Computer Science-Joint Honours

B.A. (Moderatorship) Honours Bachelor Degree (NFQ Level 8)

Computer Science can be studied as a Joint Honours subject with one of the following options:

- TR240 Geography
- TR188 Business
- TR241 Linguistics

Computer Science Joint Honours Combinations
Each of the Computer Science Joint Honours combinations offers unique opportunities where the subjects intersect. Students studying Computer Science and Geography may have a particular interest in geographic information systems, spatial data or “smart cities”. The combined study of Computer Science and Linguistics yields opportunities for graduates to specialise in computational speech and language processing or text analysis. Our long-running Computer Science and Business joint programme provides graduates with the knowledge and expertise needed to work in the technical field of Computer Science along with the business management skills required to understand the fundamentals of markets, organisations and business management.

Pathways
The pathways available are Major with Minor and Joint Honours. See Trinity prospectus for further information.

Your degree and what you’ll study
Details of the Computer Science part of the joint programmes are provided below.

First year
In first year, students spend about 25% of their time learning to design and write computer programs. They also study Mathematics, Statistics, and Computer Systems.

Second year
In the second year the study of Computer Science continues with Algorithms and Data Structures, Information Management and Software Engineering. Depending on the pathway chosen, students may also take Applied Statistics and Probability, Intermediate Programming, Algorithms and Data Structures II, and Natural Language Processing.

Third year
All students in third year take Software Engineering, Information Management, and Computer Networks. Depending on the chosen pathway, students may take

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additional subjects such as Compiler Design, Artificial Intelligence, Symbolic Programming, Functional Programming, Discrete Mathematics, Advanced Computer Networks.

**Fourth year**
In the fourth year, all students will complete a Capstone project. In addition they choose from topics such as Group Programming Project, Machine Learning, Strategic Information Systems, Technology Entrepreneurship, Data Analytics, Fuzzy Logic, Formal Verification, Functional Programming, Internet Applications, Human Factors, Computer Graphics, Computer Vision.

**Assessment**
Courses are examined by a combination of continuous assessment and/or end of term examination or assessment.

**Study abroad**
You may apply to spend your third year studying at a university abroad as part of an exchange programme.

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**Computer Science & Geography**
TR240 BA (Moderatorship) Honours Bachelor Degree

**Why study Computer Science and Geography?**
Geographical knowledge and experience are more important than ever, giving us the skills to understand a dynamic and rapidly changing world. Geography is an integrative subject with an international outlook and openness to interdisciplinary collaboration. The focus in geography is on understanding spatial and temporal change on and of our planet. Computer Science is concerned with the study of everything to do with computers and our relationship with them. Computer scientists are critical to the efficient running of modern societies, dealing with health, security, finance, transportation, and now increasingly our interaction through social networks. Computing professionals deal with theoretical issues, solve complex problems, deal with matters of ethics and with society at large.

The combination of Computer Science and Geography allows students to combine computational skills and geographical knowledge to address important global issues. Examples of this include Geographical Information systems (GIS) which is used to underpin decision making in: urban planning; land use planning and energy distribution or Remote Sensing/Earth Observation which can be

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used to monitor the impact of global change. Graduates of this programme will be well placed to develop the next generation of GIS; these may, for example, incorporate large volumes of IOT (Internet of Things), remote sensing data, integrate diverse forms of data, and present advanced visualisations. These developments would be driven by computer scientists who understand geoscience. Graduates of the programme might apply "big data" techniques to geographic data, for example to predict flooding, to model urban traffic, to explain demographic changes or monitor long-term environmental change. Graduates with these skills will be at the heart of the design of future smart and sustainable cities and societies.

Why study Computer Science and Geography at Trinity?

This programme at Trinity College Dublin is delivered through the expertise of the School of Computer Science and Statistics and the Department of Geography.

The School of Computer Science and Statistics at Trinity is recognised for establishing computer science as an academic discipline in Ireland. The School has earned a strong international reputation and has partnerships in education, research and industry across the globe. Computer Science at Trinity is ranked number 1 in Ireland, top 25 in Europe and top 100 worldwide (QS subject rankings, 2020). The School hosts three National Research Centres and continues to evolve and lead groundbreaking research programmes. The School collaborates with leading employers and fosters innovation through its many successful start-up companies.

