

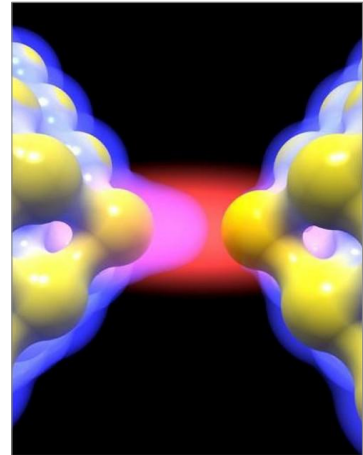
# Physics & Astronomy 400 Handbook 2012

Astronomy --- Physics --- Mathematical Physics --- Medical Physics

Version: January 2012

## Introduction to 400-level courses

- Courses
- E-mail addresses
- Keys
- Rooms
- Tea
- Mailbox
- Seminars
- Beer seminars
- Computer facilities
- Stress, conflicts, problems
- Computers
- Timetable



## Important Dates

### 480 Research Projects

- Introduction
- Assessment
- Organization
- Guidelines for the Report Format
- Your Contribution to the Research Project
- Plagiarism
- Common Mistakes and Things to Avoid



*Department of Physics and Astronomy*  
*University of Canterbury*  
*New Zealand*  
**Year 2012**



**Introduction to 400-Level Courses**  
*Department of Physics and Astronomy*  
*University of Canterbury*

Co-ordinator: To be Announced

To Feb 2012: Mike Reid, Room 606, [mike.reid@canterbury.ac.nz](mailto:mike.reid@canterbury.ac.nz)

**400 Level Courses for 2012**

Course	Title	Semester
ASTR 422	Theoretical and Observational Cosmology	S2
ASTR 423	Stellar structure and evolution	Not offered 2012
ASTR/PHYS424	Radiative Transfer Processes in Astronomy	S1
ASTR 425	The Structure and Evolution of Galaxies	S1
ASTR 430	Astronomy Literature Review	S1 or S2
ASTR 480	Research Project in Astronomy	S1+S2 (A)
MAPH 480	Research Project in Mathematical Physics	S1+S2 (A)
PHYS407	Research tools	S1+S2 (A)
PHYS 411	Advanced Quantum Mechanics	S1
PHYS 412	Advanced Condensed Matter Physics	S1
PHYS 413	Laser Physics and Modern Optics	S2
PHYS 414	Relativistic electrodynamics & quantum mechanics	S1
PHYS 415	General Relativity	S2
PHYS 416	Quantum Field Theory	S2
PHYS 418	Physics of Atmospheres	S2
PHYS 422	Theoretical and Observational Cosmology	S2
PHYS 480	Research Project in Physics	S1+S2
PHYS495	Introduction to physics education research	S1
MDPH 401	Anatomy and physiology	S1
MDPH 402	Nuclear Medicine	S2
MDPH/PHYS 403	Radiation physics	S1
MDPH 404	Radiation biology	S1
MDPH 405	Radiation therapy	S2
MDPH/PHYS 406	Medical imaging	S2
MDPH 407	Research Tools	S1+S2
MDPH 480	Medical physics research project	S1+S2

In addition, the following 300-level papers may also be taken as 400-level papers with possibly a more advanced assessment and assignments, provided the 300-level papers have not already been credited. MSc students are limited to one of the courses below, while students doing BSc(Hons) or PGDipSc may take up to two.

PHYS441	Quantum mechanics (PHYS331)	S1
PHYS442	Applied electromagnetism (PHYS312)	S2
PHYS444	Condensed matter physics (PHYS314)	S2
PHYS446	Geophysical fluid dynamics (PHYS316)	S1
PHYS456	Classical mechanics (PHYS326)	S2

Check the Enrolment Handbook for specific questions regarding requirements, degrees or pre-requisite courses. I will also help to answer such questions.

Special topics are occasionally used (i) to allow a student to take a relevant course from another department under a PHYS or ASTR code, (ii) to construct a course for a student's special needs by combining parts of two or more other courses or (iii) to be able to offer a course delivered by a guest lecturer on any relevant topic.

### Course selection:

BSc (Hons) students in physics do a research project, PHYS407, PHYS480 and seven courses from PHYS401-460, at least five of them from PHYS401-440. BSc (Hons) students in mathematical physics do PHYS407, a research project (MAPH480) and seven lecture courses, including at least four courses from the physics list and at least two from MATH401-490. BSc (Hons) students in astronomy do PHYS407, the research project, ASTR480 and seven lecture courses, including ASTR424 and the remaining six courses from ASTR and PHYS 400-level courses. The enrolment handbook gives details of prerequisites and other restrictions. BSc (Hons) students in medical physics do MDPH407, MDPH480, six courses from MDPH401-410 and one course from PHYS410-460.

MSc (Part 1) students in physics do PHYS407, PHYS480 and five lecture courses from PHYS401-460. In astronomy the choice is PHYS407, ASTR480, ASTR424 and four other courses from ASTR and PHYS 400-level courses.

