Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

TR063: Physical Sciences

Sophister Course Programme 2026-27

This programme booklet applies to all student taking **TR063: Physical Sciences**. It provides a guide to what is expected of you on this programme and the supports available to you. Please retain for future reference.

The information provided is correct at the time of publication. Any necessary revisions will be notified to students via email and the TR063: Physical Sciences webpage: https://www.tcd.ie/science/undergraduate/tr063-physical-sciences/junior-sophister/

In the event of any conflict or inconsistency between the General Regulations published in the University Calendar and the information provided in this course programme, the general college regulations will prevail: https://www.tcd.ie/media/tcd/calendar/undergraduate-studies/general-regulations-and-information.pdf

Produced by:	The Science Course Office Trinity College, Dublin 2
Email:	Science@tcd.ie
Webpage:	https://www.tcd.ie/science/undergraduate/

Welcome

Dear Students

Congratulations – you are nearing the end of the Fresh years of your degree and are ready to make the important decision about which science Moderatorship you wish to pursue. The Fresh course structure has given you an excellent grounding in your core subject to prepare you for the advanced material you will cover in your Sophister years. You have also had opportunities to take open modules in other science subjects that have given breadth and context to your science education.

Development of educational breadth continues in the Sophister years via the opportunity to take further open modules and also Trinity Electives. Trinity Electives are stand-alone, College-wide modules that enable you to broaden your knowledge outside of your chosen subject. There is a wide range of choice available to you that encompasses languages and cultures, key societal challenges and Trinity's ground-breaking research activities.
A list of the modules can be found at this link (https://www.tcd.ie/trinity-electives/).

Having the opportunity to develop these broader skills, particularly in communication and presentation, will allow you to derive the greatest benefits from your particular choice of Moderatorship subject and will give you important insights into other subjects and modes of scholarship outside of the sciences.

I wish you the very best in your Sophister years and look forward to seeing your future successes and achievements.

Prof Andrew Jackson
Associate Dean of Undergraduate Science Education

Foreword from the Physical Science Course Director

I would like to join Prof. Jackson in congratulating you on your efforts in the Fresh years and soon welcoming you to the Sophister stage of your undergraduate education in the Physical Sciences. The choice that you are facing now, towards the end of the Senior Fresh year is an important one, first in terms of your specialisation into one of the three available Moderatorships, but also as a declaration of your scientific interests and as setting a guide-light for your future career.

This Sophister Course booklet is designed to help you with your choice. It depicts the structure of each of the Sophister years in all three of the Moderatorships within the Physical Sciences course. These are: the **Physics** Moderatorship, the **Physics and Astrophysics** Moderatorship and the **Nanoscience** Moderatorship. The structures, modules, practical elements, progression, capstone research projects, and the choices available whether among the Junior Sophister open modules, Junior Sophister Trinity Elective or Senior Sophister optional modules are all listed in this handbook.

The Physical Sciences Moderatorships has been rapidly evolving in the last few years under the leadership of my predecessor Prof. Cormac McGuinness and within the ambitions of the Trinity Education project. All information presented here is as accurate as possible at the time of compilation of this Booklet. The module codes, the module content, the choice or breadth, or timing of available Core, Mandatory, Open or Optional modules and details of examinations are all, however, still subject to change between the end of this academic year and the beginning of the next when rising Junior Sophister students enter into the Sophister years of the Moderatorships within Physical Sciences. I am only too happy to see you your exciting journey within these three Moderatorships, which are now presented in a way not possible before. The Physical Sciences structures with Core components and Open modules in the Junior Sophister year, and a new broader range of optional modules in the Senior Sophister year, gives you more freedom of choice than previously possible.

Within each of the Moderatorships there are opportunities to further tailor your degree through a parallel choice of Trinity Electives in the summer; by subsequent choices within the Junior Sophister year of Junior Sophister Open modules; your preference of your Senior Sophister project, and your selection from among the Senior Sophister Open modules. Independently of your exact path and the particular Physical Sciences Moderatorship ultimately chosen, you can rest assured that it will be accredited by the Institute of Physics, the professional body for physicists in Ireland and in the United Kingdom. Each of our physics degrees also equips you with a range of transferable skills, which are valued by academia, research, industry and business, alike.

My very best wishes to you all,

Assoc. Prof. Plamen Stamenov
Course Director of Physical Sciences

Introduction

Sophister courses in **Physical Sciences** are organised so that students follow a continuous programme of work over two years leading to a Moderatorship in a particular subject. Each module (whether lecture, tutorial, seminar or practical) has a specified credit value, which is an approximate measure of the workload associated with the module and is in turn reflected in its proportional weighting in assessment. One credit is normally considered to represent a minimum of 20 hours of work on the part of a student. Students take modules to the value of 60 credits in each of the Sophister years.

The Physical Sciences (TR063) Sophister Course Booklet is intended as a detailed and comprehensive guide to all Moderatorships within Physical Sciences. Full module descriptors, course descriptions and reading lists are available from the Undergraduate Handbook of the School of Physics.

While every effort will be made to give due notice of major changes, the School of Physics and the Science Course Office reserves the right to suspend, alter or initiate courses, timetables, examinations and regulations at any time.

The information in this booklet is accurate at the time of going to print but may be subject to minor changes.

Description of ECTS system

The European Credit Transfer and Accumulation System (ECTS) is an academic credit system based on the estimated student workload required to achieve the objectives of a module or programme of study. It is designed to enable academic recognition for periods of study, to facilitate student mobility and credit accumulation and transfer. The ECTS is the recommended credit system for higher education in Ireland and across the European Higher Education Area.

The ECTS weighting for a module is a **measure of the student input or workload** required for that module, based on factors such as the number of contact hours, the number and length of written or verbally presented assessment exercises, class preparation and private study time, laboratory classes, examinations, clinical attendance, professional training placements, and so on as appropriate. There is no intrinsic relationship between the credit volume of a module and its level of difficulty.

The European **norm for full-time study over one academic year is 60 credits**. Within Undergraduate courses 1 credit represents 20-25 hours estimated student input, so a 10-credit module will be designed to require 200-250 hours of student input including class contact time, assessments and examinations. Within Postgraduate courses 1 credit represents 25 hours estimated student input, so a 10-credit module will be designed to require 200-250 hours of student input including class contact time, assessments and examinations.

ECTS credits are awarded to a student only upon successful completion of the programme year. Progression from one year to the next is determined by the programme regulations. Students who fail a year of their programme will not obtain credit for that year even if they have passed certain components. Exceptions to this rule are one-year and part-year visiting students, who are awarded credit for individual modules successfully completed.

Course Advisors

Physics	Professor Charles Patterson
Physics and Astrophysics	Professor Neale Gibson
Nanoscience	Professor Chris Batchelor-McAuley

Moderatorship Courses and Quotas

To be qualified for a Moderatorship, students must have successfully completed both Fresh years and must have taken the stated prerequisite modules for any Moderatorship for which they wish to be considered. All students in Physical Sciences who have completed both Fresh years are eligible to proceed into the **Physics** or the **Physics and Astrophysics** Moderatorships. In the Physical Sciences course, the only Moderatorship with a prerequisite is **Nanoscience** where a student must have taken in the two Fresh years all 40 credits of Open Chemistry modules.

While every effort will be made to give due notice of major changes in the quotas, the Physical Sciences Course Director reserves the right to alter pre-requisites and quotas, if necessary. In the case of the Nanoscience Moderatorship this will be in conjunction and in consultation with the Chemical Sciences Course Director and the Nanoscience Moderatorship Course Director.

Moderatorship	**Quotas**
Physics	30
Physics & Astrophysics	24
Nanoscience	10 + 6*

***Note regarding Nanoscience quota.**
Nanoscience is a shared course between the Schools of Physics and the School of Chemistry accessible through both Physical Sciences (TR063) and Chemical Sciences (TR061) for students with the appropriate 120 credits of Fresh modules in Physics, Chemistry and Mathematics.

Therefore, the 10 highest ranked students from either Physical Sciences or Chemical Sciences are allocated places in the Nanoscience Moderatorship. Six additional places are available to the highest ranked qualified students from either Physical or Chemical Sciences who have not already been allocated a place in the Moderatorship.

Allocation of Places

The Science Course office coordinates and processes the applications for Junior Sophister places in the TR063: Physical Sciences course Moderatorships. The procedures documented below show students that those places are allocated in a fair, transparent, and efficient manner.

The number of places available in each moderatorship is limited by quota. **Allocation is based on the overall mark obtained in the Senior Fresh year** and the order of choice expressed by the student.

The Science Course Office allocates Junior Sophister places. Students cannot be allocated a place by circumventing the Science Course Office and going directly to disciplines. All enquiries regarding the allocation of places, made to disciplines, will be redirected to the Science Course Office via the sophistersco@tcd.ie email address.

Places will be allocated as follows until quotas are reached:

1. All students passing their Senior Freshman year will be placed in **rank order** based on their **overall Senior Fresh year mark**.
2. Students who fail and are required to sit reassessment must reapply for the remaining unfilled places until quotas are reached. Second round forms will be made available via the relevant course page on the Science website: https://www.tcd.ie/Science/ following publication of the first round.
3. Students who are given permission by the Senior Lecturer to defer assessments and or examinations until the reassessment session may defer a place in their **first** preference only. Following publication of the results, students who pass at the reassessment session will be allocated a place based on the same criteria used in the first-round allocation of places. If the student in this category does not qualify for the deferred place, the Science Course Office will allocate that student a place in one of the subjects available in the second round and the deferred place will be offered to the next qualified student from the first-round allocation.
4. In the event a student fails at the reassessment session, be that a deferred exam or reassessment, and are eligible to repeat the SF year, they can do so in **one** of the following ways:
    - Repeating the year in full on books, such students will be treated in the same way as all other SF students in that year.
    - Students may request permission from the Senior Lecturer, via their tutor, to repeat the year off books taking assessment (**OBA**). Sitting an exam OBA is a repeat examination therefore, such students will be allocated a place in one of the remaining Moderatorships available at the **reassessment session,** the following year. Students may not repeat more than 20 credits OBA.
5. Students who have passed in the **first round** who then opt to go 'off books' for the year (**OBN**) rather than take up the place offered, will be allocated a place in the first round along with rising JS students in the following year. Places will **not** be reserved for such students.
6. Students who pass in the second round and opt to go "off books" prior to places being allocated, will be allocated a place at the **reassessment session** in the following year.
7. Results will be available on your personal portal at my.tcd.ie by the stated publication date.
8. Publication of first round JS places will be available through the my.tcd.ie portal once the academic year rollover happens in July.
9. Students are informed by email when the places are published, and the procedures followed are clearly outlined in the email.

