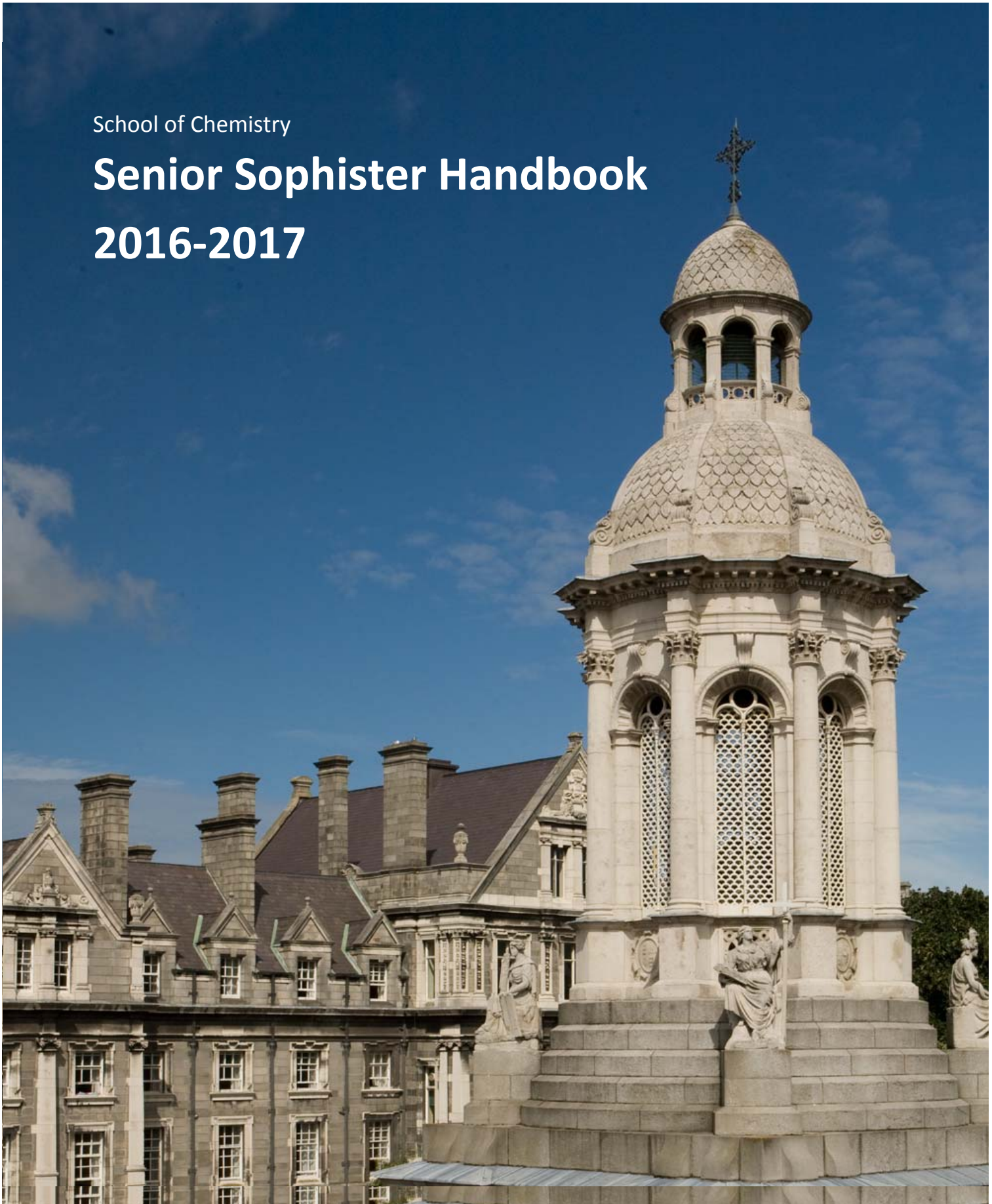
Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

School of Chemistry

Senior Sophister Handbook

2016-2017



Contents

1. General

Welcome to your final year of undergraduate study in Trinity. Prof. Thorri Gunnlaugsson (Senior Sophister Coordinator), Prof. Eoin Scanlan (Course Director of Medicinal Chemistry), Prof. Graeme Watson (Course Director of Chemistry with Molecular Modelling) and Profs. Paula Colavita and Mike Bridge (Associate Director and Director of Teaching and Learning (Undergraduate), respectively) will liaise with you during the year, will be available to discuss any problems that may arise, and to give you all the advice and help that they can. Other members of staff, of course, will also be happy to talk with you and to discuss any problems that may arise. The details of your course for the year are set out in this booklet, together with information about your final examinations.