Geography at Trinity is a place of intensive and extensive geographical scholarship in Ireland. The School carries out teaching and research across the discipline, from development theory to coastal modelling, and from climate change to the social economy, all within different contexts, from Nigeria to New Zealand. The School aims to challenge students intellectually to foster and maintain world-class research and teaching in a supportive and collegial atmosphere. Trinity is ranked in the world top 100 universities for Geography (QS World University Rankings by Subject 2020). In recent years, third and fourth year geography students have been involved in academic staff-led fieldwork from Clare Island to Mallorca, undertaken summer research projects in Kenya, and made digital video documentaries and blogposts as part of their assessed work.

What our graduates say

"It might be cheesy to say that ‘geography rocks’ but it’s true! Studying Geography at Trinity has left me with more than just an education. Through the wide range of modules offered within the course I have learnt..."
a diverse range of skills which are really relevant in today’s society. Not only that, but the chance to partake in fieldtrips both at home and abroad makes this course an excellent place for forming lasting friendships while learning lots along the way.”

Sarah McDonagh

“Many of the developments that will make ripples across the globe in years to come will be driven by computer scientists who understand geoscience and possess the technological skills to create solutions. These skills are at the very heart of the design of future smart and sustainable cities and societies. We are excited to watch our graduates develop and see which paths they take in their learning. Some may apply big data techniques to geographic data to predict flooding or model urban traffic, while others may monitor demographic changes or monitor long-term environmental patterns before developing apps that benefit people and the planet.”

Professor Lucy Hederman,
Professor Lucy Hederman,
Course Director

Programme overview
This is a Joint Honours Programme. Students on the programme begin studying both subjects equally, and then may specialise more in one subject than the other, and may exit with a Joint Honours Degree or a Major with Minor Degree.
Drawing on the expertise of both Schools, the programme focuses on delivering a research inspired, outcome-based educational experience to students. In first year students spend equal time on Computer Science and Geography. In the first three years of the Computer Science programme, students will develop key skills in designing and implementing computer programmes and systems, solving problems, using mathematics, statistics and data analytics and communicating both orally and in writing. Students will learn how to use a range of programming languages and how to tackle large software engineering projects. Students will also learn about computer networks and telecommunications, information management and the relationship between computers and society. The first year Geography course aims to provide a solid grounding in human, physical and environmental geography, focusing on materials that are dealt with in greater depth in later years. Second and third year geography modules cover issues relating to cultural, economic and historical geography, and to natural and human modified environmental processes and systems. Research skills are developed further through e.g., Remote Sensing and GIS modules and modules that include fieldwork components.

For their fourth year, students undertake a capstone project or research dissertation in either Computer Science or Geography depending on their pathway. In addition students choose from Computer Science topics such as Group Programming Project, Machine Learning, Strategic Information Systems, Technology Entrepreneurship, Data Analytics, Fuzzy Logic, Formal Verification, Functional Programming, Internet Applications, Human Factors, Computer Graphics, Computer Vision; and from Geography choose from

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modules such as Living on the Edge (coastal Geography), Globalisation and African Development, Historical Geography, Geomorphology, GIS and Remote Sensing Applications in Geography, Environmental Governance, Remote Sensing of the Environment, Spatial Analysis Using GIS, Stormy Geomorphology, Urban Geography: Cities, Space and Culture.

The Course for you?
This new course will suit students who are interested in the world around them, in understanding the significant challenges that face our world, and would like to tackle those challenges with computer and related technologies. Computer Science is best suited to those who are comfortable applying logical thinking to situations. No prior knowledge of Computer Science or Geography is assumed.

Study abroad and language options
Students may apply to spend your third year studying at a university abroad as part of an exchange programme.

Graduate Opportunities
Graduates from this new course will be highly skilled and employable in both industrial and governmental organisations both here in Ireland as well as overseas. Both geography and computer science offer a wide array of career opportunities for graduates. The combination of these disciplines train students to analyse challenges in a broad range of areas and to provide solutions to them. Careers taken up by graduating geography students in recent years include urban and regional planning, environmental consultancy and research, and teaching as well as positions in such areas as financial services, foreign affairs, leisure and tourism and overseas development. Graduates from computer science find employment in almost every sector from communications and entertainment to manufacturing and transportation, government, healthcare, education and many more. Positions can be found within: design, testing, manufacturing, support and implementation, information systems, research and development, operations and management. Some graduates of this course can be expected to pursue careers in research to Ph.D. and beyond; others will found their own companies.