Special note: Students who have passed their Senior Fresh year may not repeat the SF year to improve their performance.

Choice of Moderatorship Form

Students are required to complete the choice of subject form. You will rank your subject preferences from 1-3 i.e., Nanoscience - 1, Physics & Astro – 2 etc. The moderatorship choice form is available online: https://forms.office.com/e/Kjzihe0Gt9 . The closing date for submission of preferences is 5pm Friday 17th April 2026.

Open Module Choice Forms

Students take modules totalling 60 credits in the Junior Sophister year. There are 40 credits of core modules, and 20 credits of open modules spread equally over two semesters in the academic year. The module structure for each individual moderatorship is listed in the following pages.

In addition, students can choose one or two (one per semester) 5 credit Trinity Elective modules as shown in the module structure table for each moderatorship subject.
Note: Nanoscience students must take their Trinity Elective module in Semester 2.

Students can choose their open modules with the help of the Moderatorship Course Adviser following the allocation of moderatorship places. **Online open module choice forms will be available from your moderatorship discipline.**

Students should note that due to timetable constraints Open Modules may be delivered via a blended learning approach involving face to face and online teaching for some open modules.

Trinity Electives

https://www.tcd.ie/trinity-electives/

The Trinity Electives are a unique feature of your Trinity Education. They are stand alone, College-wide 5 credit modules. They cover a broad range of topics in the arts, humanities, sciences, health and social science, and technology. They are designed to allow students to study topics outside of their core discipline and thus provide breadth to their education. BBS students take a minimum of one and a maximum of two (one per semester) Trinity Electives in the Junior Sophister year. Depending on your moderatorship, you will choose a combination of Trinity Electives and Open Modules as described in this handbook.

Choosing your Trinity Elective

The choice of Trinity Elective is student driven. Almost all Trinity Electives are open to all students. However, students of some moderatorships may be precluded from taking certain Trinity Electives (e.g. the module 'From Planets to the Cosmos' is not available to TR063 Physical Sciences students, as this topic is part of their core discipline). The list of exemptions is outlined in the Trinity Electives webpage: https://www.tcd.ie/trinity-electives/

Selection of Trinity Electives will be made through online enrolment which will open in July 2026, after publication of examination results and allocation of moderatorship places. You will select your Trinity Electives on a first come first served basis through online module enrolment in your TCD portal.

The Trinity Electives website provides full details of each of the Trinity Electives. A list of the Trinity Electives can be found at https://www.tcd.ie/trinity-electives/

You need to think carefully about your choice of Trinity Elective as the semester in which you take it (Semester 1, Semester 2 or both) will affect your choice of Open Modules. That is: taking one Trinity Elective in the first semester, restricts you to the open modules in Option 1; taking

one Trinity Elective in the second semester, restricts you to the open modules in Option 2 while taking two Trinity Electives, (one in each semester) restricts you to the open modules in Option 3. Please refer carefully to the tables in this handbook.

Open Module Changes
If you wish to change your open module scenario, you must consult the relevant Course Advisor for advice prior to submitting your request.

Closing dates for change of Open Modules/TE's scenarios for Science Students
Semester one: 5pm on Friday 25th September 2026
Semester two: 5pm on Friday 27th November 2026

NOTE: Trinity Elective changes submitted directly to the Academic Registry will not be accepted without the relevant sign off from the Course Advisor.

Junior Sophister Examination Information

Modules are assessed by continuous assessment and/or by examination. The Junior Sophister year is comprised of modules to a total of 60 credits. The distribution scheme of marks between papers and practical work at the Sophister examinations will be published by individual schools or departments/disciplines.

Calculation of Moderatorship results

The final moderatorship results are calculated as a weighted average of the overall result for the Junior and Senior Sophister examination results.

Junior Sophister 30%, Senior Sophister 70%:

Physics, Physics & Astrophysics and Nanoscience

Reassessment - Regulation 8: Undergraduate Progression and awards regulations

- Same progression regulations, including compensation, apply for assessments relating to semesters 1 & 2 and to reassessment.
- Automatic right to reassessment applies to a student who has achieved a fail grade in any of their modules and is not eligible for compensation.
- Students (in all years) should only be required to re-sit examinations or re-submit coursework for failed modules or components thereof.
- Students are not permitted to present for reassessment in any module for which they have achieved a pass grade, in order to improve their academic performance.
- Rescheduled exams within the session will no longer be permitted.
- Different reassessment modalities are permitted.
- Capping of 60 % holds for reassessed components in reassessment sessions in the academic year 2026/27 this is due to a derogation agreed with the Institute of Physics (IOP) as of the accreditation requirements for all physics-based degrees.

Repetition of a year: Regulation 7: Undergraduate Progression and awards regulations

- Students should not be allowed to repeat all years.
- Students should not repeat any academic year more than once within a degree programme and may not repeat more than two academic years within a degree programme (see regulation 6 below)
    - **Regulation 6:**
        - The maximum number of years to complete an undergraduate degree should be:
        - 6 for a 4-year programme and;
        - 7 for a 5-year programme unless otherwise specified by accrediting bodies.
- Repetition of a year is in full, i.e., all modules and all assessment components. There will be an option to repeat a year on an 'off-books' basis.

Full Progression and Awards regulations can be found via the following:
https://www.tcd.ie/academic-affairs/academic-regulations/-undergraduate-progression-and-awards/

Academic Integrity Policy

Trinity College Dublin, the University of Dublin, is committed to upholding academic integrity, and recognises that it underpins all aspects of university life, including all activities relating to research, learning, assessment, and scholarship.

Trinity therefore considers academic misconduct to be serious and academically fraudulent and an offence against academic integrity that is subject to the Trinity procedures in cases of suspected misconduct.

The Academic Integrity Policy (https://www.tcd.ie/media/tcd/about/policies/pdfs/academic/Academic-Integrity-Policy.pdf) should be read in conjunction with (and is subject to) the University Calendar, Part II on Academic Integrity (This policy replaces the Plagiarism Policy).

Other sources of information are available:
https://www.tcd.ie/academic-affairs/academic-integrity/
https://libguides.tcd.ie/academic-integrity

Guidance on the use of AI and Generative-AI in College

The advent of commonly available artificial intelligence tools are disruptive in both positive and negative ways. Before using them in your studies it is important that you familiarise yourself with College policies on its use. Unless otherwise instructed for particular modules or assessments, **the default expectation would be that you do not submit AI generated content as an attempt at an assessment**.

Below is some basic overview of the College policy on AI and GenAI. This has been taken from the more detailed policy which is informative and wide ranging. You are expected to have read and familiarised yourself with this policy.
https://www.tcd.ie/academicpractice/resources/generative_ai/

Artificial Intelligence (AI)
Artificial intelligence is generally understood to be a set of technologies that enable computers to perform a variety of functions usually perceived as requiring human intelligence – for example, understanding speech, recognising objects in images, composing written answers and problem reasoning. A more formal definition of an AI system from the European Union AI Act (2024) is:
...a machine-based system designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments[.] (EU AI Act 2024)

Generative Artificial Intelligence (GenAI)
Generative AI is the sub-area of AI, involving AI systems which generate content — for example, human dialogue, speech, images and video. GenAI systems are capable of generating such content based on a user's request or instruction. More formally, GenAI is defined by UNESCO **as "an artificial intelligence (AI) technology that automatically generates content in response to prompts written in natural-language conversational interfaces" (UNESCO 2023).**

AI and GenAI in Trinity
As Ireland's leading university and as a world leader in AI research, Trinity recognises that AI and GenAI offer new opportunities for teaching, learning, assessment and research. We also recognise that these technologies present challenges and risks, including to academic integrity, ethics, privacy, impartiality, intellectual property and sustainability.

Acknowledging these opportunities and challenges, Trinity commits to supporting the opportunity for students and staff to become AI literate and fluent, thereby helping them to navigate and respond to the challenges and risks of AI and GenAI in order to harness the potential of (Gen)AI to enhance teaching, learning, assessment and research – and to be prepared for future challenges as these technologies evolve. We also commit to providing ongoing resources and guidance to support students and staff to use AI and GenAI in ways that are appropriate, responsible and ethical – and to ensure that academic integrity is maintained in its usage.

College aspires to develop best practice guidelines in this area. In addition to the resources and supports that College provides and recognising that appropriate uses of AI and GenAI tools vary across academic disciplines, Schools will have some flexibility to customise their own discipline-specific practices in line with this institutional statement, other institutional policies as they develop, and national and international regulation. The College goal is to enable overall consistency in the regulation of GenAI usage, while also respecting where disciplines or degree programmes require specific restrictions in GenAI usage in assessment preparation and execution. Thus, where disciplines or degree programmes wish to refine specific regulations on student use of GenAI for learning, general as well as programme-specific regulations should be communicated in the relevant discipline/degree programme handbook.

Such regulation could range from how student GenAI usage is acknowledged or cited within student assessment submissions, to prohibition of GenAI usage in the production of student assessment submissions.

Timeline of events

Date	Trinity Term 2026
09.04.26	Physics/Astro/Nano Moderatorship information session
17.04.26	Closing date for submission of Moderatorship Preference Forms: https://forms.office.com/e/Kjzihe0Gt9
20.04.26 – 01.05.26	Semester two examinations
29.05.26	Publication of Science Examination results – mytcd.ie portal
07.07.26	Publication of Junior Sophister places via my.tcd.ie

TR063 Physical Sciences

Summary from the Fresh Physical Sciences (TR063) Programme

The Junior and the Senior Fresh years in the Physical Sciences course provide the foundational material that all the Physical Sciences Moderatorships are predicated upon. Further, exposure to these courses allow time for students to determine the career path they wish to follow. In each of the Fresh years, the academic year is divided into Semester 1 (Michaelmas term) and Semester 2 (Hilary term) and all students take selected modules to the value of 60 credits for the year with no more than 30 credits from Semester 1 and 30 credits from Semester 2.

