



Welcoming Remarks to M.Sc. Students Monday, 8th September, 2008.

Prof Peter Lynch

Graduate Room (Room 125)
School of Mathematical Sciences
Science Education & Research Centre (SERC-North)
University College Dublin
Belfield, Dublin 4.

Welcome.

It is my great pleasure to welcome you all here to University College Dublin for the start of the 2008-2009 MSc Course in Meteorology. This is the fifth year in which this university course, devoted exclusively to meteorology, is being presented. The first four years have been very successful. There were nine full-time students for the first year, eight for the second, ten for the third and seven for the fourth. This year, there are eight students. I am delighted to tell you that almost all students to date have been successful in completing the course.

Meteorology, the study of the atmosphere, has been an active area of science for hundreds of years. But interest in meteorology has never been keener than it is today. The primary reason for this is the threat of significant changes in the Earth's climate. Some learned people have described this as *the greatest threat facing humanity today*. The IPCC Fourth Assessment Report issued last year has clearly identified human activities as a cause of climate change, and great challenges face us in tackling this issue.

The weather has an impact on almost all areas of our lives. Some people are interested in the weather conditions for their occupations, others with how much sunshine they will have for their holidays, and others still have more serious preoccupations about whether they will have a home tomorrow. You are all aware of the serious problems associated with flooding in Ireland, and with Hurricanes Gustav, Hanna and Ike during the past week. Weather is a serious business. So, it is vital for us to understand the dynamics of the atmosphere and ocean in order to anticipate extreme events and to prevent catastrophic changes in the climate. This Masters Course is an important step in the development of atmospheric science in Ireland.

Background.

Up until very recently, there has been a serious deficiency in meteorological education in Ireland. There was essentially no study of atmospheric dynamics, or of synoptic meteorology or numerical weather prediction. In this respect, we contrasted unfavourably with virtually every other country in Europe; in most western European countries, there are Departments of Meteorology in several universities; in the United States, about seventy universities have major programs in atmospheric science.

The National Meteorological Service, Met Éireann, recognized this lack and, several years ago, initiated discussions with a number of universities with a view to establishing courses in meteorology and enhancing research in atmospheric science. The upshot of these negotiations was that a *Memorandum of Understanding* (MoU) was signed by Met Éireann and UCD in October 2003. This proposed the setting up of a Meteorology and Climate Centre, and a Masters Course in Meteorology. It is this very course that you are about to undertake.

Recent Developments at UCD.

The Meteorology and Climate Centre is within the School of Mathematical Sciences. The School, in turn, is a school within the College of Engineering, Mathematics and Physical Sciences. The meteorology course will be in the *School of Mathematical Sciences*.

A professor of meteorology was appointed in June, 2004, the *Met Éireann Professor of Meteorology* and he took up office on 1st September, 2004. Prof Ray Bates also took up office, as Adjunct Professor, having recently retired as Professor of Meteorology in the University of Copenhagen. And a Lecturer in Meteorology, Dr Rodrigo Caballero, joined the School in September 2005.

The activity here is being undertaken in close collaboration with Met Éireann. There is an Advisory Board for Meteorology to oversee the work, and Met Éireann is represented on that Board. We now also have a supply of real-time meteorological guidance for weather analysis and study, provided by Met Éireann. Some of this is shown on our meteorological visualization system, *MetVue*.

A new undergraduate programme *Climate and Earth System Science* (DN038) started last year, and we will be teaching modules, *Introduction to Meteorology and Climate* and *Foundations of Climate Science* to First Year and Second Year students in that programme. This new programme will complement the Masters programme.

Another area of collaboration with Met Éireann is the *Community Climate Change Consortium for Ireland* (the C4I Project), the aim of which is to model and predict climate change in Ireland. We have a programme for Ph.D. students, and we have four postgraduate students, Paul Nolan, Michael Clark, Colm Clancy and John Hanley. We also have three Post-doctoral researchers, Shiyu Wang, Conor Sweeney and Nazario Tartaglione. It is planned to build up a cohesive programme of research in meteorology and climate modelling.

Details of the Masters Course.

Modules

The course is modular, and may be taken on either a full time or part time basis. The majority of students opt for full time study.

The university operates a semester system. The first semester runs from September 8th to November 28th, lasting 12 weeks. The second semester

starts on January 19st (over 7+5 weeks). Thus, there are two twelve-week semesters.

The M.Sc. lecture courses will comprise five separate taught modules. They will cover the following areas:

- (1) Physical Meteorology (Dr Rodrigo Caballero)
- (2) Dynamical Meteorology (Prof Ray Bates)
- (3) Climate Dynamics (Dr Rodrigo Caballero)
- (4) Numerical Weather Prediction (Prof Peter Lynch)
- (5) Synoptic Meteorology (Prof Peter Lynch)

Physical and Dynamical Meteorology will be taught in the first semester and Climate Dynamics and Numerical Weather Prediction in the second. Synoptic Meteorology will be taught over the two semesters. This is a new module, taught for the first time last year.

Part time students may opt to take either of the following combinations in each year:

(A) Physical in 1st Semester and Climate in 2nd Semester.

or

(B) Dynamic in 1st semester and Numerical in 2nd Semester.

They must register for Synoptic Meteorology in either the first or second year. Other combinations may not be possible, as the Climate module will depend on the Physical one, and the Numerical on the Dynamical.

Timetable

Lectures will be each morning, Monday to Friday. On Tuesday and Thursday afternoons there will be tutorials and exercises. These sessions will be guided by Prof Lynch and Dr Caballero.

Textbooks

The primary text for the Dynamic Meteorology module is Holton's "**Introduction to Dynamic Meteorology**" (4th Edn). Students are **REQUIRED** to have a copy of this text. There should be copies of this text (price about €60) available in the Campus Bookshop.

