Maynooth University
Department of Geography

MSc. Climate Change

Course Handbook

2019-2020

Contents of Handbook

1. WELCOME TO THE DEPARTMENT OF GEOGRAPHY

Welcome to Maynooth Geography and to the MSc in Climate Change. You join a group of scholars with an international reputation. You will find you are sharing your learning with people who are engaged in research published in the leading scientific journals, including Nature and Science. Your lecturers include people prominent in framing the work of the Intergovernmental Panel on Climate Change, who have advised the Citizens' Assembly on Climate Change, and who are regularly relied upon by responsible journalists.

The external assessors of our course regularly praise the quality of work produced by Maynooth's graduate students in Climate Change. You are working at the research frontier and can expect speculations in one class to become hypotheses for published work later in the year. It's an exciting prospect for you. So please do follow the tradition of MSc Climate Change students of being marvellous departmental citizens, attending department seminars, supporting publications in the Department and ICARUS blogs and in our staff-student publication, Milieu.

If you see me around, stop and say hello,

With best wishes,

Gerry Kearns, Head of Department

Gerry Kearns, Professor of Geography
Head of Department

2. IMPORTANT DATES

First Semester

19th September 2019: Taught Masters Induction (University)
23rd September 2019: Start of Lectures and Course Orientation with Dr. Murphy
26th September 2019: Department Postgraduate Welcome (16.00 Rocque Lab)
31st October 2019: Registration deadline for Postgraduate modules (semester 1)
31st October 2019: Deadline to withdraw from studies without losing free fee status
28th October 2019: Study Week
23rd December 2019: Christmas Vacation

Second Semester

31st January 2020: Registration deadline for change of modules.
3rd February 2020: Start of Lectures
6th February 2020: Thesis Proposal Presentations
16th March 2020: Study Week
13th April 2020: Easter Vacation
20th April 2020: Lectures Resume
8th May 2020: Last day of term
31st July 2020: Deadline for submission of thesis and end of course

3. INTRODUCTION AND USE OF HANDBOOK

The MSc in Climate Change at Maynooth University is offered by the Department of Geography to provide Graduates with the knowledge, skills and experience necessary to enable them to undertake analysis of both global and Irish related climate change science, impacts and policies. The MSc was first offered in 2008-09 in response to the need for trained graduates in meeting the challenges posed by climate change, and is the only course of its type offered in Ireland.

The MSc in Climate Change is a full-time postgraduate programme running from the commencement of the first semester to the submission of a research thesis (deadline end of July). The modules offered are wide ranging and designed to impart a breadth of skills which will be of use in succeeding years, and to nurture independent and critical thinking on climate change issues. This handbook is intended to be the first point of reference for module overviews and assessment or for any queries that you have about the course. If you cannot find answers to any question you may have please get in contact with the course director (Conor Murphy). Students are encouraged to actively participate in all lectures, practicals and seminars and to fulfill the requirements of the various components of the course. Since this is a postgraduate course, a high level of performance and contribution is expected from each participant.

4. IRISH CLIMATE ANALYSIS AND RESEARCH UNITS (ICARUS)

ICARUS is the largest dedicated climate change research and modelling centre in Ireland and conducts both pure and applied research covering all aspects of climate change from regional climate modelling to impact assessments in a variety of sectors and provides a wide and diverse range of research capabilities in the climatic arena. Researchers in *ICARUS* have a strong record of publication in International journals and have provided climate change information for key policy documents in Ireland. Key researchers with *ICARUS* will be involved in teaching and supervising on the MSc throughout the year, with the objective of linking teaching with cutting edge research that is being undertaken by *ICARUS*. There is a vibrant postgraduate environment in *ICARUS* of which you will be an important part and will be expected to contribute to. For more information on *ICARUS* and the type of research undertaken see the following link: http://icarus.nuim.ie/

5. OBJECTIVES OF THE MSC CLIMATE CHANGE

- To introduce students to current global climate change issues and impacts
- To provide training in research methods appropriate for understanding observed and future climates and their impacts
- To develop the capacity for undertaking independent research in the climate change area
- To provide a professional education in the area of climate change policy for those who need to be familiar with current developments for mitigating and adapting to future climate change.

6. PROGRAMME OUTCOMES

At the end of this course students will:

- Have a knowledge and understanding of the basic principles involved in the wide range of subject material that can be involved in tackling the management of climate change.
- Have developed specialist knowledge and skills in the area of climate change.
- Have developed the ability to bring specialist knowledge and skills together in order to develop an understanding of alternative courses of action in the management of environmental problems.
- Appreciate the complex and multi-faceted nature of climate change problems and to realise that no one simple formulation or solution to them is likely.
- Have the ability to convey ideas and recommendations clearly and logically in both verbal and literary form.