In each semester there are 20 credits of Core modules, and 10 credits of Open modules. The details of the Fresh modules are repeated here.

Moderatorships:
As stated in the earlier Physical Sciences Fresh handbooks, in the Junior and Senior Fresh years Physical Sciences TR063 students complete a course of study which will qualify them to compete for a place in one of the following Moderatorships after the Senior Fresh year: **Physics**, **Physics and Astrophysics** or **Nanoscience**.

Core and Open Module Choices in Junior and Senior Fresh Years

Year 1: JUNIOR FRESH	
CORE MODULES – 40 credits 20/20	
Semester 1	**Semester 2**
PYU11P10: Physics 1	PYU11P20: Physics 2
MAU11S01: Mathematics	MAU11S02: Mathematics

Year 2: SENIOR FRESH	
CORE MODULES – 40 credits 20/20	
Semester 1	**Semester 2**
PYU22P10: Physics 3	PYU22P20: Physics 4
MAU22S01: Multi-variable calculus for Science	MAU22S02: Vector Calculus for Science
MAU22S03: Fourier analysis for Science	PIU22992: History, Philosophy and Ethics of Science

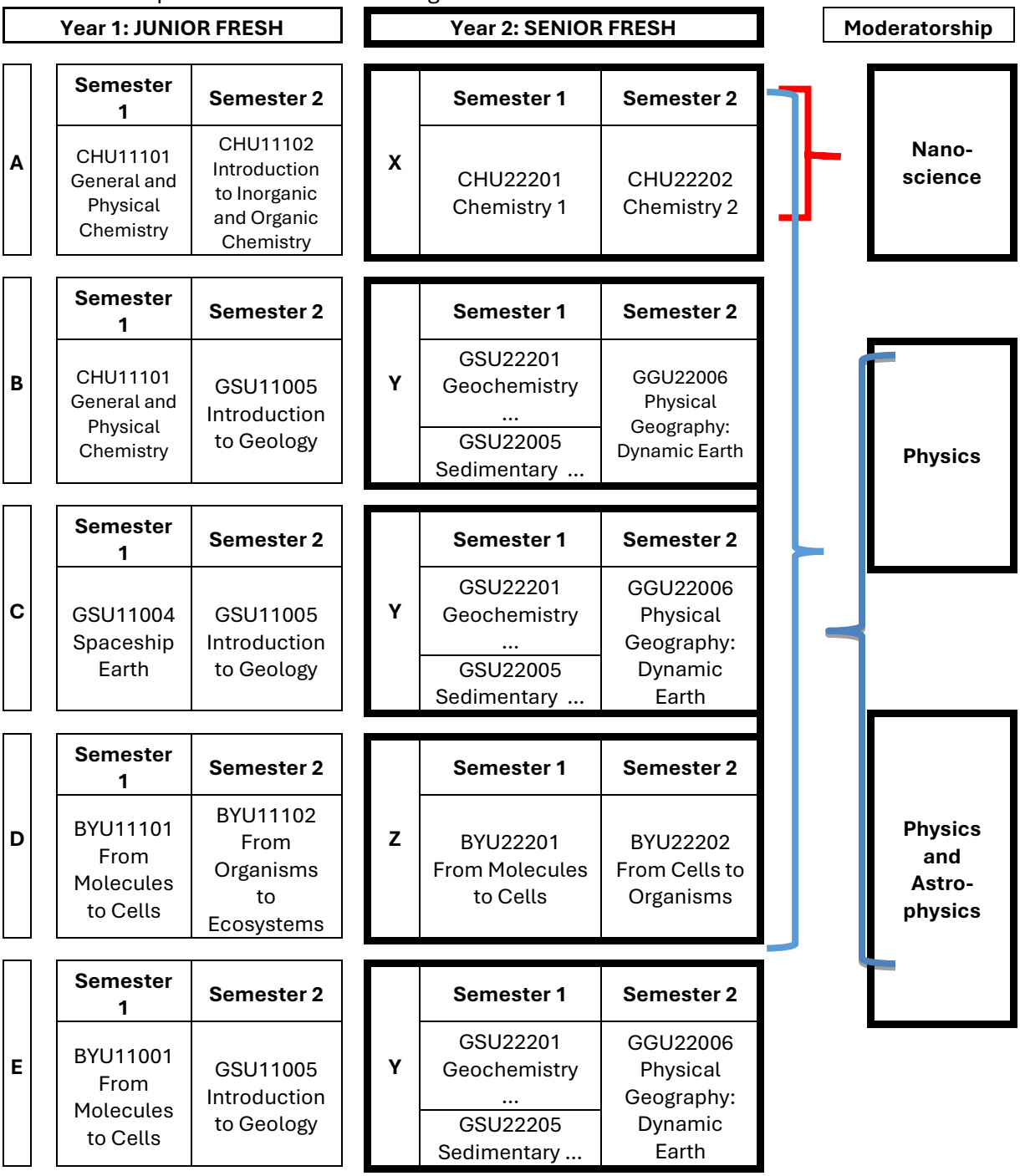
OPEN MODULES – choose 20 credits 10/10	
CHU11101 General and Physical Chemistry	CHU11102 Introduction to Inorganic and Organic Chemistry
GSU11004 Spaceship Earth	GSU11005 Introduction to Geology
BYU11101 From Molecules to Cells	BYU11102 From Organisms to Ecosystems

OPEN MODULES – choose 20 credits 10/10	
CHU22201 Chemistry 1	CHU22202 Chemistry 2
GSU22201 From Atoms to Rocks: Introduction to Geochemistry	GGU22006 Physical Geography: Dynamic Earth
GSU22205 Sedimentary Processes & Environments	
BYU22201 From Molecules to Cells	BYU22202 From Cells to Organisms

TR063: Moderatorships and Open Module Choice Diagram

Moderatorships in **Physics** or in **Physics and Astrophysics** are available to all students regardless of the choice of open modules in the Junior Fresh and Senior Fresh years. To qualify for the Moderatorship in **Nanoscience**, a student must take all available Chemistry open modules in both semesters of the Junior and Senior Fresh years.

Five distinct patterns of open modules are available to students across Junior Fresh and Senior Fresh years. In Junior Fresh these are denoted A, B, C, D and E leading to three distinct module patterns in Senior Fresh, designated as X, Y and Z. The pathways to the possible Moderatorships are indicated in the diagram.



Applications to choose a specific Moderatorship in Sophister years, detailed here occur via a preferred Moderatorship choice form available in Semester 2 of the Senior Fresh year.

Physics

Junior Sophister Course Advisor: Assoc. Prof Plamen Stamenov stamenp@tcd.ie
The Physics moderatorship covers a range of topics across the spectrum of modern physics, and the experimental, theoretical, and computational techniques used to explore them. It builds on the Physics modules taken in the Fresher years. There is a particular emphasis on condensed matter physics, photonics and nanoscience, reflecting the importance of these fields as well as reflecting the strength of the School's research expertise in these areas.

Junior Sophisters:
The JS year consists of lectures, tutorials and practical delivered in modules, as listed below. Within the Junior Sophister year in Physics there are 40 credits of Core modules, the remaining 20 credits are either Open or Elective modules. **All students are required to take a Trinity Elective in either the first or the second semester.** Students receive training in communication skills as part of the cross-semester practical module.

Assessment and Examination Procedures
Each 5-credit lecture module will be examined separately by a 2-hour exam in the relevant end-of-semester examination period, with the exception of PYU33C01, which is assessed entirely by continuous assessment. Examined modules may include continuous assessment components. Some modules are assessed by a 50:50 combination of continuous assessment and examination (in a 1-hour exam), such as in PYU33P15 in recent years. The composition of written papers will be given in the Junior Sophister Physics Orientation issued to rising Junior Sophisters. The JS Physics mark will constitute 30% of the final degree mark. Continuous assessment of the two practical modules contributes 15 credits. For full details of assessments and modules and module descriptors please see the School of Physics Handbook, https://www.tcd.ie/Physics/study/current/undergraduate/handbook/

Senior Sophisters:
The SS year consists of lectures, tutorials and practical physics delivered in modules, as listed. A major component of the year is an independent capstone research project, which is carried out during the first 9 weeks of Michaelmas term. There are no lectures during this period. The project may be carried out at other international partner institutes. The independent capstone research project may be an experimental, theoretical or computational project in almost any physics topic.

Core Modules: The capstone research project, problem solving module and several other modules are designated as core modules. These core modules total 40 credits, the remaining 20 credits of the Senior Sophister year in Physics are made up from among a range of several Open 5 credit modules.

