

UNIVERSITY OF MELBOURNE

SCHOOL OF PHYSICS

BACHELOR OF SCIENCE WITH HONOURS IN PHYSICS

INFORMATION DOCUMENT FOR 2008

TO: ALL POTENTIAL PART IV STUDENTS

Attached please find details of *the 2008* Part IV program.

This is a collection of information for interested second and third year students, and detailed information for those students preparing for Honours in 2008. This information is also relevant for intending Post-Graduate Diploma students.

Dr. Nicole Bell
Part IV (Honours & Post-Grad. Diplomas) Year Organizer

TIMETABLE 2008

Research Commencement*	04-Feb		
Hons Orientation Week:	11-Feb	-	15-Feb
Demi-semester 1**	18-Feb	-	07-Apr
<i>Non-teaching period</i> †	<i>21-Mar</i>	-	<i>30-Mar</i>
Examination Period	14-Apr (QMA)	&	16-Apr (QMB)
Demi-semester 2**	21-April	-	30-May
Examination Period	09-Jun	-	16-Jun

Provide a title and a short abstract (1 page) for your project 20-Jun

<i>Research Period</i>	<i>17-Jun</i>	-	<i>11-Jul</i>
Demi-semester 3**	14-Jul	-	22-Aug
Examination Period	01-Sep	-	05-Sept

Part III/IV BBQ 2-Oct @ 1pm[©]

Research Period 08-Sep - 03-Nov

Research Reports Due 03-Nov by noon to Cilla (room 106)

Practice Talks 6-Nov - 7-Nov
Honours Talks 10-Nov - 11-Nov

End of Honours BBQ 1pm after the talks on 11 Nov in the Physics courtyard

Honours Dinner 12-Nov at University House at 7.30pm (students pay for their meal and school pays for drinks and venue - approximately \$54 pp)

* Students are expected to arrive around this date and to commence administrative issues including allocation of keys and office desks; and to begin discussions and efforts relating to their Research Projects. The actual date can depend upon discussions with the Research Supervisor.

**Lectures "lost" due to public holidays will be re-arranged by the lecturer concerned.

† Period from Good Friday through Easter week. AVCC common week

©Honours students host this BBQ so cooking and setting up is done by the students from 11am. Class representatives liaise with Cilla

Your Attendance in Orientation Week is essential.

School of Physics

B.Sc. (Hons) and Post-Graduate Diploma Year

General Information

1. Students undertaking B.Sc.(Hons) or the Post-Graduate Diploma do a common fourth year in which they must attend certain unit courses. They will also be assigned to a research group and participate in the activities of that group.

The year consists of two components which carry equal weight.

640-496 Physics Research
640-497 Physics Advanced Coursework

Note that individual course numbers (e.g. 640-401) are for internal physics use only. Only a single course mark (for 640-497) and a single research mark (for 640-496) are transmitted to faculty and will appear on your academic record.

The assessment of each component is described later in this document.

2. **Joint Maths/Physics B.Sc.(Hons) students** attend an approximately equal number of lectures in Maths and Physics and undertake a research project in Maths **or** Physics. Their final mark is obtained from these three components in a ratio which depends on the project and is determined by the Honours Coordinators in consultation.
3. Formal (Physics) lecture units are offered during the first semester and the first half of the second semester, with the rest of the year reserved for the student to concentrate on his or her research project. However, it must be understood that the first three demi-semesters are **not** reserved solely for course work. Work on the research project is carried out **throughout** the year. There are also particular periods before each demi-semester which are devoted to research work on and towards the project.
4. **Entrance to higher degree studies is strongly dependent** on the assessment made at the end of the fourth year. Notwithstanding this statement, the number of students accepted for higher degrees may be limited by the availability of facilities and the staff in the School of Physics.

The fourth year result carries substantial weight (2/3) in decisions regarding the award of Australian Postgraduate Awards, University of Melbourne Research Scholarships and other scholarships. Closing dates for applications for these can be obtained from a University Diary or Principal Dates sheet, but are typically at the end of October. Third year marks may contribute up to 1/3 of the assessment for such scholarships.

5. Students are strongly encouraged to do some light reading in preparation for Honours based on prescribed texts. Students are also strongly encouraged to arrive at the University earlier than the official Orientation Week, as marked on the calendar, in order to settle in and sort out administrative details. Students are warned against leaving valuables, especially calculators, in unlocked rooms. Unfortunately, every year a number of thefts occur within the School of Physics building.

The Course-Work Component [640-497]

6. **All Physics Honours Students** will complete six lecture courses of which two (Quantum Mechanics A and B) are compulsory. Joint Maths/Physics students are required to take both Quantum Mechanics courses plus two elective units. Post-Graduate Diploma Students should consult with the Honours Coordinator and their supervisor regarding the proposed detailed plan.

