, economic valuation methods, poverty and natural resources, and natural resource accounting.



## **SPECIALISATION STREAMS**

### **COASTAL AND MARINE RESOURCE MANAGEMENT**

This stream will provide students with the knowledge and skills in concepts, policies, tools and techniques necessary for fishery and coastal zone management, and with a clear appreciation of the transdisciplinary approach required to be either effective fishery and coastal zone managers or effective advisors and consultants to organisations whose activities impact on the coastal zone. Emphasis will be on Caribbean case studies, with ample opportunity for practical experience. The four specialization courses offered in this stream are:

### **ENVT 6122 Fisheries Biology and Management**

This course introduces students to biological assessment techniques for fishery resources and focuses on management needs and a critical analysis of fishery management tools and their application to Caribbean fisheries. Topics include: importance and state of world fishery resources and management; introduction to ocean biogeography and productivity patterns; traditional and genetic-based stock identification techniques; stock dynamics (growth, mortality, reproduction/recruitment rates of individuals and populations); introduction to yield prediction modeling and interpretation; framework of international law and fisheries policy; influence of NGOs and market demand (eco-labeling); prioritizing management goals and objectives; choice of management tools (quotas, gear restrictions, minimum size, limited entry, closed seasons, MPAs). Emphasis will be on tropical species and Caribbean case studies.



### **ENVT 6123 Sustainable Tourism in the Coastal Zone**

This course provides students with information and exposes them to resources and experiences through which they will develop analytical and practical skills for the efficient management of natural and cultural resources as part of the tourism product. It looks at the emergence of sustainable tourism and its use as a strategy for both development and conservation and critically assesses the elements of the tourism industry thereby evaluating possible directions for the future of sustainable tourism in the Caribbean. Topics covered are: the historical development of tourism in the Caribbean; the social, economic and environmental impacts of tourism; the structure and sectors of the industry standards in the tourism industry; community-based tourism; heritage tourism; sports tourism and sustainable tourism.





### **ENVT 6124 Coastal Ecology and Dynamics**

This course examines the distribution, ecology and dynamics of critical coastal marine communities and non-living coastal resources of the Caribbean with emphasis on the biophysical processes that shape them, and the linkages and interactions among them. Topics will include: a basic overview of ocean currents and Caribbean circulation; structure and function of critical coastal ecosystems (coral reef, seagrass and mangroves), sensitivity to natural and anthropogenic stresses and appropriate mitigative measures; sea level changes; wind-generated waves and their properties, including refraction, diffraction and reflection; coastal erosion, transport, deposition and resultant geomorphologic features; the sediment budget and beach stability; and a review of coastal management tools examining their advantages and disadvantages. These tools will include the use of water quality standards, harvest and use controls and coastal protection structures.



### **ENVT 6125 Managing Coastal and Marine Resources and Biodiversity**

This course examines institutional and organizational arrangements for integrated management of coastal and marine resources and biodiversity at international, national and local scales. These are considered in the context of current and emerging models for governance of natural resource systems. The course provides the technical base for biodiversity conservation and integrates this topic with management of fisheries, oceans and coastal zones. Topics include: Governance of complex systems, management implications of international and regional conventions, ecosystem-based management; determination and application of coastal setbacks, zoning, regulatory regimes in coastal zone management, co-management; the precautionary approach; origin and value of biodiversity; and causes, magnitude and impacts of biodiversity loss. There will be a one-week field trip. In recent years this has been to the Grenadine Islands.