Assessment and Examination Procedures

Each 5-credit lecture module will be examined separately in the relevant end-of-semester examination period. The 10-credit lecture modules PYU44P11 is examined in the semester 2 examination period but will also have continuous assessment components. The 10-credit lecture module PYU44N02 is examined in part in semester 1, with the majority of the assessment by continuous assessment and examination in Semester 2. The research project PYU44PP2 is assessed during semester 2. Problem Solving in Physics (PYU44PP5) will be examined at the end of Semester 1. Examined modules may include continuous assessment components. The SS Physics mark will constitute 70% of the final degree mark. For full details of assessments and modules please see the School of Physics Handbook,

https://www.tcd.ie/Physics/study/current/undergraduate/handbook/

Junior Sophister Course Structure Diagram

The Junior Sophister course structure is diagrammatically illustrated below:

<table>
<tr><th colspan="3">Junior Sophister TR063 – PHYSICS</th></tr>
<tr><td colspan="3">40 Credits core + 20 Credits Open modules or Trinity Elective modules</td></tr>
<tr><td rowspan="5">Core Modules (40 credits)</td><td>Semester 1: Core</td><td>Semester 2: Core</td></tr>
<tr><td>PYU33P01: Quantum Mechanics I
(5 credits)</td><td>PYU33P15: Atomic Physics and Statistical Thermodynamics
(5 credits)</td></tr>
<tr><td>PYU33P03: Condensed Matter I
(5 credits)</td><td>PYU33P04: Semiconductor Physics
(5 credits)</td></tr>
<tr><td colspan="2">PYU33PP3: JS Physics Laboratory (10 credits)</td></tr>
<tr><td>PYU33P02: Electromagnetic Interactions I (5 credits)</td><td>PYU33PP4: JS Physics Laboratory
(5 credits)</td></tr>
<tr><td rowspan="4">Open or Trinity Elective Modules (20 credits)</td><td>Semester 1: Open – choose 2 of 3</td><td>Semester 2: Open – choose 2 of 3</td></tr>
<tr><td>PYU33C01: Computer Simulation I
(5 credits)</td><td>PYU33P07: Experimental Techniques
(5 credits)</td></tr>
<tr><td>PYU33A03: Stellar & Galactic structure
(5 credits)</td><td>PYU33A17: Experimental Techniques for Astrophysics
(5 credits)</td></tr>
<tr><td>Trinity Elective 1
(5 credits)</td><td>Trinity Elective 2
(5 credits)</td></tr>
</table>

A Physics student can choose to take their one required Trinity Elective in either semester but can then take only one of the available Open modules in that semester. A Physics student can choose to take a second Trinity Elective, one in each semester, but then has a much-reduced choice of only taking only one of the available Open modules in each semester. Taking two Trinity Electives severely reduces the Physics content in the degree and can impact on later choice. For example: Computer Simulation II in the SS year will be (partially) dependent upon taking Computer Simulation I in the JS year.

Junior Sophister Core Modules 40 credits

PYU33P01 Quantum Mechanics (S1) **5 credits**
This module covers solution of the Schrödinger Equation in specific topics, such as angular momentum and the hydrogen atom.

PYU33P02 Electromagnetic Interactions I (S1) **5 credits**
This module covers the fundamentals of electromagnetic theory together with quantum optics and lasers.

PYU33P03 Condensed Matter I (S1) **5 credits**
This module introduces condensed matter concepts such as crystal structure and thermal and electronic properties of matter.

PYU33P15 Atomic Physics and Statistical Thermodynamics (S2) **5 credits**
This module covers atomic physics and spectroscopy together with statistical mechanics and thermodynamics.

PYU33P04 Semiconductor Physics (S2) **5 credits**
This module covers the physics of semiconductors and the construction, fabrication and application of semiconductor devices.

PYU33PP3 Practical in Physics (S1 & S2) **10 credits**
PYU33PP4 Practical in Physics (S2) **5 credits**
In these modules' students complete a number of advanced experiments in Physics together with an introduction to data analysis in Physics. The first cross-semester module includes components involving training in communication skills, personal and career development, and requires attendance at School Seminars. The second semester 2 module develops these skills further and ensures that students have a broad experience within a physics laboratory.

Junior Sophister Open Modules and Trinity Electives **20 credits**

PYU33C01 Computer Simulation I (S1) **5 credits**
This module provides an introduction to numerical and computational techniques and how they may be used to solve problems in Physics.

PYU33A03 Stellar and Galactic Structure (S1) **5 credits**
This module covers the evolution of stars, from their hydrogen burning until supernova explosion, and the properties of galaxies in the local and distant Universe.

PYU33P07 Experimental Techniques (S2) **5 credits**
This module covers instrumentation with specific examples in imaging techniques together with common device electronics and measurement methods and strategies.

PYU33A17 Experimental Techniques for Astrophysics (S2) **5 credits**
This module covers astrophysical instrumentation, with the astrophysical spectroscopy required to interpret spectra from across the electromagnetic spectrum.

Trinity Elective (S1 or S2) **5 credits**
Details on Trinity Electives are found at: https://www.tcd.ie/trinity-electives/ .

Senior Sophister Physics

Senior Sophister Course Advisor: **Assoc. Prof. Plamen Stamenov**
stamenp@tcd.ie

Senior Sophister Course Structure Diagram

<table>
<tr><th colspan="4">Senior Sophister TR063 – PHYSICS</th></tr>
<tr><th colspan="4">40 Credits Core modules + 20 Credits Open modules (AY 25/26)</th></tr>
<tr><td rowspan="4">Core Modules (40 credits)</td><td colspan="2">Semester 1: Core</td><td>Semester 2: Core</td></tr>
<tr><td colspan="2">PYU44PP2: Capstone Research Project (20 credits) – Assessment in Semester 2</td><td></td></tr>
<tr><td rowspan="2">Project only in first 9 weeks of semester 1</td><td>PYU44PP5: Problem solving (5 credits)</td><td>PYU44P05: Electromagnetic Interactions II (5 credits)</td></tr>
<tr><td colspan="2">PYU44P11: Advanced Quantum Mechanics, Nuclear Structure and High Energy Physics (10 credits)</td></tr>
<tr><td rowspan="7">Open Modules (20 credits)</td><td colspan="2">Semester 1: Open modules</td><td>Semester 2: Open modules</td></tr>
<tr><td></td><td colspan="2">PYU44N02: Nanoscience, complex fluids and polymers (10 credits)</td></tr>
<tr><td colspan="2" rowspan="6">Take 4 Open modules which total 20 credits</td><td>PYU44P13: Magnetism & Superconductivity</td></tr>
<tr><td>PYU44P06: Modern Optics</td></tr>
<tr><td>PYU44T20: Quantum Optics and Information</td></tr>
<tr><td>PYU44A05: Cosmology
Or
PYU44P16: Quantum Plasmonics and Metamaterials</td></tr>
<tr><td>PYU44C01: Computer Simulation II</td></tr>
<tr><td>PYU44P17: Energy Science</td></tr>
</table>

The PYU44PP2 capstone research project takes place in the first nine weeks of Semester 1. The assessment of the research project is in Semester 2. The remaining

three weeks of Semester 1 have tutorials associated with the PYU44PP5 Problem Solving module, which is examined at the end of Semester 1.

Lectures associated with the core PYU44P11 module and the open PYU44N02 module begin in the last three weeks of Semester 1. Examinations for PYU44P11 are at the end of Semester 2. PYU44N02 is examined in part in semester 1, with the majority of the assessment by continuous assessment and examination in Semester 2. All other modules, whether mandatory or optional, occur wholly within Semester 2 and are examined at the end of Semester 2.

Senior Sophister Physics Core Modules **40 credits**

PYU44PP2 Physics Research Project (S1 & S2) **20 credits**
This module comprises a 9-week full-time capstone research project in experimental, theoretical, or computational physics, undertaken at the beginning of Semester 1. The project may be undertaken in Trinity, or in another University or Research Institute in Ireland or abroad. Submission of report and presentation of results is in Semester 2

PYU44PP5 Problem Solving in Physics (S1) **5 credits**
This module develops techniques and approaches to general problem solving in physics.

PYU44P11 Advanced Quantum Mechanics, Nuclear Structure and High Energy Physics
(S1 & S2) **10 credits**
The quantum mechanics of this module extends the discussion of quantum physics into multi-electron atoms, time dependent Schrödinger Equation and perturbation theory. It includes nuclear physics, strong nuclear force and nuclear reactions and introduces high energy physics theory and experiment, fundamental particles, and the Standard Model.

PYU44P05 Electromagnetic Interactions II (S2) **5 credits**
This module covers electromagnetic wave phenomena together with the optical properties of materials.

Senior Sophister Physics Open Modules **20 credits**

PYU44N02 Nanoscience, Complex Fluids and Polymers (S1 & S2) **10 credits**
This module covers nanoscience, and the modified properties of nanoscale matter, its fabrication and potential applications together with the rheology and behaviour of liquids as applied to microfluidic systems and a detailed overview of polymer physics.

PYU44P13 Magnetism and Superconductivity (S2) **5 credits**
This module covers magnetism, magnetic materials, and introduces superconductivity.

PYU44P06 Modern Optics (S2) **5 credits**
This module covers optical communications and nonlinear optics involving lasers.

PYU44A05* Cosmology (S2) **5 credits**
This module covers cosmology, deriving its basic equations and using them together with observations to examine the history and future of the Universe. Recent results concerning dark matter and dark energy, and possible future directions are also examined.

PYU44C01 Computer Simulation II (S2) **5 credits**
This module provides an introduction to matrix computing and discrete Fourier transforms and partial differential equations through Python and extends the toolkit of numerical and statistical computer simulation techniques.

PYU44P17 Energy Science (S2) **5 credits**
This module consists of the physics behind key technologies for energy generation.

PYU44P16* Quantum Plasmonics and Metamaterials (S2) **5 credits**
This module covers quantum plasmonics and the fundamentals of photonics of metallic and dielectric nanostructures up to extreme nanoscales and the physics of metamaterials, that is the optics of materials having near-zero and negative refractive index.

PYU44T20 Quantum Optics and Information (S2) **5 credits**
This module covers the mathematical treatment of photons, quantized electromagnetic fields entanglement and quantum information or qubits.

*PYU44A05 and PYU44P16 cannot be taken together

Physics Moderatorship Learning Outcomes.

On the successful completion of this programme, a student should be able to

- demonstrate in written and oral form a comprehensive level of knowledge of physics and the mathematics that underpins this knowledge, together with an awareness of its place within the broader science curriculum

- apply the core concepts of Classical and Modern Physics across a wide spectrum of topics and applications, such as information technology and materials science

- perform calculations to solve practical problems, including the use of numerical methods and computing

- operate sophisticated spectrometers and similar test and evaluation apparata across a wide spectrum of investigation

- independently design and carry out an experiment and evaluate critically the data obtained, including appropriate error analysis

- communicate the results of an experiment or project via dissertation, poster or oral presentation

- employ literature search methods to obtain information relevant to research and development

- act effectively as an individual or as a member of a team in professional, educational and industrial settings

- update personal knowledge with a high degree of autonomy, whether in the workplace or in the context of further study

Physics and Astrophysics

Junior Sophister Course Advisor: Prof Neale Gibson n.gibson@tcd.ie
Physics and Astrophysics combines the core modules from the moderatorship in Physics with specialist modules in astrophysics theory and practice. This moderatorship reflects a curriculum for those with an increasing interest in astronomy and space science as well as reflecting the strength of the School's research expertise in these areas.