7. TRANSFERABLE SKILLS

In addition to in-depth specialist knowledge, the realisation of programme outcomes will also impart a range of valued and transferable skills that are relevant for a wide range of future employment and research opportunities. These include:

- data processing and analysis skills (such as quality assurance, statistical techniques);
- writing policy and technical reports;
- assembling scientific evidence in decision-making contexts;
- technical presentations;
- research design;
- quantitative methods and modelling concepts;

8. PROGRAMME STRUCTURE AND REQUIREMENTS

To meet the requirements of the MSc in Climate Change, students are required to accumulate 90 credits. Table 1 shows the modules available in semesters one and two and the associated credits for each module. All modules are compulsory, the thesis is a required module. The programme will be delivered through lectures, practicals and seminar presentations. A variety of assessment techniques will be used, including; practical assignments, group and individual seminar presentations, terminal examination and research thesis. The sections of this handbook detailing the module outlines provide further information on the types of assessment for individual modules. Students are encouraged to closely read the marks and standards guidelines laid down by the university. These can be found at the link: https://www.maynoothuniversity.ie/sites/default/files/assets/document//MU%20Marks%20and%20Standards%20-%20ver%206%20Sept%202017.pdf

To qualify for the award of Master of Science, students must:

- Pass all modules (40% or higher).
- Obtain at least 40% in the research thesis.
- Obtain at least 40% on aggregate in the course.

For modules other than the thesis a mark of at least 35%, but less than 40% can be compensated for by other modules. Marks below 35% cannot be compensated and will be recorded as incomplete/not passed. A student who has an incomplete grade in one or more modules will not be assigned a course mark and will be graded as Fail or Incomplete as appropriate. In cases where a student obtains a mark of less than 35% in a module (excluding the thesis) effort will be made to provide a supplemental assessment during the same period of study. A course mark will not be allocated to a student who has insufficient credits - either by not being registered or by not attending the relevant examination or if they are not awarded a mark in a module. The grading system used for each module and the overall course is as follows and grade related criteria for different forms of assessment can be found later in the handbook:

First Class Honours:	70+%
Second Class Honours Grade I:	60<69%
Second Class Honours Grade II:	50<59%
Pass:	40<49%
Fail:	<40%

	Code	Module Name	Credits
Semester One	GY652	Applied Climate Sciences (PT/RF)	10
	GY655	Impacts, Adaptation and Mitigation (CM)	10
	GY672	Spatial and Temporal Data using R (CB/MC)	10
	GY671	Field Course (CM)	
	GY660	Thesis Planning and Design (Research Tutorial) (CM/HS/GMC/LO)	
Semester Two	GY667	The Ocean and Climate Change (GMC)	10
	GY671	Field Course (CM/HS/GMC/LO)	10
	GY663	Detection, Attribution and Decision Making (CM/PT)	10
	GY660	Dissertation/Thesis	30

Table 1: MSc Structure and module credits

9. COURSE TIMETABLE FOR SEMESTER ONE

The course timetable for semesters one is outlined below, most classes will be hosted in Physical Geography Computer Room in Rhetoric House. Some modules will run in workshop format facilitating students to focus on developing thesis topics, especially in the second semester. The timetable for semester two will be provided in due course. The timetable has been organised to allow more than sufficient time for preparation for class and the timely completion of assignments. Students will have priority use of the dedicated computer room. However the room is also used for general departmental teaching. Students should use their time in the computer lab as effectively as possible.

Time	Monday	Tuesday	Wednesday	Thursday	Friday
09.00-10.00	MSc CC	MSc CC		MSc CC	MSc CC
10.00-11.00	Tutorial	GY652		MSc CC	MSc CC
11.00-12.00	GY655	GY652	GY672 (Rm2.3 Iontas)	MSc CC	MSc CC
12.00-13.00	GY655	GY652	GY672 (Rm2.3 Iontas)	MSc CC	MSc CC
13.00-14.00					
14.00-15.00	MSc CC		MSc CC		
15.00-16.00	MSc CC		MSc CC		
16.00-17.00	MSc CC		MSc CC		

Table 2: Timetable/Schedule for semester 1

Notes on semester 1 timetable

All classes will take place in the Physical Geography Lab on the ground floor of Rhetoric House unless otherwise stated (e.g. GY672)

Where MSc CC appears on the timetable, these are times for which you have access to the lab for your own work.

