A Special Project is equivalent to 4 credit points and is normally taken as part of one of these 6 credit point Units of Study:

- Semester 2 (2017): PHYS 3991: Statistical Mechanics & Special Project (Adv)

The equivalent of 4 hours per week is spent in a research group within the School of Physics, working on a research experiment or theoretical project supervised by a researcher. Approval for this unit must be obtained from the Senior Physics Coordinator. In practice, this means that students need to identify a supervisor and a project. For more information, see the Senior Physics web pages:


1. Aims

The aim is for students to acquire an understanding of the nature of research by carrying out a project under the supervision of a researcher, and as part of a research group. This will allow students to apply their knowledge of physics and scientific practice and will serve as valuable preparation for a research project at Honours level and beyond. This unit addresses several of the University’s generic attributes, including: an appreciation of the requirements and characteristics of research; the ability to plan and achieve goals; and the ability to work with others.

2. Student Learning Outcomes

By the end of this unit of study, students should:

1. appreciate the stages involved in planning and carrying out a research project;

2. understand, through discussion and reading, a particular research problem, including its background and implications;

3. have developed relevant research skills, in the areas of experiment, theory and/or computation;

4. be able to interact with colleagues to learn about research techniques, solve problems and discuss results;

5. be able to prepare a scientific report and present a talk describing their research to non-specialists in the field.
3. Learning Commitments and Contact

This unit is worth 4 credit points, which usually implies 4 hours of contact per week over the 13 week semester, plus 4 hours per week of private study. In practice, contact time with the supervisor and other members of the research group will fluctuate. For example, there might be more contact in the first and last stages of the project than in the middle. Students will become part of their research group and will be expected to interact with the other members. They will be provided with access to necessary facilities (e.g. computers, laboratory equipment).

4. Learning Situations

Students will encounter a variety of learning situations, depending on the nature of their research project. This may include group or individual work, as well as meetings and interactions with team members or the supervisor. Independent background investigation of a topic will be required in all cases. Students are encouraged to seek advice from peers and team members within the research group. As members of a research group, students will be welcome to attend relevant meetings and seminars. The balance between these activities will depend on the composition of the project (whether it is experimental, theoretical or computational), and is at the discretion of the supervisor. In some case it may be appropriate for the results of their research to be included in a paper published in a scientific journal or presented at a conference.

5. Learner Preparation

Prerequisites: 12 credit points of Intermediate Physics with an average of at least 70.

6. Assessment

**Final mark and grade in PHYS 3941/3991:** The final mark in each unit is the total mark for the component modules (lecture module/Special Project), weighted by the credit value of each, and the grade is assigned accordingly. However, a pass grade requires a pass in each component.

Special Project marks are assigned as follows.

Project mark (25%) This will be given by the supervisor and other members of the research group, based on attendance, understanding, enthusiasm, initiative and technique, and on successful interaction with the research group.

Written report (55%) This should describe the topic and research activities. Your report should be 5000–6000 words long and as a general guideline, the overall report, including figures and diagrams, should be approximately 15 pages long.

The report should be written so that it can be understood by a physicist who is not a specialist in the subject (such as a fellow student). Such a person should be able to acquire a good understanding of the subject from the report. The report should give some background and motivation for your work (with references), and then describe the research activity, and any technical results or conclusions. You should follow standards in scientific referencing, and cite texts and journal articles, rather than web references. It is generally best to use a style more like a journal article than a laboratory report. However, unlike for a journal article, your own contribution to the work should be clear in the report. Most students will be part of a research team, which is a good thing, but the exact nature of the student's individual contribution must be made clear (e.g., make
it clear who performed experiments, wrote computer code, made observations, built apparatus, analysed data, etc.).

The report must begin with an abstract and conclude with a paragraph in which you reflect on your experience in this project and summarise what you have learnt about the nature of research. Additional material relevant to the project may be included as appendices to the written report. These appendices will not be included in the word count and will not be assessed. Material that is sometimes put in appendices includes: tables of raw data, a catalogue of images, source code for computer programs, circuit diagrams, etc.

Finally, the report must conclude with a statement of your contribution. This should explicitly indicate exactly which parts of the project were done by you. For example, did you develop the software or experimental apparatus from scratch, modify something that already existed, or use a finished system? What role did others play? It is not sufficient to write, “All work is my own except where otherwise noted.”