Junior Sophisters:
The JS year consists of lectures, tutorials and practical delivered in modules, as listed below. Within the Junior Sophister year in Physics and Astrophysics there are 40 credits of Core modules, the remaining 20 credits are either Open or Elective modules. **All students are required to take a Trinity Elective in either the first or the second semester.** Students receive training in communication skills as part of the practical modules.

Assessment and Examination Procedures
Each 5-credit lecture module will be examined separately by a 2-hour exam in the relevant end-of-semester examination period, with the exception of PYU33C01 which is assessed entirely by continuous assessment. Examined modules may include continuous assessment components. Some modules are assessed by a 50:50 combination of continuous assessment and examination (in a 1-hour exam), such as PYU33P15 in recent years. The composition of written papers will be given in the Junior Sophister Physics and Astrophysics Orientation issued to rising Junior Sophisters. The JS Physics and Astrophysics mark will constitute 30% of the final degree mark. Continuous assessment of the two practical modules contributes 15 credits. For full details of assessments and modules and module descriptors please see the School of Physics Undergraduate Handbook,
https://www.tcd.ie/Physics/study/current/undergraduate/handbook/

Senior Sophisters:
The SS year consists of lectures, tutorials and practical physics delivered in modules, as listed. A major component of the year is an independent capstone research project, which is carried out during the first 9 weeks of Michaelmas term. There are no lectures during this period. The independent capstone research project may be in either an astrophysics topic or in a physics topic.

Core Modules: The research project, problem solving module and several other modules are designated as core modules. These core modules total 50 credits, but the remaining 10 credits of the Senior Sophister year in Physics and Astrophysics are made up from among several Open modules.

Assessment and Examination Procedures
Each 5-credit lecture module will be examined separately in the relevant end-of-semester examination period. The 10-credit lecture modules PYU44P11 and PYU44A01 are examined in the semester 2 examination period but will have continuous assessment components. The research project PYU44PP2 is assessed during semester 2. Problem Solving in Physics (PYU44PP5) will be examined at the end of Semester 1.

Examined modules may include continuous assessment components. The SS Physics mark will constitute 70% of the final degree mark. For full details of assessments and modules and module descriptors please see the School of Physics Handbook: https://www.tcd.ie/Physics/study/current/undergraduate/handbook/

Junior Sophister Physics and Astrophysics Course Structure Diagram

The Junior Sophister course structure is diagrammatically illustrated below:

Junior Sophister TR063 – PHYSICS AND ASTROPHYSICS		
40 Credits core + 20 Credits Open modules or Trinity Elective modules		
Core Modules (40 credits)	**Semester 1: Core**	**Semester 2: Core**
	PYU33P01: Quantum Mechanics I (5 credits)	PYU33P15: Atomic Physics and Statistical Thermodynamics (5 credits)
	PYU33A03: Stellar & Galactic Structure (5 credits)	PYU33A17: Experimental Techniques for Astrophysics (5 credits)
	PYU33AP3: JS Astrophysics Laboratory (10 credits)	
	PYU33P02: Electromagnetic Interactions I (5 credits)	PYU33AP4: JS Astrophysics Laboratory (5 credits)
Open or Trinity Elective Modules (20 credits)	**Semester 1: Open – first is core then choose 1 of 2**	**Semester 2: Open – choose 2 of 3**
	* PYU33P03: Condensed Matter I **[Mandatory]** (5 credits)	PYU33P04: Semiconductor Physics (5 credits)
	PYU33C01: Computer Simulation I (5 credits)	PYU33P07: Experimental techniques (5 credits)
	Trinity Elective 1 (5 credits)	**Trinity Elective 2** (5 credits)

A Physics and Astrophysics student can choose to take their one required Trinity Elective in either semester, but if in Semester 1 can then only take the additional mandatory PYU33P03 module and cannot take the PYU33C01 module. If taking the one required Trinity Elective in Semester 2, then both Physics and Astrophysics Open modules in Semester 1 are taken and the student takes only one of the available School of Physics Open modules in Semester 2.

A Physics and Astrophysics student can choose to take a second Trinity Elective, i.e. one in each semester, but then has a much-reduced choice between the two available Open modules in semester 2 and is not able to take Computer Simulation I in Semester

Further, taking one Trinity Elective in Semester 1 or taking two Trinity Electives in Semester 1 and Semester 2, severely reduces the Physics and Astrophysics content in the degree, and can impact on the benefit of later modules. In particular**, not taking PYU33C01 Computer Simulation I** in the JS year **will be detrimental** to your performance in many of the typical SS Astrophysical capstone research projects involving simulation, even though the JS Astrophysics laboratory also contains relevant astrophysical data analysis and programming. It would also be of general benefit if taking Computer Simulation II in the SS year.

Junior Sophister Physics and Astrophysics Core Modules **40 credits**

PYU33P01 Quantum Mechanics I (S1) **5 credits**
This module covers solution of the Schrödinger Equation in specific topics, such as angular momentum and the hydrogen atom.

PYU33P02 Electromagnetic Interactions I (S1) **5 credits**
This module covers the fundamentals of electromagnetic theory together with quantum optics and lasers.

PYU33A03 Stellar and Galactic Structure (S1) **5 credits**
This module covers the evolution of stars, from their hydrogen burning until supernova explosion, and the properties of galaxies in the local and distant Universe.

PYU33P15 Atomic Physics and Statistical Thermodynamics (S2) **5 credits**
This module covers atomic physics and spectroscopy together with statistical mechanics and thermodynamics.

PYU33A17 Experimental Techniques for Astrophysics (S2) **5 credits**
This module covers astrophysical instrumentation, with the astrophysical spectroscopy required to interpret spectra from across the electromagnetic spectrum.

PYU33AP3 Practical in Computational Astrophysics (S1 & S2) **10 credits**
PYU33AP4 Practical in Physics (S2) **5 credits**
In these modules' students complete a number of advanced experiments in Physics together with an introduction to computational methods in Astrophysics. The first includes components involving training in communication skills, personal and career development, and requires attendance at School Seminars. It also specializes in astrophysical data analysis and trains the students in the appropriate data analysis methods and software in preparation for the final year capstone project.

Junior Sophister Physics and Astrophysics Open Modules and Trinity Electives

20 credits

PYU33P03 Condensed Matter I (S1) **5 credits**

This module introduces condensed matter concepts such as crystal structure and thermal and electronic properties of matter. (This is a mandatory module.)

PYU33C01 Computer Simulation I (S1) **5 credits**

This module provides an introduction to numerical and computational techniques and how they may be used to solve problems in Physics.

PYU33P07 Experimental Techniques (S2) **5 credits**

This module covers instrumentation with specific examples in imaging techniques together with common device electronics and measurement methods and strategies.

PYU33P04 Semiconductor Physics (S2) **5 credits**

This module covers the physics of semiconductors and the construction, fabrication and application of semiconductor devices.

Trinity Elective (S1 or S2) **5 credits**

Details on Trinity Electives (TEs) are found at: https://www.tcd.ie/trinity-electives/. If a TE is taken in Semester 1 then the chosen TE must replace PYU33C01 as PYU33P03 is required for all JS Physics and Astrophysics students.

Senior Sophister Physics and Astrophysics

Course Advisor: Prof Neale Gibson n.gibson@tcd.ie

Senior Sophister Course Structure Diagram

<table>
<tr><th colspan="5">Senior Sophister TR063 – PHYSICS AND ASTROPHYSICS</th></tr>
<tr><th colspan="5">50 Credits Core modules + 10 Credits Open modules</th></tr>
<tr><td rowspan="5">Core Modules (50 credits)</td><td colspan="2">Semester 1: Core</td><td colspan="2">Semester 2: Core</td></tr>
<tr><td colspan="3">PYU44PP2: Capstone Research Project (20 credits) – Assessment in Semester 2</td><td></td></tr>
<tr><td rowspan="3">Project only in first 9 weeks of semester 1</td><td>PYU44PP5: Problem solving (5 credits)</td><td colspan="2">PYU44P05: Electromagnetic Interactions II (5 credits)</td></tr>
<tr><td colspan="3">PYU44P11: Advanced Quantum Mechanics, Nuclear Structure and High Energy Physics (10 credits)</td></tr>
<tr><td colspan="3">PYU44A01: Planetary and Space Science and Cosmology (10 credits)</td></tr>
<tr><td rowspan="5">Open Modules (10 credits)</td><td colspan="2">Semester 1: Open modules</td><td colspan="2">Semester 2: Open modules</td></tr>
<tr><td colspan="2" rowspan="4">Take 2 Open modules which total 10 credits</td><td colspan="2">PYU44P13: Magnetism & Superconductivity</td></tr>
<tr><td colspan="2">PYU44P06: Modern Optics</td></tr>
<tr><td colspan="2">PYU44C01: Computer Simulation II</td></tr>
<tr><td colspan="2">PYU44P17: Energy Science</td></tr>
</table>

The PYU44PP2 capstone research project takes place in the first nine weeks of Semester 1. The assessment of the research project is in Semester 2. The remaining three weeks of Semester 1 has tutorials associated with the PYU44PP5 Problem Solving module, which is examined at the end of Semester 1.

Lectures associated with the core PYU44P11 module and the core PYU44A01 module begin in the last three weeks of Semester 1, but examinations for these modules are at the end of Semester 2. All other modules, whether mandatory or optional, occur wholly within Semester 2 and are examined at the end of Semester 2.

Senior Sophister Physics and Astrophysics Core Modules **50 credits**

PYU44PP2 Physics Research Project (S1 & S2) **20 credits**
This module comprises a 9-week full-time research project in astrophysics, physics or computational physics, undertaken at the beginning of Semester 1. The project may be undertaken in Trinity, or in another University or Research Institute in Ireland or abroad. Submission of report and presentation of results is in Semester 2

PYU44PP5 Problem Solving in Physics (S1) **5 credits**
This module develops techniques and approaches to general problem solving in physics.

