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

School of Computer Science and Statistics

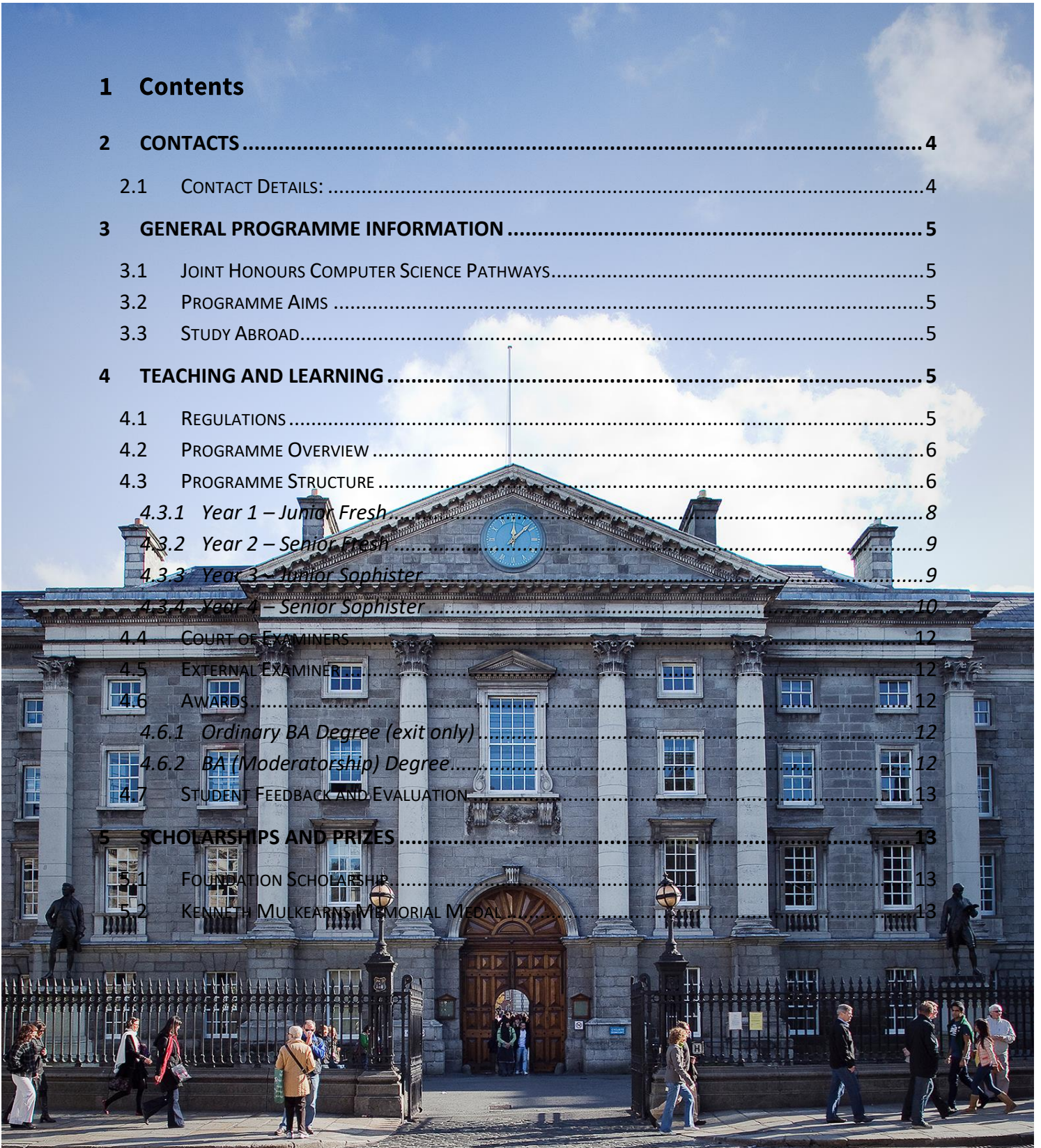# Joint Honours Computer Science Handbook 2021–2022

1 Contents

Welcome

This handbook contains information and regulations for Joint Honours Computer Science students.

It provides a guide to what is expected of you on this programme. It should be read in conjunction with the SCSS undergraduate handbook, which covers information common to all undergraduates on SCSS programmes, and the handbook for the other subject in your programme.