The text on which the Physical Meteorology module is based is "**Atmospheric Science: An Introductory Survey**", by J M Wallace and P V Hobbs, Second Edition (2006). This is a REQUIRED text.

Texts for the modules in Climate Dynamics and Synoptic Meteorology will be given at a later stage. Notes for these modules will be provided.

The text for the course in Numerical Weather Prediction is "**Atmospheric Modeling, Data Assimilation and Predictability**" by Eugenia Kalnay, published in 2003 by Cambridge. This is a REQUIRED text.

Synoptic Meteorology Sessions

On Friday mornings there will be Synoptic Meteorology sessions, of varying nature and content, lasting (up to) three hours, from 10am to 1pm. Generally, there will be a lecture from 10am to 10:50, a break, and a Weather Analysis session involving application of theory, current weather or analysis of historical cases.

Afternoon Sessions

The afternoon "Laboratory" Sessions will vary in nature. They will include tutorials, supplementary lectures, assigned exercises, special seminars and student presentations. All students are expected to participate in these sessions. Part time students must participate in 50% of the Laboratory Sessions, with students from the two alternate streams participating in alternate weeks. We are anxious to have feedback from students about the best way of arranging these sessions, so let us have your views.

Research Thesis

Students will be required to undertake a research project over a ten-week period in the Summer months, and to write up the results in the form of a thesis. Thesis projects will be assigned by agreement, and each student will report regularly to a supervisor. Research work for the projects will be undertaken over a period of about ten weeks, from early June until mid-August (exact dates will be given later) but it is wise to start planning your projects early in the academic year.

The project reports are typically about fifty to one hundred pages in length. It is important for you to bear in mind that they are *formally assessed*, and count towards your final marks.

Field Excursions

In late September, there will be a Field Excursion to Valentia Observatory, the Met Éireann main Geophysical Observatory in Caherciveen, Co Kerry. The provisional date for this is Friday, 26th September. In view of the distance, it will be necessary to travel to Kerry on Thursday, 25th. There will be lectures and presentations at the Observatory, and students will be able to witness a radiosonde launch and learn about the geomagnetic and seismological work in addition to the meteorological programme of the Observatory. All students are expected to participate in the Field Excursion.

This year, for the first time, we have arranged for another Field Trip, to Leeson House Field Studies Centre in Langton Maltravers, Dorset. You will be joining the Masters students from Reading University for a two-day programme of observation and weather analysis there. Students must bear their own travel and accommodation expenses for the Field Excursions. Further details about it will be available soon.

Examinations

Most modules will be taught over a single semester, and will be examined at the end of the semester. Thus, there will be two examinations in December (in Physical and in Dynamical Meteorology) and three in May (in Climate Dynamics, Numerical Weather Prediction and Synoptic Meteorology) each year. The thesis will also be assessed and a mark awarded.

The allocation of marks will be as follows:

Physical Meteorology	100
Dynamical Meteorology	100
Climate Dynamics	100
Numerical Weather Prediction	100
Synoptic Meteorology	100
Research Thesis	100
Total marks	600

The Grade Point Average, which has been introduced at UCD , is computed by an aggregation of the grades obtained in all the modules. The final aggregate result of assessments for each student registered to a module is returned as a single letter grade according to the following scheme:

GRADE	GRADE-POINT	DESCRIPTION
A+	4.2	Excellent
A	4	
A-	3.8	
B	3.6	Very Good
B	3.4	
B	3.2	
C	3	Good
C	2.8	
C	2.6	
D	2.4	Acceptable
D	2.2	
D	2	
E	1.8	Marginal Fail, <i>may compensate</i>
F	0	Fail

Honours for modules are awarded based on the following marking levels:

First Class Honours	Grade A	$\geq 70\%$
Second Honours, Grade 1	Grade B	$\geq 60\%$
Second Honours, Grade 2	Grade C	$\geq 50\%$
Pass	Grade D	$\geq 40\%$
Fail	Grade F	$< 40\%$

To be eligible for award of an M.Sc., *students must obtain a pass grade (Grade D or better, directly or by compensation) for each of the four modules and also for the thesis.*

Warning: Marks for *repeat* examinations will be capped at 40% (Grade Point 2).

A Miscellany of other issues

Seminars on meteorological topics are arranged within the School of Mathematical Sciences through the academic year. All M.Sc. students are expected to attend these seminars. They are part of your education!

Journal Club. On an occasional basis, normally on the third Wednesday of the month, we assemble for discussion of a paper in a meteorological journal. Some of these papers will be of interest, and you are very welcome to participate in and contribute to these discussions.

The *Irish Meteorological Society* is open to all interested in meteorology, which (I sincerely hope) includes all of you. The society arranges occasional lectures through the winter months.

If you have difficulties with mathematics, there is a newly-established *Mathematics Support Centre*. The centre caters primarily for first-year students, but all are welcome to visit the centre and seek assistance for any mathematical problems they may have. The Centre is located on the ground floor of the Science Centre Hub, which makes it very convenient for you. The Director is Nuala Curley. I encourage you to drop in and talk to the staff there.

Concluding Remarks

The Meteorology Masters Programme at UCD is a relatively new venture in meteorology in Ireland, one that holds great promise for the future and should bring substantial benefits to the university, the National Meteorological Service and the country as a whole. I hope you find it a rewarding and enjoyable experience. Its ultimate success depends very much on your efforts. I wish you all the very best of luck and sincerely hope you enjoy the year.

A handwritten signature in black ink that reads "Peter Lynch". The signature is written in a cursive style with a large, stylized initial 'P'.