***GY655 and GY672** will run weekly throughout the semester.*

***Tutorial:** this will run for first weeks up to mid-term only*

***GY652:** Classes run weekly in this slot after mid-term with Dr. Rowan Fealy. The first half of the module will be delivered by Prof. Peter Thorne in workshop form as follows:*

- *Workshops: Week commencing 30th September: Monday 14.00-1600; Tuesday, Thursday, Friday 10.00-12.00*
- *Assignment drop in sessions in ICARUS meeting room in Laraghbryan House: Monday 14th October 14.00-16.00 and Thursday 7th November 10.00-12.00*
- *Assignment Presentations: Thursday 21st November 10.00-13.00 in Physical Geography Lab.*

***GY660** Thesis proposal workshop will take place all day on Thursday 14th November in the Physical Geography Lab*

***GY671** Field Course: to help free time for thesis research in semester 2 we will run two of the trips as part of the field course in semester 1. These will be the trip in the Celtic Voyager Ocean Research Vessel and the ecology trip to Lullymore peat bog. Details on the latter will follow, but will likely be in October.*

The Celtic Voyager Trip will take place on the weekend of the 16th-17th November. The preparatory workshop is scheduled for Friday 8th November 10.00-13.00 and the wrap up workshop for Friday 29th November 10.00-13.00.

10. SEMINARS

Throughout the year the Department of Geography's seminar series will include climate change related topics and will also be relevant to developing and planning your research. The seminar series will take place on Thursday afternoons at 4.00 pm in the Rocque Lab and all postgraduate students are ***expected*** to attend all seminars. The series will introduce students to frontier research/research design in geography, environment and climate and examine how researchers seek to formulate research questions. Students will be exposed to key issues in research, particularly developing suitable methodologies in addressing specific research questions. Each seminar will be delivered by a national or international researcher, who will provide detail on the methodology they have applied in a specific project. The researcher will illustrate issues and methodological challenges associated with undertaking research.

DEPARTMENT OF GEOGRAPHY
RESEARCH SEMINAR SERIES 2019-2020

2019	
September 26th	**Department of Geography Postgrad Welcome** - *no seminar*
October 10th	**Laura McAtackney** (Aarhus University) *Material, Memory and Ruination at a former Magdalene Laundry: towards using archaeology and heritage as tools of transitional justice* *Part of the Spatial Justice Seminar Series*
October 17th	**Dr Huhana Smith** (Massey University) *Socio-spatial relations within hapū-led resilient pathways for climate change. Part of the Spatial Justice Seminar Series. Funded by the IRC New Foundations Scheme*
October 24th	**André Dusterhüs** (Maynooth University) *Seasonal to decadal climate prediction.* *Joint event with ICARUS and Met Éireann*
November 14th	**Malene Jacobsen** (Maynooth University) *Where is War? What is Refuge?*
Week of 18—22 November TBC **Geoweek** **University Library**	**Artists Monica de Bath, Cathy Fitzgerald, Pauline O'Connell, Seoídin O'Sullivan, in conversation with geographers Patrick Bresnihan and Karen Till.** *Tírdhreach Feasach: Irish Environments in Transition:* Exhibition launch and symposium - *Joint event with Kildare County Council Arts Service and Maynooth University Library, with additional support from the IRC New Foundations Scheme and Creative Ireland.*
November 28th **Iontas Seminar Room**	**Martina O'Brien, Kildare Weather Observers & others** *The Art of Citizen-Science: Monitoring a Climate Disaster'* Exhibition launch and symposium - *Joint event with Maynooth University Illuminations Gallery, Kildare County Council Arts Service and Creative Ireland*
December 12th	**Eugene McGovern** (Technical University of Dublin) *Geomatics - State-of-the-art and some interesting applications*

2020	
February 6th (provisional date)	**Geography Taught Postgraduate Presentations** (Maynooth University)
February 13th	**Danny Dorling** (Oxford University) *The Geography of falling apart - United Kingdom 2020*. *Part of the Spatial Justice Seminar Series*
TBC	**New PhD Student Research Presentations** (Maynooth University)

11. ATTENDANCE AND ASSIGNMENTS

Attendance, punctuality and participation are compulsory for all classes and students are expected to come prepared to class. If there is a documented personal/medical reason for not coming to class, it is the student's responsibility to let the instructor and course director know in advance. As a postgraduate student learning to be a Master of your discipline, it is expected that you turn up for class on time and participate fully on all occasions. Problematic attendance, punctuality and participation will be reported to course director.

Mandatory deadlines will be strictly enforced. We have coordinated all assignments across modules so that student workload will not get piled up. Assignments submitted after the set deadlines will be penalised 3% of their overall mark per day for late submissions, with a cap/maximum penalty being that final grade can't drop below 40%. Exception: If there are extremely extenuating personal or medical circumstances, the course director and instructor will consider extensions on a case by case basis. The circumstances must be communicated to, and accepted by, the lecturer prior to, or, in cases of unexpected emergencies, immediately after, the relevant deadline.