We are confident that you will find the Computer Science Joint Honours programme challenging and demanding and we hope that you will find your studies at Trinity College Dublin both stimulating and rewarding. Our programme has several features which we believe will contribute to your studies being an effective and enjoyable period of personal and academic development.

If you are a new student to university, it is strongly recommended that you meet your tutor as he or she is your advocate in College and can also provide you with support should you have any difficulties.

We wish you every success in the coming year.

Lucy Hederman

(Joint Honours Computer Science Course Director)

Notes

Information provided in this handbook is believed to be accurate at the time of preparation. Please note that, in the event of any conflict or inconsistency between the General Regulations published in the University Calendar and information contained in course handbooks, the provisions of the General Regulations will prevail. The University Calendar is available at http://www.tcd.ie/calendar/.

This handbook is available from the School of Computer Science and Statistics website. The handbook is subject to change.

2 Contacts

2.1 Contact Details:

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Course Administrator:
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The School of Computer Science Reception
The School reception office is beside Room G.8 in the O'Reilly Institute (ORI).

Opening hours: During lecture terms:
9:15am-11:00am,
11:30am-1:00pm and
2:00pm-4:30pm.

Tel:	(01) 896 1765,
E-mail:	enquiries@scss.tcd.ie,
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Address:	School of Computer Science and Statistics,
	O'Reilly Institute,
	Trinity College Dublin,
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3 General Programme Information

The Joint Honours Computer Science (JH CS) programme is part of the Trinity Joint Honours (TJH) course, which is a four-year course leading to an honour's degree. Information about the TJH course can be found at https://www.tcd.ie/tjh.

Computer Science can be studied as a Joint Honours subject with Business, Geography, or Linguistics. More details about the JH CS programme, and updates to this handbook, can be found at SCSS Joint Honours CS pages

3.1 Joint Honours Computer Science Pathways

Depending on student choices made during the programme students may exit with a Joint Honours award, with a Major in Computer Science and Minor in the other subject, or with a Major in the other subject and Minor in Computer Science. The only possible Single Honours exit from combinations with Computer Science is Single Honours in Geography.

3.2 Programme Aims

The aim of the programme is to equip its graduates with the knowledge, skills, and experience to be able to:
1. Develop and apply computer systems from a broad base of knowledge in mathematics, computer science and human factors.
2. Identify and formulate advanced technical challenges and demonstrate judgement to design appropriate computer science solutions.
3. Design systems, components, or processes to meet specified functional objectives and to measure and analyse performance against these objectives.
4. Understand and express the role of computer science in the community including the need for high standards of ethical behaviour and professional responsibility.
5. Work effectively, independently and within multidisciplinary teams, and act as a mentor in team settings and engage in lifelong learning.
6. Communicate effectively both professionally with other computing professionals and with the wider community.
7. Participate in contemporary research activity as appropriate and demonstrate the knowledge and skills needed to undertake independent research.

3.3 Study Abroad

See the SCSS Undergraduate handbook for details on study abroad. Note that to study abroad Computer Science Joint Honours students must achieve an overall II.1 standard in the Junior Fresh year of the Computer Science subject but will otherwise be subject to overall College study abroad requirements and any additional requirements specified for the other subject. Note that Joint Honours students will need to consult with and get approval from both departments/schools for their proposed studies abroad.

4 Teaching and Learning

4.1 Regulations

The **College Calendar**, which is published annually at the beginning of each academic year, online at https://www.tcd.ie/calendar/undergraduate-studies/

contains additional **General Regulations** that apply to all degree programmes in the University. The regulations governing TJH students taking Computer Science are as for all TJH students, also found in the College Calendar. For modules delivered by the School of Computer Science and Statistics, additional rules apply as laid out in the SCSS UG Handbook. For example, the SCSS UG handbook details regulations about attendance, late submission and non-submission of coursework, plagiarism, and absence from examinations. Read the relevant sections now and whenever you are in any doubt about the rules. You are expected to be aware of the various regulations; ignorance is not a valid reason for failure to comply. Don't depend on what your classmates tell you – read the rules for yourself.

If any discrepancy exists between the regulations in the SCSS UG handbook, this document and the College Calendar, the College Calendar takes precedence.

4.2 Programme Overview

The Joint Honours Computer Science programme provides students with a solid foundation in Computer Science. The core programme ensures that graduates have the knowledge, skills, and experience to design and develop computer software, individually and as part of a team. Those majoring in Computer Science cover more advanced topics and have an opportunity to choose subjects that interest them.