### **CLIMATE CHANGE**

This stream will provide students with - an understanding of the causes of climate change globally and within the Caribbean; knowledge of current climate trends and projections for the Caribbean; an appreciation of potential impacts of climate change on natural and socio-economic systems in the region; knowledge of adaptive and mitigative measures available to buffer the impacts; an understanding of the regional and international policy framework within which climate change is addressed; and with the negotiation skills required to make significant contributions at regional and international climate change meetings and Conventions. The four specialization courses offered in this stream are:

### **ENVT 6130 Climate Dynamics and Modeling**

This course develops knowledge and skills for modeling and simulating climate and interpreting the results from climate models. It demonstrates the contribution and relevance of interdisciplinary research and policy considerations as inputs to climate modeling. Topics include: constituents, structure and primary atmospheric processes; weather, climate and climate variability; climate driving forces, including greenhouse gases and their effects; anthropogenic aerosols and volcanic eruptions; ultraviolet radiation, ozone and CFCs; global energy balance including oceanic circulation; numerical modeling and climate models; scaling issues and limitations of General Circulation Models; climate sensitivity; monitoring, observation and modeling of past climates and trends; global warming, hurricanes and El Niño Southern Oscillation (ENSO); future climate trends and changes.





### **ENVT 6131 Policy Response to Climate Change**

This course evaluates a broad suite of policy approaches to GHG reduction and climate stabilization, in the context of the United Nations Framework Convention on Climate Change (UNFCCC), and the Kyoto Protocol. It develops knowledge and skills for policy formulation, and for strengthening negotiating capacity to protect regional interests in the global climate change debate. Topics include: the international policy response; UNFCCC, Berlin Mandate and Kyoto Protocol as instruments for atmospheric stabilization; policy approaches of developed and developing countries; negotiating positions of major UN Groups: European Union (EU), Japan-United States-Canada-Australia-New Zealand (JUSCANZ), Group of 77 and China (G77), Environmental Integrity Group (EIG), Organization of Petroleum Exporting Countries (OPEC), and the Alliance of Small Island States (AOSIS); application of key negotiating tenets, including the precautionary principle and common but differentiated responsibilities; exploring elements of a CARICOM negotiating position.

### **ENVT 6132 Vulnerability to Climate Change and Impact Assessment**

This course will adopt a problem-solving approach to climate impacts and vulnerability assessments in the Caribbean. It will draw on lessons from the hazard and disaster management community, the UNEP Country Studies, IPCC Common Methodology, and other methodologies and studies appropriate to the circumstances of the Caribbean and Small Island Developing States. From these an integrated approach to assessing impacts, vulnerability and adaptation will be developed. Themes will include: variability, extreme events (e.g. hurricanes, storm surge, droughts, floods) and their link to climate change; methods and tools in climate impact assessment; use of scenarios in vulnerability and impact assessments; impact of projected climate change and sea-level rise on key socio-economic sectors in the Caribbean; types and treatment of uncertainty; risk assessment and management; decision making based on outputs from vulnerability and risk assessments.



### **ENVT 6133 Climate Change Impacts: Mitigation and Adaptation**

This course will examine current trends and approaches to climate change mitigation and adaptation. Methodologies, broad strategies and specific options will be discussed and their efficacy at the global, regional and local scales will be evaluated. Among the topics to be discussed are: objectives of the UNFCCC and the Kyoto Protocol and their implications for mitigation and adaptation in the Caribbean; costs and benefits of emissions reductions; economic instruments for promoting mitigation including taxes, insurance schemes and tradable emission permits; carbon sequestration in soils and vegetation; types of adaptation – autonomous, anticipatory and planned; constraints to the implementation of adaptation options and strategies; timing of adaptation; technologies for energy efficiency and their application to the Caribbean: small hydro, solar thermal, photovoltaics, wind, ocean thermal energy conversion (OTEC), and no-carbon fuels; equity issues and their implications for adaptation in small vulnerable states.



## **WATER RESOURCES MANAGEMENT**

This specialisation stream is offered by CERMES, in collaboration with the Caribbean Institute for Meteorology and Hydrology (CIMH). The goal is to prepare graduates to address technical, social, economic and political dimensions of water resources management, especially in Small Island Developing States. The specialisation courses will cover the physical and organisational dimensions of water supply, distribution and wastewater management and the variety of issues facing water services managers. They will provide training in hydrological and hydrogeological (groundwater) analysis techniques and their application.