For all module assignments/coursework, the standardised ***cover sheet*** must include: the name of the student, her/his student number, the title and code of the module, the name of the lecturer who gave the assignment in question; when appropriate, a thematic title for the work; and the total word count of the student's work, along with what percentage the submitted work is over/under the assigned word count. A blank cover sheet will be available on the GY660 webpage (MSc course Moodle page).

Word-count limits will be strictly enforced and penalties applied for continuous assessment work (incl. essays/literature reviews/critical reflections) significantly over- or under-word counts. For every 10.1% over/under a designated word-count, students will be penalised by 3% of their overall mark, with a cap/maximum penalty being that final grade can't drop below 40%. (So, if you are 10.1% over, you will be penalised 3% of your overall mark; if you are 20% over, you will be penalised 6%; if you are 30% over, you will be penalised 9%; and so on). Students are required to indicate what the assignment total word count is on the cover sheet accompanying submission of coursework.

12. GRADE RELATED CRITERIA

Marking criteria and guidelines used for marking are presented here for the following types of assessment: Coursework essay, Examination essay, Coursework Reports, Oral presentation. These broad guidelines should be read in conjunction with any specific advice on assessment that may be provided by module leader.

COURSEWORK ESSAYS: The key criteria used to arrive at the mark reflect the ability of students to:

- respond to a specific question
- structure an argument
- think independently
- support an argument with reference to different literature and examples
- evaluate different kinds of evidence
- undertake independent study of the topic in question
- communicate effectively in writing
- produce a well-presented piece of work

EXAMINATION ESSAYS: The key criteria used to arrive at the mark reflect the ability of students to:

- respond to a specific question within a limited amount of time
- structure an argument
- think independently
- support an argument with reference to different literature and examples
- evaluate and weigh up different kinds of evidence
- undertake independent study of the topic in question
- communicate effectively in writing

COURSEWORK REPORTS: The key criteria used to arrive at the mark reflect the ability of the students to:

- present data appropriately in graphical and tabular form
- interpret data in relation to specific questions/hypotheses using clear reasoned arguments or observations
- analyse data – using correct statistics if appropriate
- show awareness of the strengths/weaknesses of methods of investigation
- communicate effectively in writing
- think independently and critically about data, analysis and interpretation
- where appropriate use literature to support their arguments and interpretations throughout
- produce a well-presented piece of work

ESSAYS, EXAMS, REPORTS

Class	Mark Range	Grade Related Criteria for Essays/Exams/Reports
First Class Honours	80+	– Outstanding answer based on extensive reading that demonstrates an impressive ability to understand theoretical literature and to make connections between that literature and appropriate examples. – Exceptional insight and originality in the use of evidence. – Very well written with no grammatical or other errors. – Contains material of publishable quality, as a whole or in part, as a journal paper, and is worthy of retaining for reference. ***(Reports)*** – Exceptional insight and originality in the application of methodology – Exceptional analytical skills as evidenced by – Ability to make connections between own results and the literature, where appropriate
	70-79	– Excellent answer based on extensive reading and a clear understanding of theoretical debates. – Original or insightful answer drawing on own observations and critical treatment of literature. – Contains material that is potentially of publishable quality, in part, as a journal paper, and / or is worthy of retaining for reference. ***(Reports)*** – Strong insight and/or originality in the application of methodology – Original or insightful answer drawing on own observations – Strong analytical skills – Ability to make connections between own results and the literature, where appropriate

Second Class Honours Grade I	60-69	– Very good answer that shows a thorough understanding of arguments, contributions and context, with efficient use of relevant reading and examples. – Well organised, clearly expressed and a direct response to the question / topic. – Evidence of good analytical skills and reflecting wider reading. – Does not display the outstanding ability, critical acuity and/or originality characterising the award of first class honours ***(Reports)*** – Shows insight and thoroughness in the application of methodology – Good analytical skills – Ability to make connections between own results and the literature, where appropriate
Second Class Honours Grade II	50-59	– Competent treatment of ideas and concepts from classes and set reading – Little evidence of independent critical appraisal. – Evidence of good effort and sound argument, but little spark or critical insight. ***(Reports)*** – Competent but lackluster application of methodology – Little attention given to limitations of approach – Good analytical skills – Lacks connections between own results and the literature, where appropriate
Pass	40-49	– Shows a basic understanding of the question / topic and of the broader subject area – Little evidence of detailed knowledge or reading is partial and selective – Contains mistakes, misunderstandings or irrelevant material. – Poor organisation, poor expression and an uncritical approach. ***(Reports)*** – Poor organization and application of methodology – Poor analytical skill – Few connections between own results and the wider literature
Fail	0-39	– At worst, nothing of relevance in answer to the question / topic. – At best, not a direct response to the question / topic, but shows some basic understanding of the general field. – Likely to be muddled and/or incomplete, and poorly expressed. – Little evidence of reading or reading sources are trivial. ***(Reports)*** – Inappropriate application of methodology – Poor understanding of approaches – No analysis of results – No connections between own results and the wider literature