PGDipSc students may replace PHYS407 and the PHYS/ASTR480 project with three other lecture courses in PHYS or ASTR at 400-level; otherwise the PGDipSc requirements are the same as those for MSc (Part 1).

In all cases the precise requirements on course selection and prerequisites can be found in the Enrolment Handbook, or please consult me as 400-level supervisor of studies.

Other items that you need to attend to:

**E-mail Addresses:** You will receive from me important notices and reminders. Please make certain that I have the e-mail address that you most often check.



**Keys:** See the office staff in room 708 to obtain a corridor key.

**Rooms:** You should be given a desk within your research group.

**Coffee/Tea:** You are welcome to coffee/tea in room 701 from 10:30 – 11:00 am and 3:30 – 4:00 pm. These facilities are available at all times except when a meeting is being held in room 701.

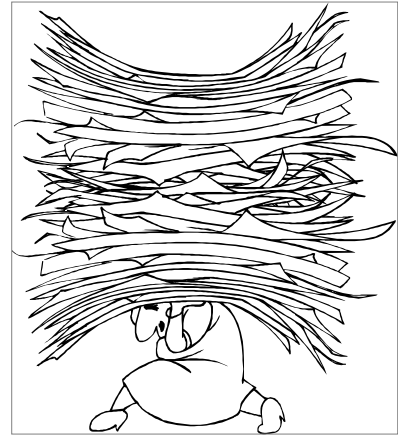
**Mailbox:** You should have your own mailbox (pigeon hole) in room 711. Please check this frequently.

**Seminars:** You are **URGED** to attend the departmental seminars at 11:00 am on Fridays. The seminars are worth the price of your University education—and there are no exams!

**Beer Seminars:** Mainly students, lively discussion and beer!

**Computer Facilities:** You will be assigned a username and password. There will be tutorial support for those new to the system. I encourage you to learn as much as you can. Your computer account will have \$20 in funds for printing. Your research supervisor can request additional funds, if that is necessary for your work.

**Stress, conflicts, problems:** Your studies will be challenging. You might find them overwhelming. Overwork also promotes personal conflicts. Personal and family relationships can affect your university work. Please feel free to discuss any problem at any time, with me, your instructors, or the Head of the Department. Usually it is better to get help early.



### Computers Available

We provide research equipment for all our research students. All students doing a 480 research project can expect a desk and access to a desktop computer for their project work.

### Important Dates

**Monday 20 February:** 480 Project descriptions available on the physics dept website.

**Wednesday 29 Feb:** E-mail me your first, second and third choices for 480 projects

**Friday 2 March:** 480 assignments will be e-mailed to you

**Monday 5 March:** Nominal start date for 480 projects

**Wednesday 7 March:** Barbecue at the Staff Club starting at 5:10. Free food!!

**Friday 13 July:** A three-page (max. length) progress report on your project is due at 4.00 pm with Rhondda.

**Week 16-20 July:** PHYS407 talks. 15 mins total (12 min talk, 3 min questions) per speaker

**Friday 7 September:** Your full project reports (25 pages max. length) are due to be handed in to the Office by 4.00 pm (3 copies). Late projects and those which are over the page limit will have their grade reduced.

**Week 10-14 October:** PHYS480 oral examinations. You will discuss your work with a panel of assessors and an external moderator. PHYS407 Poster



symposium. As a part of PHYS407, all students will produce an A0 format poster on the research undertaken in your 480 project.

It will be possible for some students to start their 400-level studies in semester 2 and conclude in semester 1 of the following year. In that case the dates for the commencement of the research project and for the deadlines along the way will be set by mid-2012.

## **2012 Research Projects** **PHYS 480, ASTR 480, MAPH 480, MDPH 480**

### **Introduction**

Each student doing 400 level Honours or MSc part I in physics, astronomy, mathematical or medical physics is required to do a research project. Those doing a PGDipSc may choose to replace three lecture courses with a research project. The project must include:

- A 3-page (max) written progress report due on July 15.
- A final written report due on September 9. The maximum length is 25 pages, including diagrams and tables.
- Oral Examinations. Your work will be assessed by a panel of assessors and an external moderator who will discuss your research with you for around 30 minutes.

Project descriptions will be available from about 21 February. Please talk to the supervisors about any project that interests you. The current list of projects being offered will be on the web from 21st February.

The written report must comply with the format given in this document. This scholarly work will be archived in the Departmental Library.

The **McLellan Prize in Physics** is awarded annually to the highest ranked project undertaken by a BSc Hons student.

### **Assessment**

The following are the credit weightings for the assessment of your project work:

- The progress report is not assessed but it is essential to complete this by the deadline to complete the course.
- The final written reports are assessed by four people: your supervisor (25%), two independent readers ( $2 \times 15\%$ ) and an external moderator (15%), total 70%.
- The oral examination will be chaired by the external moderator and consist of the moderator and the two readers of your report. Your supervisor may also be present. Total 30%.

