The structures of the Senior Sophister moderatorship examinations are outlined below along with information that will appear on the front cover of the exam papers.

Please note that the information given below is informal and is not guaranteed to be error and/or omission free.
PY4P01-1  Quantum Mechanics II

Physics, Physics and Astrophysics

<table>
<thead>
<tr>
<th>Module</th>
<th>Lecturer</th>
<th>No. of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantum Mechanics II</td>
<td>PY4P01</td>
<td>Paul Eastham</td>
</tr>
</tbody>
</table>

**Rubric:**
Follow the instructions below.
Booklets of Formulae and Tables are available from the invigilator for all students who require them. Graph paper is also available.

Non-programmable calculators are permitted for this examination – please indicate the make and model of your calculator on each answer book used.

*ANSWER EACH QUESTION IN A SEPARATE ANSWER BOOK.*

*ALL QUESTIONS CARRY EQUAL MARKS*

**All Students**
Answer *TWO* questions, in 2 hours.
PY4T01-1  Condensed Matter Theory

Theoretical Physics

<table>
<thead>
<tr>
<th>Module</th>
<th>Lecturer</th>
<th>No. of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condensed Matter Theory</td>
<td>PY4T01</td>
<td>Stefano Sanvito</td>
</tr>
</tbody>
</table>

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*ALL STUDENTS MUST ANSWER EACH QUESTION IN A SEPARATE ANSWER BOOK.*
*ALL QUESTIONS CARRY EQUAL MARKS*

**All Students**
Answer *TWO* questions, in 2 hours.
PY4P02-1  High Energy Physics

Physics, Physics and Astrophysics, and Theoretical Physics

<table>
<thead>
<tr>
<th>Module</th>
<th>Lecturer</th>
<th>No. of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Energy Physics</td>
<td>PY4P02</td>
<td>Cormac McGuinness</td>
</tr>
</tbody>
</table>

Rubric:
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ANSWER EACH QUESTION IN A SEPARATE ANSWER BOOK.
ALL QUESTIONS CARRY EQUAL MARKS

All Students
Answer TWO questions, in 2 hours.
PY4P06-1  
Modern Optics

Physics, Physics and Astrophysics, and Nanoscience-Physics and Chemistry of Advanced Materials

<table>
<thead>
<tr>
<th>Module</th>
<th>Lecturer</th>
<th>No. of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical Properties of Materials</td>
<td>John Donegan</td>
<td>2</td>
</tr>
<tr>
<td>Nonlinear Optics</td>
<td>Louise Bradley</td>
<td>2</td>
</tr>
</tbody>
</table>

Rubric:
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ANSWER EACH QUESTION IN A SEPARATE ANSWER BOOK.
ALL QUESTIONS CARRY EQUAL MARKS

All Students
Answer TWO questions, ONE from Section A and ONE from Section B, in 2 hours.
Electron and Photon Physics

Theoretical Physics

<table>
<thead>
<tr>
<th>Module</th>
<th>Lecturer</th>
<th>No. of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section A Metal Physics and Superconductivity</td>
<td>PY4T02 J. M. D. Coey</td>
<td>2</td>
</tr>
<tr>
<td>Section B Quantum Theory of Light and Matter</td>
<td>PY4T02 Paul Eastham</td>
<td>2</td>
</tr>
</tbody>
</table>

Rubric:
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Non-programmable calculators are permitted for this examination – please indicate the make and model of your calculator on each answer book used.

ANSWER EACH QUESTION IN A SEPARATE ANSWER BOOK.
ALL QUESTIONS CARRY EQUAL MARKS

All Students
Answer TWO questions, ONE from Section A and ONE from Section B, in 2 hours.
Module | Lecturer | No. of Questions
--- | --- | ---
Section A | Metal Physics and Superconductivity | PY4P03 | J. M. D. Coey | 2
Section B | Semiconductor Devices | PY4P03 | Plamen Stamenov | 2

Rubric:
Follow the instructions below.
Booklets of Formulae and Tables are available from the invigilator for all students who require them. Graph paper is also available.