7. This year the following courses (all of approximately 24 lectures) will be offered. Note there are no new courses this year, but there will be significant modification of some of the following courses due to feedback from this year's operation.

SUBJECT	SYMBOL	LECTURER
Demi-Semester 1:		
401 Quantum Mechanics A	QM-A	Scholten
402 Quantum Mechanics B	QM-B	TBA
Demi-Semester 2:		
403 Particle Physics I	PPI	Barberio
408 Quantum & Advanced Optics	QAO	Chantler
406 Statistical Mechanics	SM	Melatos
407 Quantum Field Theory	QFT	Volkas
404 Condensed Matter	CM	Martin
Demi-Semester 3:		
409 Particle Physics II	PPII	Foot
410 Scattering & Imaging	SI	Allen
413 General Relativity	GR	
415 Extra-galactic.Astrophysics & Cos.	EAC	Wyithe

Lecture Timetables can only be established when students have selected their courses. Lecture venues will also be notified then as some courses may run in parallel. Most lectures will be held in the Geoff Opat seminar Room, 360.

8. Selection of elective units must be approved by the student's research supervisor and submitted to Cilla Gloger on the appropriate form which is included in this memorandum **on or before the beginning of Honours Orientation Week.**

Any alteration of course selection by a student requires the written approval of his/her supervisor and must be arranged with the Honours Coordinator, (i) before any examination or grading in the courses concerned, and (ii) by, at the latest, the end of the first week of the course.

9. All students are encouraged to avail themselves of the opportunity to audit lectures in units other than those taken for credit. Although formal approval is not required for these audit units, your research supervisor can offer suggestions that can guide your selection of those units in which your informal attendance would be of value. However, do not become overcommitted.

10. All units will be examined by either:
- (i) written examinations (at least 60%)
 - or (iii) project work and/or problem working throughout the course (at most 40%)

The precise method of examination for each unit will be specified early in each course. All units will carry equal weights in the assessment of the course work component of your fourth year program.

11. A series of general colloquia will be given throughout the year. Attendance is mandatory for B.Sc. (Hons) and first year M.Sc. students. For timetable and titles see notice boards in the elevators, the Physics kiosk (<http://kiosk.ph.unimelb.edu.au/>) and Part IV notice board on level 3.
12. All pertinent notices and information on coursework will be posted on the Part IV notice board on level 3. Posted information and emails will serve as a principal medium of communication to students. Notices about job opportunities and scholarships appear on level 3 as well.

13. *All B.Sc. (Hons) and M.Sc. (Preliminary) students are required to attend a set of safety lectures. These will be given on **Thursday of Honours Orientation Week.***

Research Component [640-496]

14. Students accepted into Part IV will have been assigned to a specific Research Group. It is desirable for all students to begin their research work no later than the first week in February.

Normally, the student and supervisor will agree upon a well-defined research problem early in the first semester. In some groups it is common practice to define a rather broad problem at this stage, and to allocate a specific project when the student's ability and rate of progress have been assessed.

At the end of semester 1, you will be asked to provide a title and a short abstract for your project.

It is expected that a research student will have *frequent contact and discussions* with his or her research supervisor.

Commencement of a research project normally involves a review of previous related work.

15. On occasion it can happen that a student is not satisfied with some aspect of his/her supervision. Normally such problems are resolved by an informal chat between the two persons concerned. There are many other sources of advice available to the student if concerns remain. He or she can, and should, discuss the matter with one or more of the following persons (the order is arbitrary): senior graduate students in their group, their group leader, the Part IV Year Organiser, members of the Research & Industry Committee, or the student representatives on the Staff/Student Liaison Committee. Finally, if the matter is still causing serious concern after you have sought advice, it should be brought to the attention of the Chairman of the Research & Industry Committee (Professor Ray Volkas).
16. A report on the research work done during the year must be handed in by **12pm on 3 November**. It is expected that this report will indicate
- (i) that at least a major part of the review mentioned above has been carried out; and
 - (ii) what progress has been made in actual research work.
 - (iii) a statement at the beginning of the report on a separate page shall state the student's initiative and explicit contributions to the material presented in the report. For example, 'Statement of Contributions: Chapter 2 is an original review and all experimental work in Chapters 3-6 is the author's own unless otherwise stated.' Any work achieved during a summer or third year project is expected to be summarised here in order to show the independence and contributions of this report.

Apart from its part in the School's formal assessment procedure, an Honours thesis is considered to be a professional scientific report, and we occasionally receive requests for copies of reports from outside the University. Both from the point of view of formal assessment and from its professional status, an Honours report and the work leading to it must adhere to the highest standards of fairness and honesty.