### **ENVT 6200 – Hydrology**

Hydrology is the study of the occurrence and movement of water in the environment and is essential to the understanding of water quantity and quality issues for those involved in the management of water resources in any way. This course will provide an understanding of hydrological processes and a knowledge of the techniques used to assess water resources. It starts from a basic understanding of the hydrological cycle and its processes and an introduction to rivers, flood plains and wetland environments. The course will cover hydrological parameters such





as rainfall, evaporation and surface run-off, stream processes and systems, the measurement of these parameters and their use in modelling. Water quality and related pollution issues associated with surface waters such as streams, rivers and other water bodies will be covered. The interactions between surface water and groundwater will be introduced. Data gathering, monitoring programmes, and data analysis approaches will be presented. Techniques used to assess water resources such as modelling, remote sensing and GIS will be introduced to give an overview of their use and potential. Other topics that will form part of the course will include: the hydrology of dams covering catchment characteristics, reservoir yields and sedimentation; aspects of urban hydrology; pluvial and fluvial flooding and; the interaction between hydrological and ecological processes.

### **ENVT 6210 - Groundwater Resources**

Many of the freshwater resources on the Earth are in the form of groundwater and as a result they are increasingly under stress from over abstraction and pollution. The sustainable management of groundwater is critical for current and future generations. In the Caribbean, groundwater resources are the primary source of freshwater not just for domestic use but for agriculture, tourism and industry, on many islands such as Barbados, whole economies depend on it. The purpose of this course is to provide a comprehensive introduction to groundwater systems and their management. It will start with the origins, nature and behaviour of aquifers and subsurface waters and how it fits into the wider natural environment. Themes and concepts related to groundwater flow, including Darcy's law and the continuity equations, parameterization and related concepts will be covered. The techniques of hydrogeological investigation, evaluation of groundwater resources and monitoring including groundwater quality and groundwater modeling will be presented. The principles of solute transport will be discussed. The vulnerability of subsurface waters to the effects of land use change, pollution, over-abstraction and climate change will be explored along with coastal hydrogeology, groundwater management and its place in integrated water resources management.



### **ENVT 6220 - Water and Wastewater Management**

The focus of this course is on the technical, managerial and organizational aspects of making water resources available to consumers and the removal, treatment and disposal of wastewater. Students will be provided with an understanding of the issues surrounding aspects of water and wastewater management such as water collection and treatment, transportation and distribution of water; water demand estimation, supply and demand management; water distribution in urban and rural areas; water quality standards and measurement; definitions and characteristics of wastewaters; the potential environmental and public health concerns; sanitation, different wastewater collection and wastewater treatment and disposal systems; green-, grey- and black-water recycling and reuse; residuals management; storm-water drainage and management in urban and coastal areas; policy, legislation and regulations; financial mechanisms and institutional arrangements. In addition the potential impact of climate change on water and wastewater management and the range of responses, adaptations and mitigations measures will be explored.



### **ENVT 6230 - Water Management and the Environment**

Integrated water resources management considers how water should be managed by considering the multiple viewpoints and factors that need to be taken account when making decisions and taking actions. The competing uses of water in the natural, social and economic environment requires knowledge and expertise from across many different disciplines. The aim of this course will be to examine the varying aspects that constitute water resources management in island and non-island countries in the Caribbean region and the relationships between the technical, natural, social, economic and political environment, particularly those issues facing SIDS. The course places an emphasis on the economics of water and water resources as well as on legal and policy perspectives. Course material will cover: concepts of catchment/watershed management, integrated water resources management; national and international laws and institutional





arrangements that impact on water management; economics; the political ecology of water; the impacts of water resources developments including land/marine interaction issues, decision support tools and, development pressures.

### RESEARCH PROJECT

#### ENVT 6900

The research project is usually undertaken immediately after semester II between June to September. Students are required to submit a research report at the end of this period for examination. Research projects will be supervised by CERMES faculty and will be in priority research areas relevant to the students' specialization stream. Students from non-campus countries will be encouraged to conduct their research in these countries, providing that adequate supervision arrangements can be made.



### FIELD TRIPS

For all specialization streams, students may be given the opportunity to go on one week field trips which are typically within the Wider Caribbean Region. Students may be asked to contribute towards travel costs associated with these trips.