An electronic copy of the report must be uploaded to eLearning/Blackboard (please see the Special Projects section of the Senior Physics web pages on eLearning/Blackboard for submission instructions) and a second copy must be sent to your supervisor. The eLearning/Blackboard submission must be on time to avoid a late penalty. The online submission is due by midnight on Monday 6 November (Semester 2, 2017) or by midnight on Monday 11 June (Semester 1, 2018). Your report mark is based on your introduction (background description), writing style, the presentation of results, and the analysis and interpretation, as described below. The final report mark is an average of the mark given by your supervisor or your research group and by several independent readers.

Oral presentation (20%) This is a short talk (15 minutes, plus about 5 minutes for questions) to your research group, describing the main aims and results of the project. Your supervisor will arrange a suitable time and venue for your talk, which must be done in Week 13 or the Study Vacation week, which means 30 October – 10 November (Semester 2, 2017) and 4 June – 15 June (Semester 1, 2018). The mark is given by the research group, based on quality and clarity of the presentation, including explanations, analysis, interpretation and understanding.

Assessment criteria: Marks will be awarded in each category according to the following guidelines:

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<th>Grade</th>
<th>Mark Range</th>
<th>Description</th>
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<tr>
<td>PS</td>
<td>50-64</td>
<td>Project work is competent, but student may need help in understanding the material and techniques; written report meets basic standards of clear English and is reasonably well organised; oral report makes basic use of audio/visual materials, and provides a reasonable description of the project and its outcomes.</td>
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<tr>
<td>CR</td>
<td>65 - 74</td>
<td>Good project work, student understands material but may require help in applying knowledge to research settings; written report is a good summary of the project work and includes appropriate analysis, discussion of errors, etc.; oral report shows understanding of the topic.</td>
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<tr>
<td>DI</td>
<td>75 - 84</td>
<td>Excellent project work, student shows very good understanding of the material, and applies knowledge to the research problem, critically assessing approaches and methodology; written report is well organised and clearly explains the project at an appropriate level; oral report shows good understanding of the topic, and is clearly presented.&quot;</td>
</tr>
<tr>
<td>HD</td>
<td>85+</td>
<td>Project work outstanding, student has made significant contributions to the project, critically analysing the research problem and independently applying new skills. Work of a standard that could lead to it being included in a ongoing research program and/or a</td>
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Journal publication; written report shows depth of understanding and makes use of appropriate references; oral report presents a clear and coherent overview of project, discusses the methodology and analysis of the project, shows excellent understanding by answering questions from the audience.

**Late Penalties:** Assessments submitted late without permission will incur an immediate late penalty equal to 10% of the maximum mark. 24 hours later a further 20% penalty will be imposed for reports between 1 and 7 days late, with extra 20% penalties imposed after each one week period from the due date until the assessment is submitted or submissions are closed. For example, on an assessment given a mark of 7/10, the penalty would be 1 mark if submitted up to 24 hours late, resulting in a final mark of 6/10. If the assessment is submitted up to 1 week late, the final mark would be 4/10. An assessment will not ordinarily be accepted after a solution for the assessment is released or marked assessments are returned to other students.

**Academic Dishonesty and Plagiarism:** The School of Physics will NOT accept assessments that are simply copied. Copying the work of another person without acknowledgment is plagiarism and contrary to University policies on Academic Dishonesty and Plagiarism as described on the University Policy Register web site (http://sydney.edu.au/policy/). An outline of what constitutes Academic Dishonesty and Plagiarism can be found at http://sydney.edu.au/science/physics/local/acadhonesty.shtml.

**Consideration of factors affecting your study:** If your academic performance in a Science Faculty unit of study is adversely affected by illness or some other serious event, such as an accident or important commitment, you should complete an Application for Special Consideration or an Application for Special Arrangements and submit it with accompanying documentation to the Faculty of Science Office (level 2 of the Carslaw building) within relevant time limits.

These two forms of Consideration should cover most allowable circumstances. However, if you have another reason for requiring the School of Physics to take account of your circumstances, you should notify the School of Physics Student Services Office immediately.

You should not submit an application of any type if
- there is no assessment associated with a missed class, or
- you have a reasonable opportunity to make up any work you missed.


For full details of applicable university policies and procedures, see the University Policy Register web site at http://www.sydney.edu.au/policy.