4.3 Programme Structure

Trinity Joint Honours courses follow the structure depicted at https://www.tcd.ie/tjh/prospectivestudents/pathways/. Students may exit with a Joint Honours award, with a Major in Computer Science and Minor in the other subject, or with a Major in the other subject and Minor in Computer Science. The only possible Single Honours exit from combinations with Computer Science is Single Honours in Geography. Those entering Joint Honours Computer Science do not have the option to exit with Single Honours in Computer Science. Furthermore, it is not possible to exit from Computer Science and Business with Single Honours in Business; nor is it possible to exit with Single Honours in Linguistics. Available pathways are subject to change and may be dependent on capacity.

In each academic year full-time undergraduate students at Trinity College must complete 60 ECTS credits. For Joint Honours students these credits are spread across Computer Science, the other subject, and optionally Trinity Electives or Open Modules in second year.

Overview

In Junior Fresh, students take 30 mandatory credits in Computer Science and 30 credits in their second subject. Students take a module in statistics (STU11002 Statistical Analysis I) unless their other subject includes an equivalent study of statistics in Year 1, in which case they will take CSU11022 (Introduction to Computing II) instead.

In Year 2, students may take:

  a) 40 credits in Computer Science and 20 credits in their second subject
  b) 20 credits in Computer Science and 40 credits in their second subject

c) 20 credits in Computer Science, 20 credits in their second subject and 20 credits of Open Modules and Trinity Electives

In Year 3, students choose to study for:

(a) Major degree in Computer Science with a Minor in the second subject
(b) Joint Honours degree in Computer Science with the second subject
(c) Minor degree in Computer Science with a Major in the second subject

Students studying for a Joint Honours award will take:

- 30 credits in both Computer Science and the second subject in Year 3
- 20 credits in both Computer Science and the second subject in Year 4
- 20 credit capstone project in either Computer Science or the second subject in Year 4 (or a multi-disciplinary capstone project in both subjects)

Students studying for a Major in Computer Science may either:

- study both Computer Science and their second, Minor subject over Years 3 and 4. (This is known as Option A.) In this case, students will take:
  - o 40 credits in Computer Science and 20 credits in the Minor subject in Year 3
  - o 20 credits in Computer Science and 20 credits in the Minor subject in Year 4
  - o 20 credit Computer Science capstone project in Year 4
- complete the Minor subject in Year 3 and study only the Major subject in Year 4. (This is known as Option B.) In this case, students will take:
  - o 30 credits in Computer Science and 30 credits in the Minor subject in Year 3
  - o 40 credits in Computer Science in Year 4
  - o 20 credit Computer Science capstone project in Year 4

Students studying for a Minor in Computer Science may either:

- continue to study Computer Science in Year 3 and Year 4, taking 20 credits in Computer Science in each year (Option A).
- complete their study of Computer Science by taking 30 credits in Year 3 and studying only their Major subject in Year 4 (Option B).

Computer Science modules in each year are shown below. Brief descriptions of the programme modules are provided on the relevant year page of the course website https://teaching.scss.tcd.ie/joint-honours-computer-science/. Full details, including learning outcomes, pre-requisites, book recommendations and important evaluation and assessment criteria are available through module links on those pages, or at http://my.tcd.ie.
During the Trinity term of each year students will be invited to register their preferences for the following year of their course, including Trinity Electives and Open Modules. Students will be advised of how to do this, and of where they will find relevant module information several

weeks before they are invited to register. Timetabling may restrict the availability of modules to individual students.

4.3.1 Year 1 – Junior Fresh

In year 1 (Junior Fresh) all JH CS students take the following mandatory modules in addition to what is required for their other subject:

Year 1	
Michaelmas Term	Hilary Term
Mathematics I CSU11001 (5 Credits)	SCSS ELECTIVE MODULE (5 credits)[*]
Introduction to Programming CSU11010 (10 credits)	
Introduction to Computing I CSU11021 (5 Credits)	Programming Project CSU11013 (5 Credits)
SCSS Elective Modules	
	Introduction to Computing II CSU11022 (5 Credits)
	Statistical Analysis I STU11002 (5 Credits)

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[*] This is not a student choice but depends on the other subject. Students must take STU11002 (Statistical Analysis I) unless their other subject includes an equivalent study of statistics in Year 1, in which case they will take CSU11022 (Introduction to Computing II) instead.