2. Research Project

During Michaelmas term you will carry out a research project. For those working in the School of Chemistry, the research project will be carried out under the supervision of a member of staff and must be completed by the end of the semester. **Project work will begin in Trinity College on Monday 12 September 2016 and a compulsory safety workshop has been organized for Tuesday 20 September 2016.**

Normally, only students with sufficiently high marks in their Junior Sophister year (II-1 and higher) will have automatic permission to do their projects abroad. For students with a JS grade of II-2 or lower, whether or not they can take their project abroad will be reviewed on a case-by-case basis. ERASMUS and other projects carried out abroad start approximately two weeks earlier (approx. 29 August) than the start date in Trinity. Students who opt to do their project abroad will normally be allocated a "home mentor" – a member of the academic staff of the School who will act as a contact with the School while they are away, and will be available to give advice and assistance. Students who have queries or encounter problems should contact their home mentor as soon as possible. In the absence of a home mentor, students should e-mail the International Coordinator (Prof. Gun'ko), cc'ing the SS Year Coordinator (Prof. Gunnlaugsson) and the DTLUG (Prof. Bridge).

All students should submit their final project report electronically by **no later than 16:30 on Friday 2 December 2016**. In an attempt to create a fair evaluation method and to keep in line with College guidelines on plagiarism, the software "TurnItIn" will be used for electronic report submission. Details and guidance on how to use this software will be sent to you later in the year. Two hard copies of the identical report should be handed in to the School Office by **no later than 16:30 on Monday 5 December 2016**.

Discuss the structure and content of your report with your supervisor. **It must be typed using a font size of 12, and be double-spaced, bound, and no more than 30 pages in length.** In addition to this page limit, you can include limited numbers of spectra *etc*. as an appendix. Your laboratory notebooks, together with appendices of spectra *etc*. must also be handed in at this time. It is crucial that you allow sufficient time for the completion of your report. Your supervisor must receive a draft copy of your report **by Friday 18 November 2016**. Two formal meetings will be held with Senior Sophisters to discuss work progress and the writing of the report during the first semester (dates to be set). Those of you opting to carry out your project abroad will receive this information from your home mentor/SS Coordinator. The presentation slides given to students remaining in TCD will be uploaded to the SS course pages, e.g. http://chemistry.tcd.ie/undergraduate/chemistry/ss.

Project Assessment: The outlined assessment structure will apply to all students, both those doing projects in TCD and those doing projects abroad. Your project work will be assessed by three people (equal weighting), one of whom will be your supervisor. The supervisor will submit a written report on the work conducted during the project. The other two assessors will assess the project report and conduct a formal assessment involving a 10-minute presentation by the student followed by a question & answer session in which the work and underlying theoretical concepts will be discussed. These oral examinations will be scheduled between **Monday 12 December and Friday 16 December 2016.** Your supervisor will have no role in these oral examinations.

If there are significant mark discrepancies between the project assessors, the Director of Teaching and Learning, Prof. Bridge, may appoint adjudicative assessors to ensure a balanced and fair evaluation of the written report.

Marks for your project contribute 33% to your SS year mark and will be allotted on the basis of quality of content, presentation, effort made and performance during the oral examination.

For further queries about the research project, contact Prof. Thorri Gunnlaugsson (gunnlaut@tcd.ie) or the School of Chemistry Office, either in person or by e-mail to **sschem@tcd.ie**.

Summary

Approx. 29 August	Projects abroad start
12 September	Projects start at TCD
20 September	Safety workshop
18 November	**Draft of project report to supervisor**
2 December	Submission deadline for electronic copies of project reports
5 December	Submission deadline for hard copies of project reports to School Office
12-16 December	Project presentations and oral examinations

Please read this document carefully, paying particular attention to Appendices 1-4

Lectures and Seminars

All formal lectures will be given during the first 8 teaching weeks of Semester 2. You must attend all of those lectures listed as **core** modules together with **four topics** chosen from the list of options (if a Chemistry student) or **two topics** (if a CMM student). A provisional list of all modules is included in this booklet. A full list of available option topics will be circulated later in the year and you must notify the School Office electronically of the topics you will take by **2 December 2016** (this only applies to Moderatorships in Chemistry and Chemistry with Molecular Modelling). Medicinal Chemistry students have no choice (see Section 7).

All students are required to attend the School Research Seminars that are held during the year (Thursdays at 12 noon), and should also attend any research lectures organized by the Werner Chemical Society.

3. Moderatorship Examinations

It is likely that Moderatorship Examinations will be held during the first two weeks of the examination period but your examination timetable will be available through your student portal closer to the exam period.

All degree programmes will use the same set of external examiners. They review the exam questions and the structure of the exam papers before they are finalized. They also review exam scripts and project theses.