PYU44P11 Advanced Quantum Mechanics, Nuclear Structure and High Energy Physics (S1 & S2) **10 credits**
The quantum mechanics of this module extends the discussion of quantum physics into multi-electron atoms, time dependent Schrödinger Equation and perturbation theory. It includes nuclear physics, strong nuclear force and nuclear reactions and introduces high energy physics theory and experiment, fundamental particles, and the Standard Model.

PYU44A01 Planetary and Space Science and Cosmology (S1 & S2) **10 credits**
This module covers advanced concepts in planetary astrophysics, including the properties of solar system planets and exoplanets, their interiors, and atmospheres. In addition, this module covers cosmology, deriving its basic equations and using them together with observations to examine the history and future of the Universe. Recent results concerning dark matter and dark energy, and possible future directions are also examined.

PYU44P05 Electromagnetic Interactions II (S2) **5 credits**
This module covers electromagnetic wave phenomena together with the optical properties of materials.

Senior Sophister Physics and Astrophysics Open Modules **10 credits**

PYU44P13 Magnetism and Superconductivity (S2) **5 credits**
This module covers magnetism, magnetic materials, and introduces superconductivity.

PYU44P06 Modern Optics (S2) **5 credits**
This module covers optical communications and nonlinear optics involving lasers.

PYU44C01 Computer Simulation II (S2) **5 credits**
This module provides an introduction to matrix computing and discrete Fourier transforms and partial differential equations through Python and extends the toolkit of numerical and statistical computer simulation techniques.

PYU44P17 Energy Science (S2) **5 credits**

This module consists of the physics behind key technologies for energy generation.

Physics and Astrophysics Moderatorship Learning Outcomes.

On the successful completion of this programme, a student should be able to:

- demonstrate in written and oral form a comprehensive level of knowledge of physics and astrophysics and the mathematics that underpins this knowledge, together with an awareness of its place within the broader science curriculum
- apply the core concepts of classical and modern Physics across a wide spectrum of topics and applications, such as computer modelling of astrophysical phenomena
- perform calculations to solve practical problems, including the use of numerical methods and computing
- understand the operation of modern astronomical instruments, such as electronic cameras and optical and radio telescopes
- independently design and carry out experiments and evaluate critically the data obtained, including appropriate error analysis
- communicate the results of an experiment or project via dissertation, poster or oral presentation
- employ literature search methods to obtain information relevant to research and development
- act effectively as an individual or as a member of a team in professional, educational and industrial settings
- update personal knowledge with a high degree of autonomy, whether in the workplace or in the context of further study

Nanoscience

Junior Sophister Course Advisor: Professor Chris Batchelor McAuley (chris.mcauley@tcd.ie)
Nanoscience is a moderatorship taught jointly by the Schools of Physics and Chemistry. Building on the foundation courses taken in the Fresh years, students follow in-depth courses across the spectrum of modern physics, physical chemistry, materials science and nanoscience while reflecting the strength of Trinity's research expertise in these areas.

Junior Sophister:
The Junior Sophister year consists of lectures, tutorials and practicals delivered in modules, as listed below. Within the Junior Sophister year in Nanoscience there are 40 credits of Core modules, with the remaining 20 credits comprising either Open or Elective modules. Some Open modules are in fact mandatory and this requirement in the Junior Sophister year is to satisfy the progression of students in this specialised degree. **All Nanoscience students are required to take a Trinity Elective in the second semester of their Junior Sophister year.** Students receive training in communication skills within the practical modules.

Safety:
To reinforce and extend laboratory skills rising Junior Sophister students are required to attend workshops on Chemical and Laboratory Safety to be held in at the beginning of semester one. Attendance at all workshops **is compulsory**.

Core Modules: The Core modules, one Trinity Elective and two Open modules specified below are mandatory. In the second semester, students have the choice of taking one of the specified Chemistry or Physics Open modules**.**

Assessment and Examination Procedures:
Modules may be assessed by end-of-semester examination and/or continuous assessment. Some modules may be assessed by a 50:50 combination of continuous assessment and an examination (in a 1-hour exam). Further information relating to the assessed components and composition of written papers will be given in the Junior Sophister Nanoscience Orientation issued to rising Junior Sophisters. Examined modules may include continuous assessment components. Junior Sophister marks contribute 30% of the final degree Moderatorship mark.

Senior Sophisters:
The Senior Sophister year consists of lectures, tutorials and a capstone research project, as listed below. The independent capstone research project is pursued during the first nine weeks of the first semester, in an internationally recognised laboratory that specialises in aspects of nanoscience, physics, chemistry or advanced materials, either on campus or in a facility off-campus. Projects external to Trinity College are either hosted by cognate universities or research institutes. Projects are also hosted by the Schools of Chemistry and Physics and by CRANN and PIs within AMBER.

Core Modules: The research project and several other modules are designated as core modules. These core modules total 45 credits, but the remaining 15 credits of the Senior Sophister year in Nanoscience are made up from among several Open modules of either 5 or 10 credits in size.

Assessment and Examination Procedures:
Modules may be assessed by end-of-semester examination and/or continuous assessment. Further information relating to the assessed components and composition of written papers will be given in the Senior Sophister Nanoscience Booklets issued to rising Senior Sophisters. Assessment of the full-time research project (PYU44NP2) will be performed in Semester 2. Problem Solving in Nanoscience (PYU44NP5) will be examined at the end of Semester 1. Examined modules may include continuous assessment components. The 10-credit lecture module PYU44N02 is examined in part in semester 1, with the majority of the assessment by continuous assessment and examination in Semester 2. Senior Sophister marks contribute 70% of the final degree Moderatorship mark.

Junior Sophister Nanoscience Course Structure Diagram

The Junior Sophister course structure is diagrammatically illustrated below:

<table>
<tr><th colspan="3">Junior Sophister TR063 – NANOSCIENCE</th></tr>
<tr><th colspan="3">40 Credits core + 20 Credits Open modules or Trinity Elective modules</th></tr>
<tr><td rowspan="5">Core Modules (40 credits)</td><td>Semester 1: Core</td><td>Semester 2: Core</td></tr>
<tr><td>PYU33P01: Quantum Mechanics I (5 credits)</td><td>CHUXXXX: Advanced Core Inorganic Chemistry 1 (5 credits)</td></tr>
<tr><td>CHU33405: Analytical and Computational Methods (5 credits)</td><td>CHU33307: Solid State Materials and Modelling (5 credits)</td></tr>
<tr><td colspan="2">PYU33NP3: Nanoscience Physics Laboratory (10 credits)</td></tr>
<tr><td>CHU33409: Analytical and Computational Methods Workshops (5 credits)</td><td>CHU33603: Practical in Physical Chemistry and Nanoscience (5 credits)</td></tr>
<tr><td rowspan="4">Open or Trinity Elective Modules (20 credits)</td><td>Semester 1: Open modules both core</td><td>Semester 2: Open – choose 1 of 2 and Trinity Elective</td></tr>
<tr><td>* PYU33P03: Condensed Matter I (5 credits)</td><td>PYU33P04: Semiconductor Physics (5 credits)</td></tr>
<tr><td>* PYU33P02: Electromagnetic Interactions I (5 credits)</td><td>CHUXXXX: Advanced Inorganic Chemistry Options 1 (5 credits)</td></tr>
<tr><td>* Indicates a mandatory selection No Trinity Elective available in Semester 1.</td><td>Trinity Elective (Nanoscience students obliged to take a TE in S2) (5 credits)</td></tr>
</table>

A Nanoscience student must take their one required Trinity Elective in Semester 2. In Semester 2 the choice of Open module is then between PYU33P04 (Semiconductor Physics) and CHUXXXX (Advanced Inorganic Chemistry Options).
A Nanoscience student cannot choose to take a second Trinity Elective. The requirement by College for these students for 10 Elective credits is met between the JS Trinity Elective in Semester 2 and the SF module in the History Ethics and Philosophy of Science.

Junior Sophister Nanoscience Core Modules **40 credits**

PYU33P01 Quantum Mechanics (S1) **5 credits**
This module covers solution of the Schrödinger Equation and specific topics, such as angular momentum and the hydrogen atom.

CHU33405 Analytical and Computational Methods (S1) **5 credits**
This module introduces the student to instrumental methods in analytical chemistry and to modern computational tools to understand chemical structure and interpret spectroscopic results.

CHU33307 Solid State Materials and Modelling (S2) **5 credits**
This model introduces the student to the fundamental aspects of solid-state materials and the modelling of them. It will focus on the electronic structure and defects and how these can be used to influence the properties of materials and hence create functional materials.

CHU33409 Analytical and Computational Methods Workshops Nanoscience Lab/Workshops (S1) 5 credits
In this module students complete a range of experiments in advanced chemical analysis, spectroscopic and other characterisation techniques.

CHUXXXX Advanced Core Inorganic Chemistry 1 (S2) **5 credits**
Note – new module, code to be confirmed. The aim of this module is to develop an understanding of materials and nanochemistry, bioinorganic chemistry and organometallic chemistry.

CHU33603 Practical in Physical Chemistry and Nanoscience (S2) **5 credits**
In this module students complete several nanoscience and physical chemistry experiments.

PYU33NP3 Practical in Nanoscience (S1 & S2) **10 credits**
In this module students complete several advanced experiments in Nanoscience and Physics together with a practical training in Advanced Nanoscience. It also includes components involving training in communication skills, personal and career development, and requires attendance at Nanoscience related School Seminars in Schools of Physics and Chemistry.

Junior Sophister Nanoscience Open Modules and Trinity Electives **20 credits**

PYU33P02 Electromagnetic Interactions I (S1) **5 credits**
This module covers the fundamentals of electromagnetic theory together with quantum optics and lasers. (This is a mandatory module.)

PYU33P03 Condensed Matter I (S1) **5 credits**
This module introduces condensed matter concepts such as crystal structure and thermal and electronic properties of matter. (This is a mandatory module).

Trinity Elective (S2 only) **5 credits**
Details on Trinity Electives are found at: https://www.tcd.ie/trinity-electives/.
Nanoscience students **must** take a TE in Semester 2. They cannot take two TEs.