Fail	0	– Copied or plagiarised answer with no intellectual input from student – Work penalised for late submission without the granting of an extension by the module facilitator. – Plagiarised material may be reported to the University Authorities

ORAL PRESENTATION: The key criteria used to arrive at the mark reflect the ability of students to:

- structure an oral presentation
- compile suitable material
- communicate effectively
- deliver a balanced and complete presentation within a time limit
- design and use visual aids
- undertake independent study of the topic in question
- respond to questions

PRESENTATIONS

Grade Range	Indicative Mark	Grade Related Criteria for Oral Presentations
90-100	95-100	Advanced and mature presentation exhibiting substantial oratorical skills. Material presented is balanced and been very well researched. Excellent anticipation and fielding of questions. Excellent structure. A balanced and complete presentation delivered within a time limit. As good as can be expected at this academic level.
	90-94	Advanced and mature presentation, well researched and balanced content. Evidence of critical thought and analysis, very good with appropriate illustrative material. Very goof anticipation and fielding of questions. Delivered within a time limit.
80-89	85-89	Excellent oral presentation, well paced and balanced. Content and depth of knowledge are beyond that delivered from lectures. Confident delivery, imaginative and enthusiastic performance that holds a captive audience, very confident response to questions. Delivered within time limit.
	80-84	Excellent oral presentation with suitable material, well structured, excellent use of visual aids. Shows substantial knowledge and understanding of topic. Confident delivery, keeps to time and confident in responding to questions.
70-79	75-79	Very good presentation scoring highly on structure, suitable material, communication. Well researched with aims and conclusions clearly stated. Good ability to handle questions. Keeps to time.
	70-74	Very good presentation balanced and keeps to time. Confident delivery of suitable material with good visual aids. Well researched and competent handling of questions. May lack polish

		and fluency of a higher scoring presentation.
60-69	68	A good presentation with a clear logical structure, coverage of well researched, suitable material and good visual aids. Some ability to handle questions.
	65	A good presentation, well structured and appropriate delivery of researched material. Some minor shortcomings may include aims not clearly indicated, contents pitched at a slightly wrong level, inconsistent handling of questions
	62	A competent presentation delivering appropriate, researched material. Shortcomings may include slightly imbalanced structure, some time keeping difficulties, inconsistent quality of visual aids and/or poor handling of questions.
50-59	58	A competent presentation demonstrating a reasonable standard in all aspects of the presentation. Content is largely relevant and shows some evidence of research. Some of the ideas may be less well expressed, may be unable to handle questions.
	55	Presentation is largely relevant but may be variable in quality. May not be completed within the time available or may be significantly imbalanced. Visual aids may be variable in quality and relevance. Unable to handle some questions.
	52	Adequate presentation but under performs in one or more key areas. Delivery may lack confidence, inability to hold audiences attention through the presentation.
40-49	48	Weak but acceptable presentation. Some irrelevant or inaccurate material is included. May be significantly under or over time limit. Unable to handle the majority of questions.
	42	Poor presentation with flaws in some aspects. May include a significant amount of irrelevant material. Presentation lacks structure and the presenter does not engage with the audience. Visual aids are poorly constructed, not always relevant and difficult to see. Unable to handle the majority of questions.
FAIL		
30-39	38	Presentation narrowly but clearly fails in several aspects. There may be major gaps in knowledge and understanding, and/or inclusion of substantial amounts of irrelevant material. May be substantially over or under the time limit.
	32	Presentation is unacceptable and fails on many of the key criteria. Limited knowledge and understanding, disorganized with insufficient explanation. Delivery is poor, for example; substantially over or under time and /or largely inaudible. Unable to handle questions.
20-29	25	Presentation fails on most key points. Very limited material, complete inability to understand or answer questions, audience disinterested. Sections may be inaudible, the majority of visual aids are difficult to see or inappropriate.
10-19	15	Unacceptable presentation, content largely irrelevant, few suitable

		visual aids, may be inaudible. Fails on all key criteria.
1-9	5	Unacceptable presentation, content entirely irrelevant, no suitable visual aids, may be inaudible. Fails on all key criteria.
0		No attempt, or not ready to present by deadline, or plagiarized.