The external examiners will be in the School in early June 2017 (provisional dates: SS External Examiners Meeting 1/2 June 2017) and they may request a viva voce with any candidate. It is likely that all Senior Sophisters will be asked to attend on the morning of the interviews and those being called for a viva will be notified at that meeting.

If you are called for a viva you cannot conclude anything from this about your performance in the examinations.

You must ensure that you are available if you are called for interview by the External Examiners.

4. Moderatorship – Chemistry

The SS year has a total of 60 ECTS, broken down as follows:

Project mark:	20 credits	33%
Examinations:	40 credits	67%

The final degree mark will comprise 35% from your JS mark and 65% from your SS mark. In a change from previous years, there will be a separate 2-hour moderatorship examination for each module that is assessed by examination, with each paper being worth 8.3% of the overall mark for the SS year. There will also be a 3-hour chemistry problem-solving paper. The mark from this paper will be combined with the project mark, having a total worth of 41.3%

Core Lecture Modules (all worth 5 ECTS)

Module Code	Title
CH4104	**Advanced Inorganic Chemistry I** CH4015 Advanced Inorganic Materials Chemistry CH4016 Characterisation Techniques in Bioinorganic Chemistry
CH4105	**Advanced Inorganic Chemistry II** CH4004 Heavy transition metals CH4011 Advanced coordination chemistry
CH4106	**Advanced Physical Chemistry I** Photochemistry Advanced physical chemistry
CH4107	**Advanced Physical Chemistry II** CH4007 Quantum chemistry CH4009 Solid state
CH4112	**Advanced Organic Transformations I** Advanced Organic Transformations
CH4113	**Advanced Organic Transformations II** Retrosynthesis Asymmetric Synthesis

CH4108 Option Topics

You must choose **four** topics (each credited as 1.25 units) from the list given below*, and **you must notify the School Office by email to sschem@tcd.ie of your choice by 2 December 2016.** More information will be made available during the semester. Please note that option topics that have been requested by only a few students may not be offered. Students interested in Medicinal Chemistry will find courses CH4031–CH4036 especially appropriate.

CH4022 **Matter transport in solids** (JC). Ionic conductance and diffusion processes in solids considered from first principles; applications include solid state reactions, including corrosion of metals and alloys, and fast ion conductors and their uses in advanced battery systems and chemical sensors.

CH4023 **Quantum chemistry** (DAMB). Quantum operators; perturbation theory and applications (Stark effect); beyond the Hartree-Fock limit; vibrations in solids (phonons).

CH4024 **Heterogeneous catalysis** (GWW). The topic will examine the basic principles of catalyst and catalyst design, including measures of catalyst activity. Examples of real-world catalysts will be given, including the use of zeolites for acid-catalysed reactions within the petroleum industry, the design and performance of car-exhaust catalysts, and hydro-desulfurisation catalysts and their link to environmental legislation.

CH4025 **Supramolecular chemistry** (TG). Host–guest chemistry and molecular recognition, including relevance to biological processes and 'molecular engineering'. Self-assembly and anion sensing.

CH4027 **Topics in structural chemistry** (YG). A brief review of the preparation, structural chemistry and physico-chemical properties of (i) molecular crystals and (ii) copper oxide superconductors, emphasising the interplay between composition, structure and properties.

CH4030 **Statistical thermodynamics** (MEB). The electronic partition function of atomic H. Application of statistical mechanics to a number of problems in adsorption onto solid surfaces – the use of approximations to examine these problems. Statistics of 2D interacting systems – Bragg-Williams and Quasi-chemical approximations. Monte-Carlo methods.

CH4031 **Organic synthetic methods II** (JMS). This course is concerned with the mode of action and the synthesis of the microtubule active anti-cancer agents Taxol® and Epothilone.

CH4034 **DNA structure and drug—DNA complexes** (JMK). Spectroscopic tools for studying nucleic acids; structure of DNA (A, B and Z); covalent and non-covalent binding to DNA; relevance to drug design.

CH4036 **Chemical biology** (MOS). Introduction; NADH stereoselective reductions in nature; amination – alkaloid biosynthesis; acetyl CoA (fatty acid biosynthesis); shikimic acid pathway; steroid biosynthesis; biotransformations, an important tool in modern organic synthesis.

CH4037 **Electrochemical biosensors** (MEGL). The physical principles underlying electrochemical sensors. A survey of surface-immobilized redox-enzyme-based biosensor devices using

electrochemical transduction. Strategies for enzyme wiring. Self-assembled monolayer-based biosensors.

CH4041 **Material synthesis using chemical vapour deposition** (GD). The aim of this module is to provide students with an introduction to the increasingly important technique of chemical vapour deposition (CVD). This method has extensive applications in both industrial processes and academic research, and is used to deposit thin films of various substances. Also, CVD has led to the synthesis of novel materials such as nanowires and nanotubes. The topic will cover the basic principles of CVD, its use as the impetus for surface and gas phase reactions, and the various technological considerations relevant to the development of the technique.