4.3.2 Year 2 – Senior Fresh

In Year 2, students may take:

a) 40 credits in Computer Science and 20 credits in their second subject
b) 20 credits in Computer Science and 40 credits in their second subject
c) 20 credits in Computer Science, 20 credits in their second subject and 20 credits of Open Modules and Trinity Electives

All modules are subject to change. Students must ensure that they have a balance of 30 ECTS credits for each semester.

Year 2	
Michaelmas Term	Hilary Term
20 credits (mandatory)	
Algorithms and Data Structures I CSU22011 (5 Credits)	Mathematics II CSU12002 (5 Credits)
Information Management I CSU22041 (5 Credits)	Software Engineering Group Project I CSU22013 (5 Credits)
+ 20 credits (for those taking 40 credits in Computer Science)	
Applied Statistics and Probability I STU22004 (5 Credits)	Algorithms and Data Structures II CSU22012 (5 Credits)
SCSS ELECTIVE MODULE (5 credits)	SCSS ELECTIVE MODULE (5 credits)
Open Modules	
SCSS Elective Modules	
Systems Programming CSU22014 (5 Credits) prerequisite: CSU11022	Concurrent Systems and Operating Systems CSU23016 (5 Credits) prerequisite: CSU22014 or CSU22061
Intermediate Programming CSU22061 (5 Credits)	Natural Language Processing CSU22062 (5 Credits) prerequisite: CSU22061

4.3.3 Year 3 – Junior Sophister

In third year, students will take 20, 30 or 40 ECTS in Computer Science depending on the path taken in second year, and the desired exit option. See Overview above.
All modules are subject to change. Students must ensure that they have a balance of 30 ECTS credits for each semester.

Year 3 Major or Joint Honours in Computer Science	
Michaelmas Term	Hilary Term
30 credits (Major and Joint Honours in Computer Science)	
Software Engineering CSU33012 (5 Credits)	Software Engineering Group Project II CSU33013 (5 Credits)
Computer Networks CSU33031 (5 Credits)	Information Management II CSU34041 (5 Credits)
SCSS ELECTIVE MODULE (5 credits)	SCSS ELECTIVE MODULE (5 credits)
+ 10 credits (Major in Computer Science only and continuing Minor subject in Year 4)	
SCSS ELECTIVE MODULE (5 credits)	SCSS ELECTIVE MODULE (5 credits)
SCSS Elective Modules	
Symbolic Programming CSU34011 (5 Credits)	Artificial Intelligence CSU33061 (5 Credits)
Functional Programming CSU34016 (5 Credits)	Advanced Computer Networks CSU33032 (5 Credits)
Computational Mathematics CSU33081 (5 Credits)	Compiler Design CSU33071 (5 Credits)

Year 3 Minor in Computer Science	
Michaelmas Term	Hilary Term
20 credits (mandatory)	
Software Engineering CSU33012 (5 Credits)	Software Engineering Group Project II CSU33013 (5 Credits)
Computer Networks CSU33031 (5 Credits)	Information Management II CSU34041 (5 Credits)
+ 10 credits (if completing Minor in Computer Science in Year 3)	
SCSS ELECTIVE MODULE (5 credits)	SCSS ELECTIVE MODULE (5 credits)
SCSS Elective Modules	
Symbolic Programming CSU34011 (5 Credits)	Artificial Intelligence CSU33061 (5 Credits)
Functional Programming CSU34016 (5 Credits)	Advanced Computer Networks CSU33032 (5 Credits)
Computational Mathematics CSU33081 (5 Credits)	Compiler Design CSU33071 (5 Credits)

4.3.4   Year 4 – Senior Sophister

In year 4, all students must complete a capstone project (or "final year project") worth 20 ECTS. For those wishing to exit with a Major in Computer Science the capstone must be in Computer Science. For the remaining 40 ECTS the balance between subjects depends on the path taken in previous years, and the desired exit option. See Overview section above.

For information about the Computer Science Final Year Project, CSU44099, visit https://projects.scss.tcd.ie/

All modules are subject to change. Students must ensure that they have a balance of 30 ECTS credits for each semester.