Non-programmable calculators are permitted for this examination – please indicate the make and model of your calculator on each answer book used.

*ANSWER EACH QUESTION IN A SEPARATE ANSWER BOOK.*
*ALL QUESTIONS CARRY EQUAL MARKS*

All Students
Answer *TWO* questions, *ONE* from Section A and *ONE* from Section B, in 2 hours.
**Py4c01-1 Computer Simulation III**

**Physics & Astrophysics and Theoretical Physics (option)**

<table>
<thead>
<tr>
<th>Module</th>
<th>Lecturer</th>
<th>No. of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>section a</strong> Numerical Methods</td>
<td>py4c01</td>
<td>Matthias Möbius</td>
</tr>
<tr>
<td><strong>section b</strong> High Performance Computing</td>
<td>py4c01</td>
<td>Charles Patterson</td>
</tr>
</tbody>
</table>

**Rubric:**

Follow the instructions below.

Booklets of Formulae and Tables are available from the invigilator for all students who require them. Graph paper is also available.

Non-programmable calculators are permitted for this examination – please indicate the make and model of your calculator on each answer book used.

*Answer each question in a separate answer book.*

*All questions carry equal marks*

**All Students**

Answer *two* questions, one from section a and one from section b, in 2 hours.
PY4P05-1  Electromagnetic Interactions II

Physics, Physics and Astrophysics

<table>
<thead>
<tr>
<th>Module</th>
<th>Lecturer</th>
<th>No. of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section A Electromagnetic Theory</td>
<td>Charles Patterson</td>
<td>2</td>
</tr>
<tr>
<td>Section B Optical Communications</td>
<td>Werner Blau</td>
<td>2</td>
</tr>
</tbody>
</table>

**Rubric:**

Follow the instructions below.

Booklets of Formulae and Tables are available from the invigilator for all students who require them. Graph paper is also available.

Non-programmable calculators are permitted for this examination – please indicate the make and model of your calculator on each answer book used.

*ANSWER EACH QUESTION IN A SEPARATE ANSWER BOOK.*

*ALL QUESTIONS CARRY EQUAL MARKS*

**All Students**

Answer *TWO* questions, ONE from Section A and ONE from Section B, in 2 hours.
Rubric:
Follow the instructions below appropriate.
Booklets of Formulae and Tables are available from the invigilator for all students who require them. Graph paper is also available.

Non-programmable calculators are permitted for this examination – please indicate the make and model of your calculator on each answer book used.

*ANSWER EACH QUESTION IN A SEPARATE ANSWER BOOK.*
*ALL QUESTIONS CARRY EQUAL MARKS*

**All Students**
Answer *TWO* questions, in 2 hours.
## Advanced Topics in Physics

**Physics and Theoretical Physics (Option)**

<table>
<thead>
<tr>
<th>Section</th>
<th>Topic</th>
<th>Module</th>
<th>Lecturer</th>
<th>No. of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section A</td>
<td>Thin Films</td>
<td>PY4P07</td>
<td>Cormac McGuinness</td>
<td>2</td>
</tr>
<tr>
<td>Section B</td>
<td>Polymers</td>
<td>PY4P07</td>
<td>Jonathan Coleman</td>
<td>2</td>
</tr>
<tr>
<td>Section C</td>
<td>Energy</td>
<td>PY4P07</td>
<td>Igor Shvets</td>
<td>2</td>
</tr>
<tr>
<td>Section D</td>
<td>Green’s Functions in Physics</td>
<td>PY4P07</td>
<td>Mauro Ferreira</td>
<td>2</td>
</tr>
<tr>
<td>Section E</td>
<td>Diffraction, Imaging and Spectroscopy of Nanostructures</td>
<td>PY4P07</td>
<td>Hongzhou Zhang</td>
<td>2</td>
</tr>
</tbody>
</table>

**Rubric:**

Follow the instructions below appropriate to the degree course you are taking.

Booklets of Formulae and Tables are available from the invigilator for all students who require them. Graph paper is also available.