CH4063 **Introduction to static and dynamic atomistic simulation** (DMacD/JC). An introduction to a simple yet powerful method for solving the many particle equations of motion for molecular systems; applications in chemistry.

CH4080 **Molecular informatics** (DMacD)

"If you want to understand life, don't think about throbbing gels and oozes, think about information technology"; Richard Dawkins, in:The Blind Watchmaker, 1986.

The interface of the molecular and computational sciences has traditionally been concerned with the application of computers to solve problems, or calculate properties of interest, in physics, chemistry and biology. This topic reverses the paradigm and explores how molecular processes may be employed to perform calculations, and even how some biochemical processes may formally correspond to computational processes.

Some aspects of molecular technology, both synthetic and natural, which relate to computing will be considered, including: (i) Computing with molecules (including Adleman's demonstration of computing with DNA); (ii) Error-coding in molecular recognition (or how concepts employed in error detection in digital TV are also found in biology) and (iii) Molecular Logic Gates - chemical systems that mimic the conventional logic gates underlying electronic circuitry.

CH4119 **Chemistry Research and Data Analysis (25 ECTS)**

This module combines the mark from the problem-solving paper with the mark obtained for your research project. The problem-solving element is based on self-directed reading to review and attain a mature understanding of the fundamental chemistry topics introduced over the entire period of the Moderatorship programme.

CHEMISTRY SEMINARS: 12 o'clock on Thursdays in the CHLLT
ALL SS STUDENTS HAVE TO ATTEND THESE

*Other or additional topics may be offered at a later date.

5. Moderatorship – Medicinal Chemistry

The SS year has a total of 60 ECTS, broken down as follows:

Project mark:	20 credits	33%
Examinations:	40 credits	67%

The final degree mark will comprise 35% from your JS mark and 65% from your SS mark. In a change from previous years, there will be a separate 2-hour moderatorship examination for each module that is assessed by examination, with each paper being worth 8.3% of the overall mark for the SS year. There will also be a 3-hour medicinal-chemistry problem-solving paper. The mark from this paper will be combined with the project mark, having a total worth of 41.3%

Core Lecture Modules (all 5 ECTS)

Module	Title
CH4112	**Advanced Organic Transformations I**
	Advanced Organic Transformations
CH4113	**Advanced Organic Transformations II**
	Retrosynthesis
	Asymmetric Synthesis
CH4401	**Advanced Medicinal Chemistry I**
	CH4050 The central nervous system
CH4402	**Advanced Medicinal Chemistry II**
	CH4052 Computational medicinal chemistry
	CH4056 Analytical methods
CH4403	**Advanced Medicinal Chemistry III**
	CH4053 Site-specific drug delivery
	CH4055 Combinatorial chemistry & screening methods
CH4404	**Advanced Medicinal Chemistry IV**
	CH4051 The cardiovascular system
	CH4054 Case studies

Short Topics Module

CH4405 Advanced Medicinal Chemistry V (5 ECTS)

These topics have been selected from the option topics for TR071 students as being particularly appropriate to Medicinal Chemists:

CH4025 **Supramolecular chemistry** (TG). Host–guest chemistry and molecular recognition, including relevance to biological processes and 'molecular engineering'. Self-assembly and anion sensing.

CH4031 **Organic synthetic methods II** (JMS). This course is concerned with the mode of action and the synthesis of the microtubule active anti-cancer agents Taxol® and Epothilone.

CH4034 **DNA structure and drug—DNA complexes** (JMK). Spectroscopic tools for studying nucleic acids; structure of DNA (A, B and Z); covalent and non-covalent binding to DNA; relevance to drug design.

CH4036 **Chemical biology** (MOS). Introduction; NADH stereoselective reductions in nature; amination – alkaloid biosynthesis; acetyl CoA (fatty acid biosynthesis); shikimic acid pathway; steroid biosynthesis; biotransformations, an important tool in modern organic synthesis.

CH4409 **MedChem Research and Data Analysis (25 ECTS)**

This module combines the mark from the problem-solving paper with the mark obtained for your research project. The problem-solving element is based on self-directed reading to review and attain a mature understanding of the fundamental chemistry topics introduced over the entire period of the Moderatorship programme.

CHEMISTRY SEMINARS 12 o'clock on Thursdays in the CHLLT;
ALL SS STUDENTS HAVE TO ATTEND THESE

6. Moderatorship – Chemistry with Molecular Modelling

The SS year has a total of 60 ECTS, broken down as follows:

Project mark:	20 credits	33%
Examinations:	40 credits	67%

The final degree mark will comprise 35% from your JS mark and 65% from your SS mark. In a change from previous years, there will be a separate 2-hour moderatorship examination for each module that is assessed by examination, with each paper being worth 8.3% of the overall mark for the SS year. There will also be a 3-hour CMM problem-solving paper. The mark from this paper will be combined with the project mark, having a total worth of 41.3%.