Year 4 Major or Joint Honours in Computer Science	
Operational From: 2022/2023	
Michaelmas Term	Hilary Term
20 credits	
ELECTIVE MODULES (20 credits)	
+ 20 credits (Major in Computer Science only, if Minor subject was completed in Year 3)	
ELECTIVE MODULES (20 credits)	
+ 20 credits (Major in Computer Science or Joint Honours in Computer Science taking Capstone in Computer Science)	
Final Year Project CSU44099 (20 credits)	
SCSS Elective Modules	
Human Factors CSU44051 (5 Credits)	Group Project CSU44098 (10 credits)
Fuzzy Logic CSU44001 (5 Credits)	
Formal Verification CSU44003 (5 Credits)	Entrepreneurship & High-Tech Venture Creation CSU44081 (5 Credits)
Topics in Functional Programming CSU44012 (5 Credits)	
Internet Applications CSU44000 (5 Credits)	
Computer Graphics CSU44052 (5 Credits)	
Computer Vision CSU44053 (5 Credits)	
Machine Learning CSU44061 (5 Credits)	
Strategic Information Systems STU45006 (10 credits)	

Year 4 Minor in Computer Science	
Operational From: 2022/2023	
Michaelmas Term	Hilary Term
0 credits (if Minor in Computer Science was completed in Year 3)	
20 credits (if continuing Minor in Computer Science in Year 4)	
COMPUTER SCIENCE ELECTIVES (20 credits)	
Elective Modules	
Human Factors CSU44051 (5 Credits)	Entrepreneurship & High-Tech Venture Creation CSU44081 (5 credits)
Other elective modules to be confirmed	Group Project CSU44098/ 10 credits

4.4 Court of Examiners

Joint Honours students' Computer Science module marks are considered at a court of examiners in the School of Computer Science and Statistics. Agreed marks are then passed to the Trinity Joint Honours Court of Examiners where the CS marks are considered alongside the marks in the other subject, where overall decisions about progression (to the following year), (degree) award and TJH prizes are made.

4.5 External Examiner

The external examiner for the JH CS programme is Professor Simon Dobson from the University of St Andrews, Scotland. He will be involved in ensuring that the examinations in third and fourth year are run properly (in terms of how the exam papers are set and marked, and how the results are moderated).

4.6 Awards

4.6.1 Ordinary BA Degree (exit only)

Students who have passed their Year 3 examinations may have an ordinary BA degree conferred if they do not choose, or are not allowed, to proceed to Year 4 of the programme, or if they fail to complete satisfactorily Year 4 of the course. Except by permission of the University Council, an ordinary BA degree may be conferred only on candidates who have spent at least two years in the University.

4.6.2 BA (Moderatorship) Degree

The BA (Moderatorship) degree is awarded if a student has successfully completed Years 3 and 4. The final degree award is calculated from the final two years' results - Year 3 is weighted at 30% and Year 4 is weighted at 70% of the overall degree award. Where students are awarded an honours degree, the class of degree awarded is based on the weighted average mark achieved as follows: First Class Honours: 70%–100%, Second Class Honours, First Division: 60%–69%, Second Class Honours, Second Division: 50%–59%, Third Class Honours: 40%–49%.

Depending upon student choices made within the programme of study it is possible to confer with a Bachelor in Arts (Moderatorship) award in one of the following categories:

Joint Honours

Major with Minor

Single Honours (in Geography only)

4.7 Student Feedback and Evaluation

The School will conduct student surveys of modules on a regular basis (at least once every three years) typically around the middle of the semester and will provide feedback on the results of these surveys as soon as practical. It will also facilitate student fora with the class representatives towards the end of each semester.

5 Scholarships and Prizes

In addition to prizes mentioned in the SCSS Undergraduate handbook, the following prize is specific to the Joint Honours Computer Science programme.

5.1 Foundation Scholarship

Foundation scholarship ("Schol") is a College institution with a long history and high prestige. Those who become Scholars get fees, accommodation, and a stipend. The examinations for "Schol" are normally taken in your second (SF) year. Further information is available at https://www.tcd.ie/academicregistry/exams/scholarship/ and, for JH students, from the Undergraduate Common Architecture Office at www.tcd.ie/tsm-tjh.

5.2 Kenneth Mulkearns Memorial Medal

Irish Life Assurance plc founded a prize in 1992 in memory of Kenneth Mulkearns. A silver medal is awarded annually (until 2024 at least) to the student who is placed first in the B.A. in Computer Science and Business degree examination. (After 2024 the criteria may change.)