For students in the Climate Change and Water Resources Management Streams, the field trip is typically held in Belize, and as such, students are responsible for obtaining a US Visa to transit the USA (Miami) on the way to Belize. For Coastal & Marine Resource Stream students, the field trip is typically in the Grenadines Islands.

## ORIENTATION

As an introduction to the MSc in Natural Resource and Environmental Management, there is a mandatory two-day orientation before classes start. Students are introduced to the CERMES staff, graduate research students, and the facilities at CERMES. A land tour is conducted by academic staff to highlight issues related to environmental management in Barbados and other small island developing states. Details of orientation are provided in student information packages.

## IMPORTANT POINTS TO NOTE

### CERMES Office Hours

Opening hours for the departmental office are Mondays to Fridays from 8:30 am to 4:30 pm.

### Course Registration

Course registration is done online via the UWI website: [www.cavehill.uwi.edu](http://www.cavehill.uwi.edu) .

### Assignments

When submitting work, please use your identification number. Assignments should not be printed in colour unless requested by lecturers and should be submitted to either Ms. Jennifer Hurley or Ms. Lisa-Ann Rollins in the CERMES office.

### Computer Room

We are very fortunate to have our own computers in CERMES. These are expensive to maintain and will be very difficult to replace, so please treat the equipment with respect. Students are not allowed to eat or drink in the computer room or allow friends to use the facilities without permission from the Director. Students who disregard these regulations will be denied access to the computer room. Students are asked to keep the computer hard drives as free as possible of their files. Scanning and colour printing facilities are available but must be supervised by a member of staff.

**Study Area**

There are 11 study cubicles available in the study area on the bottom floor. Students will be allowed access to the cubicles for two semesters. Due to the limited number of cubicles it is suggested that students share them. Students will be allowed to use the cubicles on a short-term basis to complete their research papers during the summer period.

**Cell phone usage**

Cell phones are to be turned off during lectures.

**'Brown Bag' Lunches and Seminars**

'Brown Bag' lunches are held during lunch time on the last Friday of every month. During these sessions staff and students deliver presentations given at various conferences or on research that has been conducted by the department. Students are encouraged to attend these sessions. Seminars by staff and invited guests are also held in the CERMES and students are invited to attend.

**Field Trips**

Appropriate wear may be required for field trips as some of these may occur on land and others in the water. You will be advised accordingly.

**Lab Sessions**

Appropriate wear as suggested by lecturers is required in the labs.

**Photocopying**

Students are allowed to use the photocopier in the main office and will be billed for all copies made. They are asked to settle their accounts promptly with the departmental secretary. Photocopies can also be made in the main library after purchase of a photocopy card.

**Printing Paper**

Students must provide their own paper for printing documents. However, paper may be purchased by the ream from the main office. The use of recycled paper is practiced within the department and students are encouraged to participate in this practice. The office will supply paper for the printing of your final research paper.

**Notices**

Students should check the notice boards on the relevant lecture room doors for academic messages. Students are also asked to check their email regularly since this medium is also used for the dissemination of CERMES information.

**Mail and Coursework**

Mail and coursework are placed in the students 'pigeon hole' and you are asked to check and clear it daily.

**Recycling**

The UWI implemented its Recycling Initiative in April 2009. Please participate in this worthwhile programme. Recycling bins have been placed in the CERMES building for the collection of plastic, metal, glass and paper recyclables. Please rinse all bottles before placing them in the bins. Used printer cartridges are also collected for recycling by a local company, Ink Link. Please deposit these in Maria Pena's mailbox. Scrap paper for printing and photocopying can be obtained from the office.

**ID Cards**

Kindly check with the Postgraduate section for your UWI identification cards.

**Maintenance issues**

Any maintenance problems should be reported to the Dr. Jennifer Hurley, CERMES Administrative Assistant.

**Contacts**

Please leave your term address, email address and contact number(s) with the office. Immediate notice of any change of address or telephone number(s) is required. Students are required to give one week's notice when leaving the island (unless in cases of emergency).