Core Lecture Modules (5 ECTS)

ModuleTitle

CH4105 **Advanced Inorganic Chemistry II**
CH4004 Heavy transition metals
CH4011 Advanced coordination chemistry

CH4106 **Advanced Physical Chemistry I**
Photochemistry
Advanced physical chemistry

CH4107 **Advanced Physical Chemistry II**
CH4007 Quantum chemistry
CH4009 Solid state

CH4112 **Advanced Organic Transformations I**
Advanced Organic Transformations

CH4702 **Advanced Molecular Modelling II**
CH4072 Advanced molecular quantum chemistry
CH4074 Computational drug design

CH4703 **Advanced Molecular Modelling III**
CH4071 High performance computing
CH4073 Advanced molecular dynamics

CH4701 **Advanced Molecular Modelling I**
You must take two topics (CH4023, Quantum chemistry and CH4030, Statistical thermodynamics) and choose any **two** other topics (each credited as 1.25 units) from the list given below*. Y**ou must notify the School office by email to sschem@tcd.ie of your choice by 2 December 2016.** More information will be made available during the semester. Please note that option topics that have been requested by only a few students may not be offered. Students interested in Medicinal Chemistry will find courses CH4031-CH4036 especially appropriate.

CH4022 **Matter transport in solids** (JC). Ionic conductance and diffusion processes in solids considered from first principles; applications include solid state reactions, including corrosion of metals and alloys, and fast ion conductors and their uses in advanced battery systems and chemical sensors.

CH4023 **Quantum chemistry** (DAMB). Quantum operators; perturbation theory and applications (Stark effect); beyond the Hartree-Fock limit; vibrations in solids (phonons).

CH4024 **Heterogeneous catalysis** (GWW). The topic will examine the basic principles of catalyst and catalyst design, including measures of catalyst activity. Examples of real-world catalysts will be given, including the use of zeolites for acid-catalysed reactions within the petroleum industry, the design and performance of car-exhaust catalysts, and hydro-desulfurisation catalysts and their link to environmental legislation.

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CH4041 **Material synthesis using chemical vapour deposition** (GD). The aim of this module is to provide students with an introduction to the increasingly important technique of chemical vapour deposition (CVD). This method has extensive applications in both industrial processes and academic research, and is used to deposit thin films of various substances. Also, CVD has led to the synthesis of novel materials such as nanowires and nanotubes. The topic will cover the basic principles of CVD, its use as the impetus for surface and gas phase reactions, and the various technological considerations relevant to the development of the technique.

CH4080 **Molecular informatics** (DMacD)

"If you want to understand life, don't think about throbbing gels and oozes, think about information technology"; Richard Dawkins, in:The Blind Watchmaker, 1986.

The interface of the molecular and computational sciences has traditionally been concerned with the application of computers to solve problems, or calculate properties of interest, in physics, chemistry and biology. This topic reverses the paradigm and explores how molecular processes may be employed to perform calculations, and even how some biochemical processes may formally correspond to computational processes.

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CH4709 **CMM Research and Data Analysis (25 ECTS)**

This module combines the mark from the problem-solving paper with the mark obtained for your research project. The problem-solving element is based on self-directed reading to review and attain a mature understanding of the fundamental chemistry topics introduced over the entire period of the Moderatorship programme.

CHEMISTRY SEMINARS 12 o'clock on Thursdays in the CHLLT
ALL SS STUDENTS HAVE TO ATTEND THESE

* Other or additional option topics may be offered at a later date.

Provisional Examination Structure 2016/2017

As the School is moving to a separate exam for each module, the format of exam papers will be amended in 2016/17. Sample papers will be circulated later in the year and you will be given details of the format of each paper in due course.

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EUROPEAN SOCIAL FUND

AN ROINN OIDEACHAIS AGUS SCILEANNA | DEPARTMENT OF EDUCATION AND SKILLS

HEA
Higher Education Authority
An tÚdarás um Ard-Oideachas

Investing in your Future

These courses are funded by the Irish government under the National Development Plan 2007-2013 and aided by the European Social Fund (ESF) under the Human Capital Investment Operational Programme.

Appendix 1: Regulations regarding passing exams by compensation and aggregation to each year

<u>This extract is important for all students:</u>

Faculty of Engineering, Mathematics and Science

Annual examinations

18 Students must sit their annual examinations, which are held in the Trinity term, and must complete all other assessment components, as required. Junior and Senior Freshman students who have failed in the annual examinations must take a supplemental examination at the beginning of Michaelmas term. An expanded form of the following regulations giving further details of compensation requirements and other matters is available on request at the Science Course Office.