PYU33P04 Semiconductor Physics (S2) **5 credits**
This module covers the physics of semiconductors and the construction, fabrication and application of semiconductor devices.
OR
CHUXXXX Advanced Core Inorganic Chemistry 1 (S2) **5 credits**
Note – new module, code to be confirmed. The aim of this module is to develop an understanding of materials and nanochemistry, bioinorganic chemistry and organometallic chemistry.

Senior Sophister Nanoscience

Course Advisor: Professor Chris Batchelor McAuley (chris.mcauley@tcd.ie)

Senior Sophister Course Structure Diagram

<table>
<tr><th colspan="4">Senior Sophister TR063 – NANOSCIENCE</th></tr>
<tr><th colspan="4">45 Credits Core modules + 15 Credits Open modules</th></tr>
<tr><td rowspan="5">Core Modules (45 credits)</td><td colspan="2">Semester 1: Core</td><td>Semester 2 Core</td></tr>
<tr><td colspan="2">PYU44NP2: Capstone Research Project (20 credits) – Assessment in Semester 2</td><td></td></tr>
<tr><td rowspan="3">Project only in first 9 weeks of semester 1</td><td>PYU44NP5: Problem solving (5 credits)</td><td>CHU44304: Physical Chemistry (5 credits)</td></tr>
<tr><td colspan="2">PYU44N02: Nanoscience, complex fluids and polymers (10 credits)</td></tr>
<tr><td></td><td>CHUXXXX Advanced Core Inorganic Chemistry 2 (5 credits)</td></tr>
<tr><td rowspan="9">Open Modules (15 credits)</td><td colspan="2">Semester 1: Open modules</td><td>Semester 2: Open modules</td></tr>
<tr><td colspan="2" rowspan="8">Take 2 or 3 Open modules which total 15 credits</td><td>PYU44P13: Magnetism & Superconductivity (5 credits)</td></tr>
<tr><td>PYU44P06: Modern Optics (5 credits)</td></tr>
<tr><td>PYU44P05: Electromagnetic Interactions II (5 credits)</td></tr>
<tr><td>PYU44P17: Energy Science (5 credits)</td></tr>
<tr><td>CHU44167: Advanced Physical Chemistry (10 credits)</td></tr>
<tr><td>CHUXXXX: Advanced Inorganic Chemistry Options 2 (10 credits)</td></tr>
<tr><td>CHU44705: Advanced Computational Chemistry (10 credits)</td></tr>
</table>

The PYU44NP2 capstone research project takes place in the first nine weeks of Semester 1. This may be extended to 12 weeks in some circumstances, pending approval by the

course director. The assessment of the research project is in Semester 2. The remaining three weeks of Semester 1 has tutorials associated with the PYU44NP5 Problem Solving module which is examined at the end of Semester 1. Lectures associated with the core PYU44N02 module begin in the last three weeks of Semester 1, and are examined in part in semester 1, with the majority of the module's assessment by continuous assessment and examination in Semester 2. All other modules, whether mandatory or optional, occur wholly within Semester 2 and are examined at the end of Semester 2.

Senior Sophister Nanoscience Core Modules **45 credits**

PYU44NP2 Nanoscience Research Project (S1 and S2) 20 credits
This module consists of a 9-12 week independent research project. The project is pursued in an internationally recognised laboratory that specialises in aspects of nanoscience, advanced materials or semiconductor processing. The project may be hosted within the School of Chemistry, School of Physics, CRANN, or at an approved international host institution. Submission of report and presentation of results is in Semester 2.

PYU44NP5 Problem Solving in Nanoscience (S1) 5 credits
This module involves general problem-solving and scientific comprehension in nanoscience, advanced materials or semiconductor processing.

PYU44N02 Nanoscience, Complex Fluids and Polymers (S1&S2) 10 credits
This module covers nanoscience, and the modified properties of nanoscale matter, its fabrication and potential applications together with the rheology and behaviour of liquids as applied to microfluidic systems and a detailed overview of polymer physics.

CHU44304: Physical Chemistry (S2) 5 credits
The student will be introduced to statistical thermodynamics and its applications in chemistry, integrating this topic with kinetics, classical thermodynamics and quantum chemistry covered in previous years. The second part of the module will cover elements of soft matter and macromolecular and colloid chemistry.

CHUXXXX Advanced Core Inorganic Chemistry 2 (S2) 5 credits
Note – new module, code to be confirmed. The student will be introduced to advanced inorganic chemistry associated with catalysis and also to the field of polymer chemistry.

Senior Sophister Nanoscience Open Modules

Options must total 15 credits

PYU44P13 Magnetism and Superconductivity (S2) **5 credits**
This module covers magnetism, magnetic materials, and introduces superconductivity.

PYU44P06 Modern Optics (S2) **5 credits**
This module covers optical communications and nonlinear optics involving lasers.

PYU44P05 Electromagnetic Interactions II (S2) **5 credits**
This module covers electromagnetic wave phenomena together with the optical properties of materials.

PYU44P17 Energy Science (S2) **5 credits**
This module consists of the physics behind key technologies for energy generation.

CHU44167 Advanced Physical Chemistry (S2) **10 credits**
The student will be introduced to advanced topics in physical chemistry that integrate and build on core concepts of kinetics, thermodynamics and quantum chemistry covered in core physical chemistry modules. Topics will include: (a) electrochemistry and its applications to energy devices for sustainability, (b) photochemistry and spectroscopy, and (c) surface and interfacial chemistry, including catalysis for the environment.

CHUXXXX Advanced Core Inorganic Chemistry 2 (S2) **5 credits**
Note – new module, code to be confirmed. The student will be introduced to advanced inorganic chemistry associated with catalysis and also to the field of polymer chemistry.

CHU44705 Advanced Computational Chemistry (S2) **10 credits**
This module will cover the main computational quantum chemistry methods and computational techniques, including optimisation and molecular dynamics, used in the modelling of structure, chemical reactivity and electronic properties of molecular systems and solid crystals. The performance and suitability of these methods for different applications will also be analysed and discussed. In addition, lectures will be complemented with computational practicals to see the direct application of these methods to specific scientific questions.

Nanoscience Moderatorship Learning Outcomes

On successful completion of this programme students should be able to:

- Articulate in written and oral form a foundation level of knowledge and understanding of Physics, Chemistry and Mathematics.

- Apply key concepts of Physics and Chemistry to Nanomaterials.

- Design, perform and analyse the results obtained from experiments in materials' physics and chemistry, using modern physical and chemical experimental methodologies and instrumentation, with particular reference to materials and nanomaterials.

- Demonstrate skills in problem-solving, critical thinking and analytical reasoning, and be able to effectively communicate the results of their work to chemists, physicists, material scientists and others, both verbally and in writing.

- Use modern library searching and retrieval methods to obtain information pertinent to the identification and solution of problems in the physics and chemistry of materials, and the exploration of new research areas.

- Work effectively and safely in a laboratory environment operating within the proper procedures and regulations for safe handling and use of chemicals and instruments.

- Design and perform appropriate experiments to address materials' physics, chemistry and nanoscience problems and analyse the results.

- Update their knowledge and be able to undertake further study with a high degree of autonomy.

Important information

Attendance

All students should enter residence in or near Dublin and must begin attendance at the College not later than the first day of teaching term and may not go out of residence before the last day of teaching term unless **they have previously obtained permission from the Senior Lecturer through their tutor.**

Students must attend College during the teaching term. They must take part fully in the academic work of their class throughout the period of their course. Lecture timetables are published through my.tcd.ie, and on school or department notice-boards or in Blackboard before the beginning of Michaelmas teaching term. The onus lies on students to inform themselves of the dates, times and venues of their lectures and other forms of teaching by consulting these timetables.

The requirements for attendance at lectures and tutorials vary between the different faculties, schools, and departments. The school, department, or course office, whichever is relevant, publishes its requirements for attendance at lectures and tutorials on noticeboards, and/or in handbooks and elsewhere, as appropriate.

Assessment: procedures for the non-submission of coursework and absence from examinations

All students must fulfil the course requirements of the school or department, as appropriate, with regard to attendance and course work. Where specific requirements are not stated, students may be deemed non-satisfactory if they miss more than a third of their course of study or fail to submit a third of the required course work in any term.

Full regulations on non-submission of coursework can be found via the following:
https://www.tcd.ie/media/tcd/calendar/undergraduate-studies/general-regulations-and-information.pdf
Please refer to your department/discipline handbook for specific moderatorship regulations.

Student Services

Trinity Tutorial Service
The Tutorial Service is unique, confidential, and available to all undergraduate students offering student support in all aspects of College life. The Tutorial Service is supported and co-ordinated by the Senior Tutor's Office which is located on the ground floor in House 27.

Opening Hours and Appointments
The Senior Tutor's Office is open for student appointments between 10.30am - 12.30pm and
2.30pm - 4.00pm Monday to Friday ONLY (email stosec@tcd.ie to arrange an appointment).

What is a Tutor?
A Tutor is a member of the academic staff who is appointed to look after the general welfare and development of the students in his/her care. Whilst the Tutor may be one of

your lecturers, this is not always the case as the role of the College Tutor is quite separate from the teaching role.

When should I go to see my Tutor?
You should visit your Tutor whenever you are worried or concerned about any aspect of College life or indeed your personal life, especially if it is affecting your academic work. The conversation with your Tutor takes place in strictest confidence. Unless you give him/her permission to do so, s/he will not divulge information given to them to anybody, whether a member of College or to anyone outside College (to your parents/family for example). Your Tutor can only help you if s/he knows you are facing difficulties, so if you are worried about anything go and see your Tutor before things get out of hand.

Further information on the Senior Tutors Office and College Tutors may be found via the following webpage: **Senior Tutor Services-**
https://www.tcd.ie/seniortutor/students/undergraduate/

Disability Services
The Disability Service aims to provide appropriate advice, support and information to help students and staff with disabilities. The Disability Service has in place a range of supports to ensure that students with disabilities have full access to the same facilities for study and recreation as their peers. Most students registering with the Disability Service request access to a range of supports that help the student reach their full potential while studying. Most students' needs are accommodated through these supports. The student decides what level of support they require.