DISSERTATION: The key criteria used to arrive at the mark reflect the ability of students to:

- Produce professional, potentially publishable research
- Exhibit critical ability and depth of understanding of specific areas of study
- Develop and deliver on research aims and objectives
- Implement appropriate methodologies
- To place their own work in the context of wider literature
- Write academically
- Structure and present a significant volume of work.

DISSERTATIONS

Class	Mark Range	Grade Related Criteria for Dissertations
First Class Honours	80+	– Outstanding piece of research of publishable quality, as a whole or in part. – Impressive critical ability and understanding, demonstrated by extensive reading and by location of the research within wider theoretical debates. – Very well focused and appropriate research aims and context. – Excellent and original research design and implementation, with a full, critical and reflexive discussion of the methodology adopted. – Outstanding analysis of the empirical material. – Full conclusions that discuss the original findings of the research and its contribution to the wider literature. – Presentation outstanding
	70-80	– Excellent piece of research that is potentially of publishable quality with development. – Insightful understanding of theoretical debates, and the contribution of the research project to these debates. – Clearly focused and appropriate research aims and context. – Very good and original research design and implementation, with a full discussion of the methodology adopted. – Excellent analysis of the empirical material, drawing out conclusions at a higher analytical level.

Second Class Honours Grade I	60-69	– Very good and well-executed piece of research, which is clearly located within wider theoretical debates. – Worthwhile and well formulated research aims and context. – Good research design and implementation, with a thoughtful discussion of the methodology adopted. – Good analysis of the empirical material. – Well researched and presented but discrepancies and shortcomings may not be fully explored. – Evidence of good analytical skills but does not display the outstanding ability, critical acuity and/or original contribution to the wider literature that characterise award of first class honours.
Second Class Honours Grade II	50-59	– Competent and well-organised piece of research. – Evidence of good effort and sound outcome but lacking in imagination and critical insight. – Research aims and context may be unfocused. – Dissertation may fail to achieve objectives fully or to reflect critically on the wider literature and the methodology adopted. – Analysis of the empirical material is sound but could be developed more fully and critically. – Brief and/or weak conclusions may fail to demonstrate the contribution of the research to the wider literature. – Reading base narrow and selective, overly partial.
Pass	40-49	– Deficient in effort or analysis. – Demonstration of poor analytical skills. – Incomplete and/or inaccurate analysis of the empirical material. – Lacks critical understanding of wider theoretical or methodological literature. – Weak research aims, context and conclusions. – Little evidence of understanding, detailed knowledge or reading. – Contains mistakes, misunderstandings or irrelevant material. – Poor organiation, poor expression and an uncritical approach. – Reading base very weak and thin.

Fail	1-39	**Fail (0-39)** Work that displays little or no real understanding of the topic. There is no coherent argument. The piece relies on a very limited amount of descriptive material, without any critical reflection of its significance. **30-39** No evidence of independent research; insignificant or no argument; superficial; often irrelevant or tangential. Inadequately informed, erroneous in matters of fact and interpretation, poorly organised. Poorly written with numerous grammatical and spelling errors. **20-29** Failure to carry out the task assigned. Contains no relevant information. Some attempt at analysis, but misconceived and/or incoherent, and has a weak structure. **1-19** No serious attempt to carry out the task assigned. No structure at all. No attempt at analysis. No understanding or knowledge of the topic.
Fail	0	– Copied or plagiarized work with no intellectual input from student – Work penalised for late submission without the granting of an extension by the module facilitator. – Plagiarised material may be reported to the University Authorities

13. RECEIVING FEEDBACK ON YOUR WORK

Feedback will be provided on your coursework both in terms of a numerical grade and written suggestions on how to improve in further work. The marking criteria above will help you to interpret the numerical grade assigned to your work. Feedback will not be provided before the final cut-off date for submission has passed. The timing of receipt of feedback after this time will vary between teaching staff, but every effort will be made to return work as promptly as possible. Feedback will be provided on a standard form and will highlight strengths, areas for improvement, aspects to note for future work and any appropriate additional comments.

14. AVOIDING PLAGIARISM

All work submitted by a student must be expressed in the student's own words and must incorporate his or her own ideas and judgments. This applies equally to coursework and dissertations no less than to examinations. **Plagiarism—the presentation of another person's thoughts or words as one's own—in essays, dissertations or other assessed work violates all principles of sound academic practice and is a serious disciplinary offence. Action will be taken wherever plagiarism is suspected and the Department**

regularly checks coursework and dissertations using 'Turn it In'. Dissertations will be submitted to 'Turn it In' along with other course work. Where plagiarism is confirmed, candidates will be subject to University policy with the potential for award of zero on work submitted.