Non-programmable calculators are permitted for this examination – please indicate the make and model of your calculator on each answer book used.

*ANSWER EACH QUESTION IN A SEPARATE ANSWER BOOK.*

*ALL QUESTIONS CARRY EQUAL MARKS*

**All Students**

Answer *TWO* questions, ONE from each of any *TWO* Sections, in 2 hours.
SENIOR SOPHISTER MODERATORSHIP EXAMINATION STRUCTURE IN PHYSICS 2016-2017

PY4N07-1 Advanced Topics for Nanoscience

Nanoscience-Physics and Chemistry of Advanced Materials

<table>
<thead>
<tr>
<th>Section</th>
<th>Module</th>
<th>Lecturer</th>
<th>No. of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Thin Films</td>
<td>PY4N07</td>
<td>Cormac McGuinness</td>
<td>2</td>
</tr>
<tr>
<td>B Polymers</td>
<td>PY4N07</td>
<td>Jonathan Coleman</td>
<td>2</td>
</tr>
<tr>
<td>C Diffraction, Imaging and Spectroscopy of Nanostructures</td>
<td>PY4N07</td>
<td>Hongzhou Zhang</td>
<td>2</td>
</tr>
</tbody>
</table>

**Rubric:**
Follow the instructions below.
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Non-programmable calculators are permitted for this examination – please indicate the make and model of your calculator on each answer book used.

*ANSWER EACH QUESTION IN A SEPARATE ANSWER BOOK.*
*ALL QUESTIONS CARRY EQUAL MARKS*

**All Students**
Answer *TWO* questions, *ONE* from each of *TWO* different sections, in 2 hours.
PY4A03-1 Planetary and Space Science

Physics and Astrophysics

<table>
<thead>
<tr>
<th>Module</th>
<th>Lecturer</th>
<th>No. of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planetary and Space Science</td>
<td>PY4A03 Peter Gallagher</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Aline Vidotto</td>
<td></td>
</tr>
</tbody>
</table>

**Rubric:**

Follow the instructions below.

Booklets of Formulae and Tables are available from the invigilator for all students who require them. Graph paper is also available.

Non-programmable calculators are permitted for this examination – please indicate the make and model of your calculator on each answer book used.

*ANSWER EACH QUESTION IN A SEPARATE ANSWER BOOK.*

*ALL QUESTIONS CARRY EQUAL MARKS*

**All Students**

Answer *TWO* questions, in 1.5 hours.
Py4A05-2 Cosmology

Physics and Astrophysics, Theoretical Physics (option)

<table>
<thead>
<tr>
<th>Module</th>
<th>Lecturer</th>
<th>No. of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cosmology</td>
<td>PY4A05</td>
<td>Brian Espey</td>
</tr>
</tbody>
</table>

**Rubric:**
Follow the instructions below.
Booklets of Formulae and Tables are available from the invigilator for all students who require them. Graph paper is also available.

Non-programmable calculators are permitted for this examination – please indicate the make and model of your calculator on each answer book used.

*ANSWER EACH QUESTION IN A SEPARATE ANSWER BOOK.*
*ALL QUESTIONS CARRY EQUAL MARKS*

**All Students**
Answer *TWO* questions in 2 hours.
X-PY4PP1-3  Problem-Solving Physics

Physics, Physics and Astrophysics, and Theoretical Physics

General paper

Rubric:

There are 20 questions on the paper.

ALL QUESTIONS CARRY EQUAL MARKS.

Answers to questions should be clearly numbered on each page. Do not put answers from
different questions on the same page. On the front of each answer booklet indicate the numbers of
the questions answered in the appropriate space.

You should attempt to produce complete and carefully reasoned answers.
Where possible, make appropriate quantitative estimates to support your qualitative answers.

Booklets of Formulae and Tables are available from the invigilator for all students who require
them. Graph paper is also available.

Non-programmable calculators are permitted for this examination – please indicate the make and
model of your calculator on each answer book used.

All Students
Answer TEN questions in 3 hours.