19 To gain a pass in each of the Freshman years, students must achieve an overall credit-weighted average mark of at least 40 per cent (grade III) and accumulate 60 credits by *(a)* passing all modules outright or *(b)* passing by compensation. To pass by compensation students must either pass outright modules totalling 55 credits and achieve a minimum mark of 30 per cent in the failed module, or pass outright modules totalling 50 credits and achieve a minimum mark of 35 per cent in any failed module(s). Junior and Senior Freshman students who do not pass at the annual examination session, either outright or by compensation, must complete supplemental assessments in all modules in which they did not achieve a mark of at least 40 per cent (grade III) by taking such assessment components, as required, during the supplemental examination period at the beginning of Michaelmas term.

Students who do not qualify to rise with their year and whose overall average mark is 35 per cent or higher, either in the annual or the supplemental examination can, as provided under general College regulations, repeat their year in order to improve their performance.

20 To pass the Sophister years, students must achieve an overall credit-weighted average mark of at least 40 per cent (grade III) and accumulate 60 credits either by *(a)* passing all modules outright or *(b)* passing by compensation or aggregation. Whether passing by compensation or aggregation students must pass outright modules totalling at least 40 credits in addition to achieving a 40 per cent (grade III) credit-weighted average, or higher, for the year. Compensation will be permitted in modules totalling a maximum of 20 credits provided that a minimum mark of 30 per cent has been attained in any failed module(s). Further, passing by aggregation will be permitted if a mark of less than 30 per cent has been achieved in a module or modules carrying up to a maximum of 10 credits provided that a mark of at least 30 per cent has been achieved in any remaining failed module(s). The designation of certain modules, or module components, as non-compensatable may reduce the level of compensation permitted in either Sophister year. There are no supplemental examinations in the Sophister years.

To qualify to proceed to the Senior Sophister year, students sitting the Junior Sophister examination must achieve an overall credit-weighted average mark of 45 per cent or higher in the overall examination.

Students who achieve an overall mark of 35 per cent or higher, but who do not qualify to proceed to moderatorship, can, as provided under general College regulations, repeat the Junior Sophister year in order to improve their performance.

21 Students whose overall mark is 34 per cent or lower in their annual examinations and supplemental examinations (if applicable) are not permitted to repeat their year and must withdraw from science.

Ordinary degree of B.A.

22 Students who pass the Junior Sophister annual examinations may have the ordinary B.A. degree conferred if they do not choose, or are not allowed, to proceed to the Senior Sophister year. Except by special permission of the University Council, on the recommendation of the Science Course Director, the ordinary degree of B.A. may be conferred only on candidates who have spent at least three years in the University.

Moderatorship examination

23 The Junior and Senior Sophister examinations constitute part I and part II of the moderatorship examination. There are no supplemental examinations. Students unavoidably absent from the moderatorship examination in their final year may apply to the Senior Lecturer to

M34 Calendar 2013-14

Appendix 2: Description of the European Credit Transfer System (ECTS)

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**. The Trinity academic year is 40 weeks from the start of Michaelmas Term to the end of the annual examination period 1 ECTS 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 and assessments.

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

Appendix 3: College regulation regarding plagiarism – extract from the College Calendar 2015/16

PLAGIARISM

Simply put, plagiarism is the presentation of the work of someone as your own - the university takes plagiarism offences extremely seriously. Information on what constitutes plagiarism and how the university deals with it can be found in the central repository on plagiarism:

http://tcd-ie.libguides.com/plagiarism

All students must complete our Ready Steady Write plagiarism tutorial (http:// http://tcd-ie.libguides.com/plagiarism/ready-steady-write) and sign a declaration when submitting course work, whether in hard or soft copy or via Blackboard, confirming that you understand what plagiarism is and have completed the tutorial.

COLLEGE REGULATION REGARDING PLAGIARISM:
EXTRACT FROM THE COLLEGE CALENDAR 2016/17

82 General

It is clearly understood that all members of the academic community use and build on the work and ideas of others. It is commonly accepted also, however, that we build on the work and ideas of others in an open and explicit manner, and with due acknowledgement.

Plagiarism is the act of presenting the work or ideas of others as one's own, without due acknowledgement.

Plagiarism can arise from deliberate actions and also through careless thinking and/or methodology. The offence lies not in the attitude or intention of the perpetrator, but in the action and in its consequences.

It is the responsibility of the author of any work to ensure that he/she does not commit plagiarism.

Plagiarism is considered to be academically fraudulent, and an offence against academic integrity that is subject to the disciplinary procedures of the University.

