How to succeed in the Physical Natural Sciences
Teaching in the College and the University

College
Admissions
Director of Studies
Supervisions

University
Lectures
Practicals
Examinations
Your Director of Studies

Dr Gareth Conduit
Physics & Maths
Your Directors of Studies

Dr Gareth Conduit  
Physics & Maths

Dr Andrew Bond  
Chemistry & Materials
Your Directors of Studies

Dr John Ellis  
Physics & Maths

Dr Andrew Bond  
Chemistry & Materials
Role of your Directors of Studies

Dr Gareth Conduit
Physics & Maths

Dr Andrew Bond
Chemistry & Materials

Guidance on subject choice
Organize supervisions and mock exams
Review academic progress at the start and end of term
Write reference letters
Can meet to discuss academic issues at any time – please contact by email gjc29@cam.ac.uk and adb29@cam.ac.uk
Activity: Introductions

What is your name?

Where do you come from?

What pastime / sport do you enjoy?

Something interesting that you did over the summer?
Punt jousting
Activity: Introductions

What is your name?

Where do you come from?

What pastime / sport do you enjoy?

Something interesting that you did over the summer?
Pokémon
Activity: Introductions

What is your name?

Where do you come from?

What pastime / sport do you enjoy?

Something interesting that you did over the summer?
**Structure of the Natural Sciences Physical course**

<table>
<thead>
<tr>
<th>IA 2016-17</th>
<th>Mathematics and three courses from Biology of Cells, Chemistry, Earth Sciences, Materials Sciences, Physics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pass exams</td>
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<tr>
<td></td>
<td>Pass exams</td>
</tr>
<tr>
<td>II 2018-19</td>
<td>One of Astrophysics, Chemistry, Earth Sciences, Materials Science, Physics, or a general option</td>
</tr>
<tr>
<td></td>
<td>I or II.1 in exam</td>
</tr>
<tr>
<td>III 2019-20</td>
<td>One of Astrophysics, Chemistry, Earth Sciences, Materials Science, Physics</td>
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<tr>
<td></td>
<td>Graduate BA</td>
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<td></td>
<td>Graduate BA MSci</td>
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</tbody>
</table>
Courses in the first year

<table>
<thead>
<tr>
<th>Choose 3 from</th>
<th>Physics</th>
<th>Earth sciences</th>
<th>Materials science</th>
<th>Chemistry</th>
<th>Biology of cells</th>
<th>Evolution and behavior</th>
<th>Physiology of organisms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 of</strong></td>
<td>Maths B</td>
<td></td>
<td></td>
<td>Maths A</td>
<td></td>
<td>Mathematical biology</td>
<td></td>
</tr>
</tbody>
</table>
How to get the most out of lectures

Turn up on time

Look through the handout just before the lecture

Annotate the handout during the lecture

Use the spare time between lectures for supervision work or to review the material covered

Ask the lecturer questions immediately after the lecture

If you find yourself getting confused by the material immediately ask a friend or your supervisor for help
Supervisions

Each week the lecturers will set supervision questions

A question set should take you 3 hours to complete (so a total of 12 hours per week)

Hand in the answers to your supervisor, probably the day before the supervision

Meet your supervisor weekly in pairs to discuss work

Supervisions are not assessed. Use them to help your learning
Activity: Finding your supervision partner

Each person has part of an integrand

\[ \int_{0}^{1} f_i(x) f_j(x) \, dx = 1 \]

Can you find your partner?
How to get the most out of supervisions

Discuss supervision work with your supervision partner beforehand, you will both learn from the process

Highlight on the supervision answers anything you would like to discuss so that they will not be missed

Submit the work punctually

Go to the supervision with list of topics you would like to discuss aside from the answers
How to get the most out of practicals

Practicals reinforce the lecture and contribute 25% of the IA mark

Practicals are written up and then assessed

Once a term write up one experiment in a report that is marked

It is helpful to prepare for the practical beforehand e.g. simulate electrical circuits on a computer
Exams

Each subject has a three hour exam at the end of academic year (maths has two exams)

Papers set in the previous 20 years can be downloaded from each Department’s website, answers are often available

Practice is essential: to work through 20 years of exams should take $5 \times 20 \times 6 = 600$ hours (working year contains 1725 hours, lectures, practicals, and supervisions take 688 hours)

Practice exams questions against the clock

Discuss answers with your supervisor and friends

You should do past exam questions as you learn the material
<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michaelmas</td>
<td>6 Oct</td>
</tr>
<tr>
<td>Lectures</td>
<td>1 Dec</td>
</tr>
<tr>
<td>Christmas</td>
<td>19 Jan</td>
</tr>
<tr>
<td>Lectures</td>
<td>16 Mar</td>
</tr>
<tr>
<td>Lent term</td>
<td>27 Apr</td>
</tr>
<tr>
<td>Easter vacation</td>
<td>26 May</td>
</tr>
<tr>
<td>Trinity term Lectures</td>
<td></td>
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</table>
### Make best use of the vacation

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<th>Michaelmas Term Lectures</th>
<th>Christmas Vacation</th>
<th>Lent Term Lectures</th>
<th>Easter Vacation</th>
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</table>

During the vacation you should revise as if doing a full-time job
Activity: working together

Sample short notes questions. In pairs please prepare a 3-minute presentation on:

Chemistry  
Compare acids to alkalis

Chemistry  
Why is life made from carbon?

Materials 2012  
Why does wood have anisotropic properties?

Materials 2011  
How do you measure a liquid’s viscosity?

Mathematics  
Simultaneous equations

Physics 2016  
Orbits in gravitational fields

Physics 2015  
Force fields and potential energy

Physics 2014  
Faraday and Lenz laws
Skills needed to succeed at Cambridge

Time management

Independence, self-motivation, and being proactive

Discipline to practice past exam papers

Communication skills in supervisions and exams

Confidence and the humility to seek help from peers

The initiative to find approaches that work well for you
Preparation for the Monday 15:00 DoS session

30 minutes of past exam questions from each of Mathematics, Physics, Chemistry, and Material Sciences so 2 hours in total

All questions can be done from A-level knowledge

Over the weekend please prepare written answers for the questions, and talk to each other about how to do them

During the session we will go through the written answers and compare to model solutions prepared by the DoS
Practising past exam papers in 2002-2003
Practising past exam papers in 2002-2003

In total 12952 questions

13 hours 42 mins per day
Practical activity: making squares

Each group has the tiles to make exactly one square per person

All tiles should be used