To avoid plagiarism *direct* quotations from the published or unpublished work of others must always be clearly identified as such by being placed inside quotation marks, and a full reference to their source must be provided in the proper form. Equally, if you summarise another person's ideas or judgments, you must refer to that person in your text, and include the work referred to in your bibliography. Failure to observe these rules may result in an allegation of cheating. You should therefore consult your module leader or course director if you are in any doubt about what is permissible

15. SEMESTER ONE MODULES

Module name: GY652 Applied Climate Sciences

Credit Weighting: 10 ECTS

Learning Objectives: On successful completion of the module, students should be able to:

- Explain the key natural and human drivers of climate change
- Review the concepts behind modelling the climate system
- Assess why differences occur in both global and regional climate change scenarios
- Use, develop and apply statistical based modelling techniques to generate regional climate scenarios
- Discuss the impact of uncertainty in the science of climate change and climate modelling

Module Objective: Humans are no longer mere passive observers of environmental change but are now participants acting to shape our future environment. This module will encourage students to think critically about how one fundamental aspect of the environment, the climate system, is likely to respond. Students will be facilitated in developing a rigorous understanding of the fundamental principles and concepts of modeling the climate system. Students will also learn to apply this knowledge in assessing and developing global and regional climate change scenarios through the application of dynamical and statistical based models.

Module Content: This module explores the complex physical basis of climate change with an emphasis on understanding the key natural and human drivers of change. Students will be trained in the analysis of climate data in order to develop practical skills and knowledge of how to interpret a climate change signal. These skills will be further developed through the use and application of modelling techniques to generate regional climate scenarios, through the incorporation of user-friendly tools and software. The impact of aleatory ('unknowable' knowledge) and epistemic ('incomplete' knowledge) uncertainty in the science of climate change will also be explored through an assessment of uncertainties in

climate models and emissions scenarios. The knowledge and skills developed during this module will be furthered by an exploration of the links between science, policy formulation and decision making.

Assessment: 100% of marks based on Continuous Assessment Project Work

Module Name: GY672 Analysing Spatial and Temporal Data using R

Credit Weighting: 10 ECTS

This module provides an introduction to the basics of data analysis, exploration and visualisation, with particular focus on spatial and temporal data. The module consists of a series of lectures including an introduction and start-up session to a take away practical exercise using the statistical programming language R. The module begins with basic methods to explore, describe and graphically represent one- and two-dimensional data, before moving on to consider more advanced methods to manipulate and visualise geographical information, and explore and identify trends and seasonal patterns in time series data. In addition, some methodological aspects of data analysis are introduced, in particular the use of open data and 'citizen science' data and the idea of reproducibility in data analysis.

Assessment:

1. Continuous Assessment 50%
2. End of year in-house exam 50%

Module name: GY655 Impacts, Adaptation and Mitigation

Credit Weighting: 10 ECTS

Learning Outcomes: On successful completion of the module, students should be able to:

- Distinguish a diverse range of potential and real climate change impacts.
- Identify and discuss issues surrounding these impacts and related policy approaches for their mitigation.
- Analyse the implications of modelling based projections of the enhanced greenhouse effect for Ireland and other parts of the world.
- Appraise options to mitigate global warming.

Module Objective: To raise awareness of climate change and related issues which impact on the world around us. Policy approaches will be addressed in relation to impacts and mitigation.

Module Content: Climate change is having both positive and negative impacts in many areas of our natural, social, economic and political world. This module is designed to equip students with knowledge and understanding on a diverse range of potential and real climate

change impacts. Issues surrounding these impacts and related policy approaches for mitigation will be scrutinised. The implications of modelling based projections of the enhanced greenhouse effect for Ireland and other parts of the world will be analysed, as will options to mitigate global warming. This module will be delivered by several academics working on specific impact areas. Possible topics to be incorporated into the module may include agriculture, soils, biodiversity, marine/coasts, pests, energy, transport, health, construction, tourism and planning.

Assessment: Continuous Assessment 100%

Research Tutorial (Semester 1 & 2)

This thesis support tutorial will provide students with:

- A strong grounding in the principles of research design in the physical sciences.
- An understanding of the implications of methodological issues and debates to research design in the physical sciences.
- An awareness of and practical competence in the identification and formulation of research questions in research in the physical sciences.
- An understanding of the basis of data collection including uncertainty
- Time management and organisational skills
- Experience in presenting ideas using oral and poster presentations.
- How to present materials effectively in different formats and to different audiences

Tutorial Content: considers the methodological steps involved in the design, data collection and analysis, and context of original research in climate science. The module includes an overview of research design and data analysis and includes practical workshops where students gain practical insights into the research process, including experience of different communication formats such as report writing, academic papers, dissertations and presentations. The geography research seminar series is a fundamental component of the course, introducing students to research methods from a suite of cross-disciplinary research areas.