## **Mailing Address**

The mailing address for the CERMES is:

CERMES  
The University of the West Indies  
Cave Hill Campus  
Bridgetown BB 11000  
Barbados

**Students may use the CERMES address during their period of study, but they are asked to inform all correspondents of their forwarding address on leaving the Programme.**

## **Contact information**

Tel: (246) 417-4316  
Fax: (246) 424-4204  
Email: [cermes@cavehill.uwi.edu](mailto:cermes@cavehill.uwi.edu)  
Website: <http://www.cavehill.uwi.edu/cermes/>

## **Request for Transcripts**

Students should contact the Transcripts and Records Section where forms are available. Their contact information is:

Tel: (246) 417-4140 / 4142 / 4143  
Fax: (246) 424-7392  
E-mail: [records@cavehill.uwi.edu](mailto:records@cavehill.uwi.edu)

## **Security**

Students will be issued with keys to the building which will later be replaced with security swipe cards. Please note that these are for the purpose of your security and under no circumstances are to be loaned out. Please keep the emergency door on the ground floor closed at all times.

Campus security will escort students out of buildings and to vehicles after normal working hours. They may be contacted when required at EXT 4177.

## **Main Library**

Students are only permitted to use the main library on presentation of their UWI identification card. Opening hours are as follows:

Monday to Friday	9am to 11pm
Saturday	9am to 5pm

The library is closed on all public and University holidays. Students should also be reminded that use of cell phones is prohibited in the library.

## **Bookshop and Campus Mart**

Newspapers, academic books, novels, magazines and stationery can be purchased from the UWI bookshop. There is also a limited supply of toiletries and confectionery available. Opening hours are Mondays to Fridays from 9:00 am to 5:00 pm. The Campus Mart is well stocked with basic food items and toiletries. It is located adjacent to the Sir Frank Worrell Halls of Residence. Opening hours are Mondays to Fridays from 9:00am to 10:00pm and Saturdays from 9:00am to 8:00pm.

## **Banking Services**

There is a Royal Bank of Canada located at the end of University Drive for your banking needs. For your convenience, an Automatic Teller Machine (ATM) is located on Campus just outside the bookshop.

## **Off-campus Housing**

A complete list of off-campus housing inclusive of contact persons, rent per month and utilities available can be found on the University's website at [www.cavehill.uwi.edu](http://www.cavehill.uwi.edu) under 'Prospective Students and Student Life'.

## **Transportation**

Mr. Terry Bradshaw, a former CERMES student, is recommended for your shuttling/taxi needs. He may be contacted at:

Tel: (246) 232-7457 (cell)

Email: [dfdeliveries@yahoo.com](mailto:dfdeliveries@yahoo.com)

## IMPORTANT TELEPHONE NUMBERS

### External

Operator	0
Police Emergency	211
Fire Service	311
Ambulance Service	511
Directory Enquiries	411

To make an external call, dial 9 followed by the number.

### Internal

#### General Campus Numbers

UWI PBX	4000
Campus Security (HQ)	4164
Campus Security (Lobby)	4003
Campus Security	4177
Student Services	4165
Student Health Clinic	4170/1

#### CERMES Numbers

BENSKIN, Dale	4313
BLACKMAN, Katherine	4512
CASHMAN, Adrian	4829
CUMBERBATCH, Janice	4569
GOODRIDGE, Renata	4726
DEANE, Lyn-Marie	4513
HURLEY, Jennifer	4339
MAHON, Robin	4570
McCONNERY, Patrick	4725
NURSE, Leonard	4344
OXENFORD, Hazel	4571
PENA, Maria	4727
ROLLINS, Lisa-Ann	4316/7
SELLIAH, Neetha	4568
Visiting Lecturer Office	4830
PhD Students	4827/4828
Research Assistants Office	4567
Computer Lab	4572
GIS Lab	4580
Student Carrels	4581
Water Quality Lab	4583
Fisheries Lab	4840



Prepared by the  
Natural Resource and Environmental Management Programme  
Centre for Resource Management and Environmental Studies (CERMES)  
Faculty of Pure and Applied Sciences  
University of the West Indies, Cave Hill Campus  
Barbados W.I.