For contact information or to make an appointment please contact the Disability Services – contact details are available via the following webpage:
https://www.tcd.ie/disability/contact/

Learning Development
Student Learning Development offers support in a variety of study and learning skills including essay writing, exam preparation, study skills, self and time-management and note taking. Mechanisms of support are workshops, individual appointments and drop-in clinics.
https://www.tcd.ie/sld/

Student Counselling
The Student Counselling Service is here to help you to manage any difficulties you are experiencing so you can enjoy and fully participate in your time here at College.

If you wish to make an appointment with the Student Counselling Service, please consider one of the options below. If you have any other queries you can call into reception on the 3rd floor of 7-9 South Leinster Street or contact us on:
Phone: (01) 896 1407
Email: student-counselling@tcd.ie

For further information visit the following webpage:
https://www.tcd.ie/StudentCounselling/

Useful College Websites:

Student Life
Student life offers information on Supports and Services, Clubs and Societies, Student Unions etc., https://www.tcd.ie/students/

Academic Registry
The Academic Registry is responsible for services that support the complete student lifecycle of Trinity College Dublin – from application to graduation. Academic Registry is located

For information on Registration, Fees, Grants, ID Cards etc. visit the Academic Registry (AR) in the Watts Building, on the first floor, or the visit the AR website: https://www.tcd.ie/academicregistry/

Student Accommodation
https://www.tcd.ie/accommodation/

Dates to note

Event(s)	Date(s)
Closing date for submission of Mod Preferences	17 April 2026
Semester two assessments session	20 April to 01 May 2026
Publication of Science examination results	29 May 2026
Publication of First Round Sophister Places	07 July 2026
Reassessment Examinations	24 August to 28 August 2026
Publication of Second Round Sophister places	09 September 2026
Semester one starts	14 September 2026
Semester one ends	04 December 2026
Semester one examinations	14 to 22 December 2026

Teaching term dates 2026-27

Michaelmas Term Monday 14 September - Friday 04 Dec 2026			**Hilary Term Monday 18 January 2027 - Friday 09 April 2027**		
Teaching wk. 1	Week 04	14 Sept - 18 Sept	Teaching wk. 1	Week 22	18 Jan - 22 Jan
Teaching wk. 2	Week 05	21 Sept - 25 Sept	Teaching wk. 2	Week 23	25 Jan – 29 Jan
Teaching wk. 3	Week 06	28 Sept - 02 Oct	Teaching wk. 3	Week 24	01 Feb - 05 Feb
Teaching wk. 4	Week 07	05 Oct - 09 Oct	Teaching wk. 4	Week 25	08 Feb – 12 Feb
Teaching wk. 5	Week 08	12 Oct - 16 Oct	Teaching wk. 5	Week 26	15 Feb – 19 Feb
Teaching wk. 6	Week 09	19 Oct - 23 Oct	Teaching wk. 6	Week 27	22 Feb – 26 Feb
Study week	**Week 10**	**26 Oct - 30 Oct**	**Study week**	**Week 28**	**01 Mar – 05 Mar**
Teaching wk. 8	Week 11	02 Nov - 06 Nov	Teaching wk. 8	Week 29	08 Mar – 12 Mar
Teaching wk. 9	Week 12	09 Nov - 13 Nov	Teaching wk. 9	Week 30	15 Mar – 19 Mar
Teaching wk. 10	Week 13	16 Nov - 20 Nov	Teaching wk. 10	Week 31	22 Mar - 26 Mar
Teaching wk. 11	Week 14	23 Nov - 27 Nov	Teaching wk. 11	Week 32	29 Mar – 02 Apr
Teaching wk. 12	Week 15	30 Nov to 4 Dec	Teaching wk. 12	Week 33	05 Apr – 09 Apr

Orientation week: 21 to 25 September 2026
Teaching begins for Junior Fresh students: 28 September 2026
October bank holiday: Monday 26th October 2026
February bank holiday: 1 February 2027
St Patrick's Day: Wednesday 17 March 2027
Good Friday: 26 March 2027
Easter Monday: 29 March 2027

Dates are correct at time of publication, however; they are subject to change in line with College policies and procedures. All changes will be reflected on the Science Course Office webpages: https://www.tcd.ie/science/undergraduate/ and the College Academic year Calendar: https://www.tcd.ie/calendar/academic-year-structure/

Contact Details

Course Director TR063 Physical Sciences

Professor Plamen Stamenov — E-mail: stamenp@tcd.ie

School Manager

Dr Niamh McGoldrick — E:mail: niamh.mcgoldrick@tcd.ie

Ph: 01 896 2024

Administrative Officer

Ms Una Dowling — E-mail: dowlingu@tcd.ie

Ph: 01 896 1675

Executive Officer

Ms Rashima Sharma — E-mail: sharmar3@tcd.ie

Ph: 01 896 1675

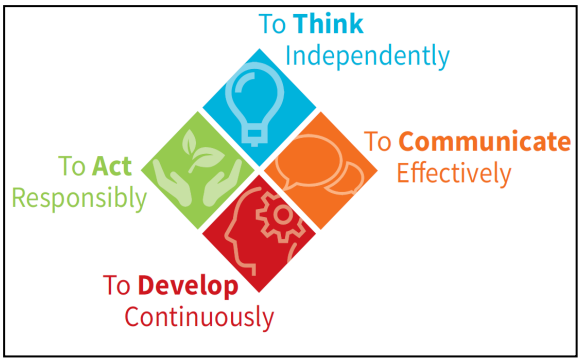
NOTE: All the information contained in this booklet is accurate at time of publication. However, the Science Course Office reserves the right to modify information, dates and times as necessary. Students will be notified of any changes via e-mail and the Science webpage.

Graduate Attributes

The Trinity Graduate Attributes represent the qualities, skills and behaviours that you will have the opportunity to develop as a Trinity student over your entire university experience, in other words, not only in the classroom, but also through engagement in co- and extra-curricular activities (such as summer work placements, internships, or volunteering).

The four Trinity Graduate Attributes are:

- To Think Independently
- To Act Responsibly
- To Develop Continuously
- To Communicate Effectively



Why are the Graduate Attributes important?

The Trinity Graduate Attributes will enhance your personal, professional and intellectual development. They will also help to prepare you for lifelong learning and for the challenges of living and working in an increasingly complex and changing world.

The Graduate Attributes will enhance your employability. Whilst your degree remains fundamental, also being able to demonstrate these Graduate Attributes will help you to differentiate yourself as they encapsulate the kinds of transversal skills and abilities, which employers are looking for.

How will I develop these Graduate Attributes?
Many of the Graduate Attributes are 'slow learned', in other words, you will develop them over the four or five years of your programme of study.
They are embedded in the curriculum and in assessments, for example, through undertaking independent research for your final year project, giving presentations and engaging in group work.

You will also develop them through the co-curricular and extra-curricular activities. If you help to run a club or society you will be improving your leadership skills, or if you play a sport you are building your communication and team-work skills.

Appendix 1

Item	Reference/Source
General College Regulations	https://www.tcd.ie/media/tcd/calendar/undergraduate-studies/complete-part-II.pdf
Emergency Procedures	In the event of an emergency, **dial Security Service on extension 1999** Security Services provide a 24-hourservice to the college community, 365 days a year. They are the liaison to the Fire, Garda and Ambulance services and all staff and students are advised to alwaystelephone extension 1999 (+353 1 896 1999) in case of an emergency. Should you require any emergency or rescue services on campus, you must contact Security Services. This includes chemical spills,personal injury or first aid assistance. It is recommended that all studentssave at least one emergency contact in their phone under ICE (In Case of Emergency).
Health and Safety	Faculty of Science, Technology, Engineering and Mathematics website - https://www.tcd.ie/stem/undergraduate/health-safety.php School Handbooks will have School/Discipline information on Health and Safety.
Data Protection	https://www.tcd.ie/dataprotection/ https://www.tcd.ie/dataprotection/assets/docs/dataprotectionhandbook/DP_Handbook_15042021.pdf
Academic Integrity	https://www.tcd.ie/teaching-learning/academic-integrity/
Research Ethics	https://www.tcd.ie/research/support/ethics-integrity.php
Blackboard	Blackboard
Explanation of Weightings	https://www.tcd.ie/academic-affairs/academic-regulations/ug-module-sizes-and-capstone/
Assessment and Progression Regulations	https://www.tcd.ie/media/tcd/calendar/undergraduate-studies/complete-part-II.pdf
Academic Awards	https://www.tcd.ie/academic-affairs/academic-regulations/

Item	Reference/Source
Equality, Diversity and Inclusion	https://www.tcd.ie/equality/
Prizes, medals, and other scholarships	https://www.tcd.ie/media/tcd/calendar/undergraduate-studies/prizes-and-other-awards.pdf
Teaching and Learning Study Abroad	https://www.tcd.ie/global/mobility/study-abroad/
Marking Scales	https://www.tcd.ie/media/tcd/science/pdfs/Trinity-Science-Guidelines-on-Marking---TSPMC-2024.pdf
Framework of qualifications Trinity Pathways	https://www.qqi.ie/national-framework-of-qualifications Trinity PathwaysTrinity Courses
Capstone (UG Programmes)	https://www.tcd.ie/academic-affairs/academic-regulations/ug-module-sizes-and-capstone/
Careers Information & events	https://www.tcd.ie/Science/careers/ For further information refer to School/Discipline Handbooks.
Attendance Requirements	https://www.tcd.ie/media/tcd/calendar/undergraduate-studies/complete-part-II.pdf
Student Cases	https://www.tcd.ie/academicregistry/student-cases/
Student complaints procedures	https://www.tcd.ie/media/tcd/about/policies/pdfs/Student-Complaints-Procedure-21.07.22.pdf
General Examination Guidelines	Exam Guidelines - Academic Registry - Trinity College Dublin
Feedback and Evaluation	Student Evaluation andFeedback Procedure for the conduct ofFocus Groups
Academic Policies and Procedures	https://www.tcd.ie/teaching-learning/academic-policies/
Registration (UG only) – Academic Registry	https://www.tcd.ie/academicregistry/student-registration/
Student supports	https://www.tcd.ie/students/
STEM Schools and Disciplines	https://www.tcd.ie/structure/faculties-and-schools/#d.en.2024679
GradIreland Career advice, graduate jobs and internships	https://gradireland.com/