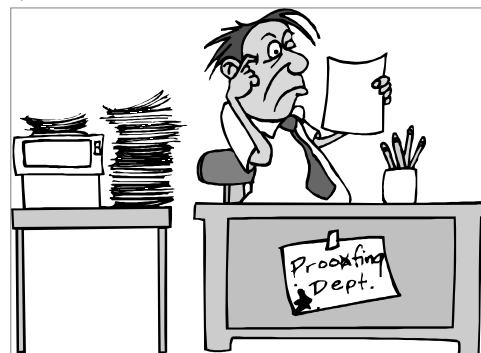
### **Your final written report will be graded on the following concepts:**

1. Clear statement of the problem being investigated
2. Use of appropriate methods
3. Reviewed the work of others
4. Clear presentation of results
5. Critical appraisal of the research outcomes

6. Logical ordering to the presentation
7. Quality of the language (grammar, spelling, clarity of expression)
8. Completeness of the bibliography
9. Amount of detail presented
10. Quality of the science presented
11. Quality of the work presented
12. Original thoughts
13. Completeness of the report
14. Quality of the presentation, including tables, and figures
15. Followed the rules (turned in on-time, length, format)

### Organization

You should meet regularly with your supervisor. You are NOT expected to take the research topic home and return with the work completed. Research is an evolving process that requires give-and-take between you and your supervisor. Make yourself a timetable and stick to it. Have a near-to-final draft of your manuscript to your supervisor several weeks before it is due.



### Guidelines for the report format

The style rules of the Journal of Physics (UK) should be used. Any article in any volume of the journal may be consulted for layout. Certain issues contain instructions on the inside cover. A project report from a previous year may be a useful guide.

In general, the report should contain:

Title Page

Abstract page (summary of project, including results less than 250 words)

Contents page (listing section and headings)

List of Figures and Table page (if applicable)

Main Sections (either divided according to topics or as given below):

Introduction

Materials and Methods

Results

Discussion

Conclusion

Figures and tables should be located in the text where cited or on the next blank page.

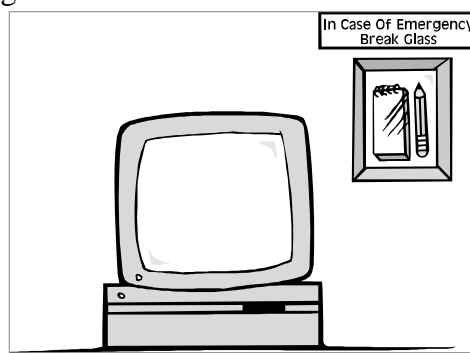
Acknowledgements

Appendices (if applicable)

References: follow the layout of the Journal of Physics

All pages from the start of the Introduction should be in Arabic numbers (1, 2, 3...) and the preceding pages (except Title and Abstract pages with lower case roman numerals (i, ii, iii,...)). The Arabic numbered pages of the report from the beginning of the Introduction through to the Conclusion **must not be longer than 25 typed A4 pages in a 12-point font**. 1.5 cm margins should be used on sides of the page, except a 3.0 cm margin should be used on the left side for binding. The 25-page limit includes figures and tables but not references.

Although the format is similar to a journal article, this report should be less cryptic and more expository than a



published article. Your report should resemble a short thesis.

### **Your contribution to the research project**

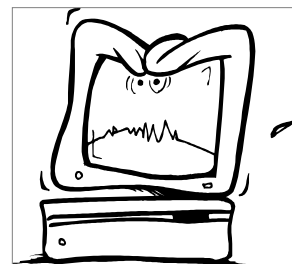
The Introduction should state the purpose of the research in the context of adequate background material. The Introduction should conclude with a very EXPLICIT statement about YOUR contribution to the project. Since most research is very collaborative, your role in the collaborations needs to be carefully listed. If a grader is unable to determine your exact role in a project, your grade might suffer.

### **Plagiarism**

In submitting your written paper, you should be aware of what is considered plagiarism. While you are encouraged to consult a wide range of references in preparing your report, the actually written submission must be your own words on the topic. It is not acceptable to copy the work of someone else and change a few words in the text. If you are uncertain about the rules, talk to me in advance. The University penalties for plagiarism are severe.

### **Common mistakes and things to avoid**

- Be sure to consult your supervisor early as to their preferences regarding writing style to minimize editorial changes
- Be sure to allow plenty of time for the original write up, revision and final formatting. As a guide, the majority of your experimental work should be completed two months before the hand in deadline.
- Do not write in the first person singular (*e.g.*, I measured the resistance. . .)
- Be consistent with verb tense.
- Be consistent with the way things are referenced.
- Define all symbols and constants the first time they are used.
- Define all abbreviations the first time they are used.



### **Further Studies**

Those of you not already undertaking a degree course involving thesis work may well be undecided on what you are doing in 2013! Feel free to discuss the possibilities for post-graduate research within the Physics and Astronomy department with any staff member. I will be free to discuss your options at anytime. Just call by or email me to set up a meeting.