83 Examples of Plagiarism

Plagiarism can arise from actions such as:

(a) copying another student's work;

(b) enlisting another person or persons to complete an assignment on the student's behalf;

(c) procuring, whether with payment or otherwise, the work or ideas of another;

(d) quoting directly, without acknowledgement, from books, articles or other sources, either in printed, recorded or electronic format, including websites and social media;

(e) paraphrasing, without acknowledgement, the writings of other authors.

Examples (d) and (e) in particular can arise through careless thinking and/or methodology where students:

(i) fail to distinguish between their own ideas and those of others;

(ii) fail to take proper notes during preliminary research and therefore lose track of the sources from which the notes were drawn;

(iii) fail to distinguish between information which needs no acknowledgement because it is firmly in the public domain, and information which might be widely known, but which nevertheless requires some sort of acknowledgement;

(iv) come across a distinctive methodology or idea and fail to record its source.

All the above serve only as examples and are not exhaustive.

84 Plagiarism in the context of group work

Students should normally submit work done in co-operation with other students only when it is done with the full knowledge and permission of the lecturer concerned. Without this, submitting work which is the product of collusion with other students may be considered to be plagiarism.

When work is submitted as the result of a group project, it is the responsibility of all students in the group to ensure, so far as is possible, that no work submitted by the group is plagiarised.

85 Self plagiarism

No work can normally be submitted for more than one assessment for credit. Resubmitting the same work for more than one assessment for credit is normally considered self-plagiarism.

86 Avoiding plagiarism

Students should ensure the integrity of their work by seeking advice from their lecturers, tutor or supervisor on avoiding plagiarism. All schools and departments must include, in their handbooks or other literature given to students, guidelines on the appropriate methodology for the kind of work that students will be expected to undertake. In addition, a general set of guidelines for students on avoiding plagiarism is available on http://tcd-ie.libguides.com/plagiarism.

87 If plagiarism as referred to in §82 above is suspected, in the first instance, the Director of Teaching and Learning (Undergraduate), or their designate, will write to the student, and the student's tutor advising them of the concerns raised. The student and tutor (as an alternative to the tutor, students may nominate a representative from the Students' Union) will be invited to attend an informal meeting with the Director of Teaching and Learning (Undergraduate), or their designate, and the lecturer concerned, in order to put their suspicions to the student and give the student the opportunity to respond. The student will be requested to respond in writing stating his/her agreement to attend such a meeting and confirming on which of the suggested dates and times it will be possible for them to attend. If the student does not in this manner agree to attend such a meeting, the Director of Teaching and Learning (Undergraduate), or designate, may refer the case directly to the Junior Dean, who will interview the student and may implement the procedures as referred to under conduct and college regulations §2.

88 If the Director of Teaching and Learning (Undergraduate), or designate, forms the view that plagiarism has taken place, he/she must decide if the offence can be dealt with under the summary procedure set out below. In order for this summary procedure to be followed, all parties attending the informal meeting as noted in §87 above must state their agreement in writing to the Director of Teaching and Learning (Undergraduate), or designate. If the facts of the case are in dispute, or if the Director of Teaching and Learning (Undergraduate), or designate, feels that the penalties

provided for under the summary procedure below are inappropriate given the circumstances of the case, he/she will refer the case directly to the Junior Dean, who will interview the student and may implement the procedures as referred to under conduct and college regulations §2.

89 If the offence can be dealt with under the summary procedure, the Director of Teaching and Learning (Undergraduate), or designate, will recommend one of the following penalties:

(a) Level 1: Student receives an informal verbal warning. The piece of work in question is inadmissible. The student is required to rephrase and correctly reference all plagiarised elements. Other content should not be altered. The resubmitted work will be assessed and marked without penalty;

(b) Level 2: Student receives a formal written warning. The piece of work in question is inadmissable. The student is required to rephrase and correctly reference all plagiarised elements. Other content should not be altered. The resubmitted work will receive a reduced or capped mark depending on the seriousness/extent of plagiarism;

(c) Level 3: Student receives a formal written warning. The piece of work in question is inadmissible. There is no opportunity for resubmission.

90 Provided that the appropriate procedure has been followed and all parties in §87 above are in agreement with the proposed penalty, the Director of Teaching and Learning (Undergraduate) should in the case of a Level 1 offence, inform the course director and where appropriate the course office. In the case of a Level 2 or Level 3 offence, the Senior Lecturer must be notified and requested to approve the recommended penalty. The Senior Lecturer will inform the Junior Dean accordingly. The Junior Dean may nevertheless implement the procedures as referred to under conduct and college regulations §2.

91 If the case cannot normally be dealt with under the summary procedures, it is deemed to be a Level 4 offence and will be referred directly to the Junior Dean. Nothing provided for under the summary procedure diminishes or prejudices the disciplinary powers of the Junior Dean under the 2010 Consolidated Statutes.