The main text of the report should be limited to 25 pages (with normal spacing and font size) including all figures. The title page, abstract, statement of contributions and the list of references are excluded from the page limit.

Additional pages of background material, in the form of an appendix, is acceptable providing that the material there is not an essential component of the report. Students should understand clearly that pages in excess of the page limit and any appendices may not necessarily be read or assessed.

All students should show draft copies of their report to their supervisors well before the submission date. It is unusual to expect that the first draft will be an appropriate final report.

Please remember when writing your report that it will partly be assessed (see below) by a member of the academic staff from another research group. *That implies that it should not be directed exclusively at experts in your field.*

Four copies of the report are required. It is normal to bind them, and there will be an easy to use binding machine available in the Baker Lab on level 4. However binding is not a requirement. If you wish the School to photocopy your thesis (black and white copies only) for you then you may contact Cilla Gloger (ext 45124) three days before to arrange it.

17. *About one week after the report submission date, students are required to give a short talk (15 minutes, plus 5 for questions) on their project.*

18. **Assessment of Research**
Supervisor assessment

This will account for 50% of the year's research assessment. The supervisor's written report will reflect the supervisor's judgement not only of the report, and results, but also his/her judgement of the effort, dedication, independence and initiative of the student.

External assessment

The report will be graded by two research staff in addition to the supervisor, and this will contribute 40% (20% each) to the year's assessment of the research component. One of these assessors will be in the same broad research field as the report topic, and the other from outside it.

Some of the criteria for the research assessment are listed below. The two external examiners will be general not be able to judge criteria (iii) and (iv) in their assessment.

- (i) Understanding
 - Perception of the problem.
 - Applicability.
 - Experimental or theoretical insight.
- (ii) Originality
 - What novel methods were used, or what were the modifications and adaptations of existing methods.
- (iii) Effort
 - A judgement of the diligence of the student.
 - The content of the report.
- (iv) Independence
 - How much assistance did other group members and supervisor give.
- (v) Professionality
 - Literature survey.
 - Critical judgement of data/results and their significance.
- (vi) Presentation
 - Ease of reading.
 - Clarity of presentation.

Talk

The student talks are assessed by representative members of the School, and are worth 10% of the year's research assessment.

19. **Tutoring and demonstrating**

Students may, and are encouraged to, supervise first year course tutoring or demonstrating. This is usually limited to no more than the equivalent of one demonstrating session per week.

20. **Honours versus Post-Graduate Diplomas**

The minimum entry requirement for honours includes an equivalent standard on core pre-requisites, via one of three streams, and a minimum of 65 average of equivalent third year science points (from the best 87.5 units of accredited science points). Depending upon the course structure and background, units such as HPS and Comp.Sci. may be included in this average. Students should generally consult with Faculty guidelines. While certain specific entry requirements may be waived by the Head of School, students should address any concerns as early as possible.

The School of Physics offers two forms of the Post-Graduate Diploma in Science. One version of the course is very similar to Honours, and in fact final marks in all streams may be considered identically for potential for higher-degree scholarships or entry. The Post-Graduate Diploma is more flexible regarding part-time issues, enrolment from overseas students (including possible exchange or study abroad students), and has a pass mark of 50. The Honours Course has a pass mark of 65.

The second form of the Post-Graduate Diploma is similar to the first, but can additionally include third year coursework (up to 50% of the total course-work mark) especially in cases where the student's background is not fully prepared for the Honours Stream. Post-Graduate Diploma Students should consult directly with the Honours Coordinator and their potential supervisors regarding the proposed detailed plan.

Course Selection Forms (to be handed to Cilla Gloger by the beginning of Orientation Week)

Please check the boxes to signify selected courses:

Demi-semester 1

- | | | |
|-----|---------------------|--------------------------|
| 401 | Quantum Mechanics A | <input type="checkbox"/> |
| 402 | Quantum Mechanics B | <input type="checkbox"/> |

Demi-semester 2

- | | | |
|-----|---------------------------|--------------------------|
| 403 | Particle Physics I | <input type="checkbox"/> |
| 408 | Quantum & Advanced Optics | <input type="checkbox"/> |
| 406 | Statistical Mechanics | <input type="checkbox"/> |
| 407 | Quantum Field Theory | <input type="checkbox"/> |
| 406 | Condensed Matter | <input type="checkbox"/> |

Demi-semester 3

- | | | |
|-----|------------------------|--------------------------|
| 409 | Particle Physics II | <input type="checkbox"/> |
| 410 | Scattering & Imaging | <input type="checkbox"/> |
| 413 | General Relativity | <input type="checkbox"/> |
| 415 | Exgl.Astro & Cosmology | <input type="checkbox"/> |

Student name (print): _____

Student's signature: _____

Supervisor's signature: _____

Date: _____