16. SEMESTER TWO MODULES

Module name: GY663 Detection, Attribution and Decision Making

Credit Weighting: 10ECTS

Module Content
This module deals with key issues in climate science and in linking climate science with policy. The quality of climate time series underpins climate science, process understanding and making properly informed decisions. The module will introduce students to approaches to homogenising (quality assuring) climate data series using cutting edge software such as

HOMER. Students will gain an appreciation of both the importance and challenges of constructing long term data series and recognise the important contributions that metadata and even citizen scientists make to the homogenisation process. Homogenous data series are important not only for detecting climate change signals but also for attribution. Students will be guided through approaches to detecting and attributing changes in various time series from temperature and precipitation to river flows and will grapple with the associated challenge of attributing detected changes. Finally students will be introduced to contemporary approaches to decision making in linking climate science and policy with a particular focus on water resources and flood management.

Learning Outcomes
On completion of the module students will:

1. Show an appreciation and awareness of the importance of data homogeneity.
2. Have an ability to apply routine homogenisation software
3. Be able to detect trends in climatic variables for a various climate indices
4. Demonstrate understanding of the complexity of attribution of detected changes
5. Show critical appreciation of approaches to decision making and how models are employed in developing responses to climate change

Assessment: 100% Continuous Assessment

Module name: GY667 The Ocean and Climate Change

Credit Weighting: 10 ECTS

Module Content: Modern climate change, at its most fundamental level, is the consequence of the radiative imbalance caused by increased and increasing anthropogenic greenhouse gases in the atmosphere. This radiative imbalance causes an excess of heat to be trapped in the atmosphere, which is where the term 'global warming' arises. Over 90% of this excess heat trapped in the atmosphere has been stored in the ocean---in other words, 'global warming' could as accurately be described as 'ocean warming'. Understanding the ocean's response to climate change is key to understanding climate change itself. This course uses the IPCC AR5 report as the fundamental jumping off point for investigation of the ocean and climate change. The fundamental properties of the ocean (temperature, salinity, chemistry, freezing) are introduced first and threaded through the course to study ocean warming, salinity, sea ice, sea level rise and the ocean's overturning circulation.

Assessment: 100% of marks based on Continuous Assessment Project Work

Module name: GY671 Field Course

Credit Weighting: 10 ECTS

Module Content: Fieldwork is often the most rewarding learning experience in the Physical Sciences. This module will comprise a set of field site investigations and follow up analysis work to allow a grasp of field investigation practice and the role of field based observation in data collection and critique.

Assessment: 100% of marks based on Continuous Assessment Project Work

MODULE NAME: GY660 THESIS

Credit Weighting: 30

Module objectives: Exploration of an original research project (7-13k words) under supervision of a staff member.

Module content: A written proposal outlining the research project; writing up the research; seminar presentations during the course of the year.

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17. TEACHING AND SUPPORT STAFF CONTACTS

Academic Staff	Email	Phone	Room
Chris Brunsdon	Christopher.brunsdon@mu.ie	6149	ION- 2.19
Ro Charlton	ro.charlton@mu.ie	3679	R-23
Stephen McCarron	stephen.mccarron@mu.ie	6147	R-14
Conor Murphy	conor.murphy@mu.ie	3494	LB-2.6
Peter Thorne	peter.thorne@mu.ie	6469	LB-1.11
Gerard McCarthy	Gerard.mccarthy@mu.ie	6550	LB-2.7
Helen Shaw	Helen.shaw@mu.ie	7574	R-07
Ro Charlton	ro.charlton@mu.ie	3679	R-23
Lisa Orme	lisa.orme@mu.ie	3769	LB-2.4
Rowan Fealy	rowan.fealy@mu.ie	4562	LB-2.3
Support staff			
Neasa Hogan,	geography.department@mu.ie	3610	R-23C
Una Holton	geography.department@mu.ie	4760	R-23C
Mick Bolger, Technician	michael.bolger@mu.ie	4762	PG-Lab
Corinne Voces, ICARUS	Corinne.voces@mu.ie	3862	LB-1.1

R = Rhetoric House; LB = Laraghbryan House; ION = Iontas Building

More details and departmental staff biographies are available at
https://www.maynoothuniversity.ie/geography/our-people