

Information Session on Physics Honours at the University of Sydney

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- 1 Introduction (HC)
 - 2 General introduction to honours (HC)
 - 3 Introduction to individual lecture courses (lecturers)
 - 4 Introduction to research projects (HC)
 - 5 Discussion with academic staff and other students ...
 - 6 ... including LUNCH from \approx 13:00

(1) Introduction

- Welcome to the School of Physics!
- This is a resource for those thinking of study beyond bachelor's level.
- The assumption is that you are close to completing a bachelor's, with a major in physics.
- We do *not* assume that you're already studying here — we regularly take students from an undergraduate background at other institutions.
- Physics is not for everyone, but physics is special — that part of the natural sciences where the objects of study are big enough, small enough, or simple enough to yield to a mix of experimental tests, mathematical analysis, fundamental inquiry, and physical intuition.
- Physics has open borders with maths and engineering, but also with chemistry, geology, biology, philosophy, IT, environmental science ... not to mention astronomy, to which physics is joined at the hip (in the US this would be called a department of “Physics and Astronomy”)
- in Sydney, the “next step” beyond undergraduate physics is **honours**

(2) General introduction to honours

- honours is a fourth year of undergraduate work, fully devoted to one subject — physics, in this case
- students take an honours year for a variety of reasons:
 - to extend and “round out” their studies in their favourite subject
 - as the (\approx necessary) next step towards higher academic study
 - to “try [physics] on for size” as a discipline
 - as training and/or enrichment for “unrelated” work
- the mix in honours varies between fields; in physics, it’s
 - **50% coursework:** four advanced-level courses (6CP Units of Study)
 - **50% research:** a single, large research project taken over eight months
- honours is probably quite unlike the work you have done up to now:
 - you are dedicated to a single area of study
 - the work is academically more demanding
 - you will be apprenticed to a research group all year
 - tasks with qualitatively different time demands must be balanced
 - you will likely have a relatively close cohort

(2) General introduction: enrolment

- formal enrolment is with the Faculty of Science * see caveats later

<https://sydney.edu.au/courses/courses/uc/bachelor-of-science-honours.html>

<https://sydney.edu.au/courses/courses/uc/bachelor-of-science-advanced-honours.html>

- by 30th November (for 2020 S1) or 30th June (for 2020 S2)
- the key requirements are:
 - a bachelor of science (or equivalent), including double degrees, parenthetical degrees, and the Bachelor of Medical Science
 - a major in physics (a major in nanoscience also counts)
 - a 3000-level physics average of 65 or greater
 - a SciWAM of 65 or greater * see caveats later
 - an academic willing to supervise you on a research project;
they must agree by formal email, cc:physics.honours@sydney.edu.au
- you may need to wait on current coursework, fees, and other administrative matters, before receiving an offer; sometimes, there is a delay between the provisional offer and the final offer
- I manage the physics end (as honours coordinator), but you must deal directly with admissions; I can help in some circumstances

(2) General introduction: coursework

- **coursework is worth 50% of your honours mark**
- you take 4 courses, each 30–36 lectures in size;
3 of which much be from the physics honours programme
- the mix of assignments, projects, presentations, and exams
varies between the courses; the usual 5%-per-day late penalties apply
- you sign up for each semester's courses by the end of week 2 * [see caveats later](#)
- exams are usually in week 14 (“stuvac”) & 15 (“exam week 1”)
- the one course (optionally) outside our honours programme can be
 - PHYS4015 Neural Dynamics and Computation (S2 interdisciplinary)
 - SCIE{4001,4002,4003} all-Faculty science 4000-level courses
 - a long list of maths & stats 4000-level courses
 - HPSC4101 Philosophy of Science
 - formally, you do not enrol, * [see caveats later](#) but you audit the course; the lecturer then sends the mark to physics.honours@sydney.edu.au
- consultation with your research supervisor is strongly encouraged

(3) Introduction to individual lecture courses

SEMESTER 1:

- **PHYS4121** Advanced Electrodynamics and Photonics (Zdenka Kuncic +)
- **PHYS4122** Astrophysics and Space Science (Helen Johnston +)
- **PHYS4125** Quantum Field Theory (Archil Kobakhidze)

SEMESTER 2:

- **PHYS4123** General Relativity and Cosmology (Geraint Lewis)
- **PHYS4124** Physics of the Standard Model (Kevin Varvell)
- **PHYS4126** Quantum Nanoscience (Stephen Bartlett +)

+ : These are multi-lecturer courses;
the co-ordinating staff member is shown.

(2 redux) What's all this about “caveats”?