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[1]The Director Of Teaching And Learning (Undergraduate) may also attend the meeting as appropriate. As an alternative to their tutor, students may nominate a representative from the Students' Union to accompany them to the meeting.

Appendix 4: Scheme for the marking of examination answers in Sophister years

Mark Range	Criteria
90-100	IDEAL ANSWER; showing insight and originality and wide knowledge. Logical, accurate and concise presentation. Evidence of reading and thought beyond course content. Contains particularly apt examples. Links materials from lectures, practicals and seminars where appropriate.
80-89	OUTSTANDING ANSWER; falls short of the 'ideal' answer either on aspects of presentation or on evidence of reading and thought beyond the course. Examples, layout and details are all sound.
70-79	MAINLY OUTSTANDING ANSWER; falls short on presentation and reading or thought beyond the course, but retains insight and originality typical of first class work.
65-69	VERY COMPREHENSIVE ANSWER; good understanding of concepts supported by broad knowledge of subject. Notable for synthesis of information rather than originality. Sometimes with evidence of outside reading. Mostly accurate and logical with appropriate examples. Occasionally a lapse in detail.
60-64	LESS COMPREHENSIVE ANSWER; mostly confined to good recall of coursework. Some synthesis of information or ideas. Accurate and logical within a limited scope. Some lapses in detail tolerated.
55-59	SOUND BUT INCOMPLETE ANSWER; based on coursework alone but suffers from a significant omission, error or misunderstanding. Usually lacks synthesis of information or ideas. Mainly logical and accurate within its limited scope and with lapses in detail.
50-54	INCOMPLETE ANSWER; suffers from significant omissions, errors and misunderstandings, but still with understanding of main concepts and showing sound knowledge. Several lapses in detail.
45-49	WEAK ANSWER; limited understanding and knowledge of subject. Serious omissions, errors and misunderstandings, so that answer is no more than adequate.
40-44	VERY WEAK ANSWER; a poor answer, lacking substance but giving some relevant information. Information given may not be in context or well explained, but will contain passages and words, which indicate a marginally adequate understanding.
35-39	MARGINAL FAIL; inadequate answer, with no substance or understanding, but with a vague knowledge relevant to the question.
30-34	CLEAR FAILURE; some attempt made to write something relevant to the question. Errors serious but not absurd. Could also be a sound answer to the misinterpretation of a question.
0-29	UTTER FAILURE; with little hint of knowledge. Errors serious and absurd. Could also be a trivial response to the misinterpretation of a question.

Appendix 4: Guidelines on Marking for Project/Dissertation Assessment

Mark Range	Criteria
85-100	Exceptional project report showing broad understanding of the project area and excellent knowledge of the relevant literature. Exemplary presentation and analysis of results, logical organisation and ability to critically evaluate and discuss results coupled with insight
70-84	A very good project report showing evidence of wide reading, with clear presentation and thorough analysis or results and an ability to critically evaluate and discuss research findings. Clear indication of some insight and originality. A very competent and well presented report overall but falling short of excellence in each and every aspect.
60-69	A good project report which shows a reasonably good understanding of the problem and some knowledge of the relevant literature. Mostly sound presentation and analysis of results but with occasional lapses. Some relevant interpretation and critical evaluation of results, though somewhat limited in scope. General standard of presentation and organisation
50-59	A moderately good project report which shows some understanding of the problem but limited knowledge and appreciation of the relevant literature. Presentation, analysis and interpretation of the results at a basic level and showing little or no originality or critical evaluation. Insufficient
40-49	A weak project report showing only limited understanding of the problem and superficial knowledge of the relevant literature. Results presented in a confused or inappropriate manner and incomplete or erroneous analysis. Discussion and interpretation of result severely limited, including some basic misapprehensions, and lacking any originality or critical
20-39	An unsatisfactory project containing substantial errors and omissions. Very limited understanding, or in some cases misunderstanding of the problem and very restricted and superficial appreciation of the relevant literature. Very poor, confused and, in some cases, incomplete presentation of the results and limited analysis of the results including some serious errors. Severely limited discussion and interpretation of the results revealing little or no ability to relate experimental results to the existing literature. Very poor overall standard of presentation
0-19	A very poor project report containing every conceivable error and fault. Showing virtually no real understanding or appreciation of the problem and of the literature pertaining to it. Chaotic presentation of results, and in some cases incompletely presented and virtually non-existent or inappropriate or plainly wrong analysis. Discussion and interpretation seriously confused or wholly erroneous revealing basic misapprehensions.

Schedule of Grades	
I	=70%+
II-1	= 60-69%
II-2	= 50-59%
III	= 40-49%
F-1	= 30-39%
F-2	= 0-29%
U.G.	= Ungraded