- The degree structure at the university is changing.
- Most students currently doing 3000-level physics are still in the old system; **the answers given in this talk are old-system answers.**
- Some internal applicants with lots of advance credit may already be enrolled in the new system (e.g. BSc/BAS)
- Honours applicants from *outside* the University of Sydney will be in the new system (“standalone BAS”)

Key differences for students in the new system:

- honours is “embedded” — an option within the BSc/BAS — rather than an extra year “appended” to the BSc
- entry requirement will be based on the WAM, not the SciWAM
- you enrol in four individual lecture courses, plus four project units; *cf.* the old system where students enrol in “shell units”
PHYS{4011,4012,4013,4014} Physics Honours {A,B,C,D},
and lecture courses are internal to the School

(4) Introduction to research projects

- the research project is likewise worth 50% of your honours mark
- you are apprenticed to a research group, in particular to your supervisor(s):
to participate in the life of the group,
to learn (by doing) the methods of their work,
to learn (by instruction and osmosis) about the subject area,
and to carry out research work of your own
- you'll have seen our list of research projects for 2020 posted on the web:
 - you should discuss projects that interest you
directly with the staff member listed as contact
 - these projects are an *indicative sample*:
treat them as a guide to the *kind* of projects on offer
by the various research groups and individual staff members
 - it may be possible to negotiate a project that is *not on the list*
- we recommend project work start *three weeks before* the start of lectures
- assessment is via a formal talk (10%) due by S2 week 9,
and a 40pp written report (90%) due by S2 week 12, assessed by
your group (who also consider your work), and ≥ 2 external examiners

(4) Introduction to research projects: project list

<https://canvas.sydney.edu.au/courses/T932/pages/physics-student-portal-homepage>

Physics Honours Projects: 2020

This document lists a number of potential honours research projects within the School of Physics, together with supervisor contact details and a paragraph describing each of the projects. These are only some of the opportunities available, and *you are welcome to explore other possibilities in your field of interest with potential supervisors*. If you are free, please also join us for the **Honours Information Session at 12:00 on Wednesday 11th September, in SNH Lecture Theatre 3003**, followed by lunch from 13:00.

It is important to choose a project and supervisor to suit your interests and skills. *You are encouraged to have discussions with several possible supervisors before making a decision*. Speaking to honours and postgraduate students will also give you valuable feedback. The Web of Science (accessible from the Library website) will give you information on the research activity of the School's academics. You should also read the School's Research pages (<https://sydney.edu.au/science/schools/school-of-physics.html>) for more information on areas of active research.

You must arrange a supervisor and project prior to applying for honours. When you have reached agreement with a supervisor, please ask them to send you a formal email agreeing to take you on as a student, with cc to physics.honours@sydney.edu.au. Note that you should aim to start work on your research project *three weeks before the start of lectures*. This will enable you to get your project underway before lectures and assignments compete for your time. You should also make certain that your proposed supervisor will not be absent for protracted periods during semester, unless an associate supervisor is also involved. These issues will need to be formally settled when you submit your Research Plan, two weeks after the start of your first semester as an honours student.

Thank you for your interest in physics honours.

Bruce Yabsley, Honours Coordinator (physics.honours@sydney.edu.au); 6th September 2019

(4) Introduction to research projects: project list

<https://canvas.sydney.edu.au/courses/T932/pages/physics-student-portal-homepage>

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(4) Intro to research projects: conjunctive grading

- the honours mark is 50% coursework and 50% research project
- **conjunctive grading** applies for the final honours grades:
 - H1** : average ≥ 80 , coursework & project marks ≥ 78
 - H2.1**: average ≥ 75 , coursework & project marks ≥ 70
 - H2.2**: average ≥ 70 , coursework & project marks ≥ 65
 - H3** : average ≥ 65
- example:
 - 85 in coursework
 - 77 for the research project
 - 81 average mark, but the project is below the minimum standard
 - **79 H2.1** final mark and grade in this case
- moral #1: grades are meant to reflect robust achievement of a standard
- moral #2: do not neglect your coursework *or* your research project

(3) General introduction continued: scholarships

Various scholarships are available, including

- **University Honours Scholarships**

- available to Australian citizens and permanent residents
- \$6000
- you must apply

- **School of Physics Honours Scholarships**

- available to Australian citizens and permanent residents
- \$3000
- University of Sydney senior physics graduates automatically eligible

- **Medical Physics Honours Scholarships**

- **International Student Scholarships**

You can only hold one major scholarship.

(3) General intro continued: contacts and dates

Where to find information and help:

- <https://sydney.edu.au/science/study/study-areas/physics.html> under “Honours”
- public-facing Honours Canvas is still under construction; will appear under <https://canvas.sydney.edu.au/courses/7932/pages/physics-student-portal-homepage>
- <https://sydney.edu.au/courses/courses/uc/bachelor-of-science-honours.html> etc for enrolment
- current and previous honours students
- your (potential) supervisor(s)
- physics.studentservices@sydney.edu.au
- physics.honours@sydney.edu.au

Important dates:

- Friday 30th November 2019 enrolment deadline
- Monday 3rd February 2020 start project work (“week –2”)
- Monday 24th February 2020 start of lectures (“week 1”)

(5) Discussion and LUNCH with staff and other students