Get in touch!

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Why study Computer Science and Business?
Computer Science and Business is a Joint Honours programme. The computer science subjects in this programme will build upon your problem solving, logical and mathematical skills and challenge you to develop a deep understanding of the science of computers. The business subjects will develop your knowledge, management ability and understanding of the operations of organisations and their critical role in society and the many roles available within organisations like marketing, organisational behaviour, human resources and finance. At the end of the course graduates will be able to apply their knowledge of computer science, business and management, along with their problem solving skills, in new and familiar environments, both within the disciplines of Computer Science and Business and in the wider context of the modern workplace.

Computer Science and Business: The course for you?
Computer Science and Business at Trinity is a challenging and exciting course with a focus on innovation and cutting-edge technology. To get the best from the course you need to be interested in exploring how organisations work and how they can be improved and in developing clear logical ideas about situations and about how to develop feasible solutions for computing to deal with these situations. No prior knowledge of computer science or business is assumed.

Computer Science and Business at Trinity
Computer Science at Trinity is ranked number 1 in Ireland, top 30 in Europe and top 100 worldwide while the Business School is ranked number 1 in Ireland, 36th in Europe and in the top 100 worldwide (QS subject rankings, 2020). Over a period of more than 50 years, both the School of Computer Science and Statistics and the Trinity Business School have earned a strong international reputation. They have enduring partnerships in education, research and industry across the globe.

Graduate skills and career opportunities
Government and industry have identified a need for more graduates with Computer Science and Business skills. Graduates of this programme have secured employment in a variety of roles and areas. They have been hired by multinationals, both nationally and internationally, such as Google, LinkedIn, Twitter and by consultancy and accountancy firms such as Ernst & Young, Accenture, MRBI, PwC, and KPMG. Our graduates are also much sought after within the public sector and for small and medium sized businesses. Many students have set up and launched

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their own businesses, some of which have won entrepreneurship awards. Other students have pursued Master’s and Ph.D. studies in business and computer science disciplines.

Your degree and what you'll study
The computer science subjects in this programme are listed on page [joint honours computer science](joint_honours_computer_science)
For more information about other Joint Honours subjects, including any special entry requirements, please visit: [www.tcd.ie/courses/undergraduate](www.tcd.ie/courses/undergraduate)

Get in touch!

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Why study Computer Science and Linguistics?
Linguistics is the scientific study of language. Linguists investigate how language works; how patterns of sounds, words and sentences combine to convey meaning. Training in linguistics promotes the critical evaluation of evidence, logical and detailed analysis, and the formulation and presentation of arguments. Studying computer science builds your problem solving, logical and mathematical skills and challenges you to develop a deep understanding of the science of computers. At the end of the course graduates will be able to apply their knowledge of computer science and linguistics, along with their problem solving skills to improve computer understanding and generation of language, to use computing to explore languages, as well as to more general issues of computing and communication.

Computer Science and Linguistics: The course for you?
If you enjoy problem solving, conceptual analysis, mathematics, languages and are interested in combining topics in creative and insightful ways, then this may be the right course for you. It appeals to students with strengths in analytical reasoning. If you are interested in how language works and in how computers can be applied both to study language and to improve communication then this is an ideal combination. No prior knowledge of computer science or linguistics is assumed.

Computer Science and Linguistics at Trinity
Computer Science at Trinity is ranked number 1 in Ireland, top 30 in Europe and top 100 worldwide (QS subject rankings, 2020). There is a decades-long tradition of Linguistics teaching and research in the Centre for Language and Communication Studies (CLCS). In both subjects, teaching is research-led: all members of the teaching team are engaged in state-of-the-art research. There is a long history of combined Computer Science and Linguistics study at Trinity.

Graduate skills and career opportunities
Graduates are qualified to work as language specialists, in the language and speech technology sector, as information technologists or software specialists in any of the IT, banking, publishing or multimedia sectors.

Your degree and what you’ll study
The computer science subjects in this programme are listed on page [joint honours computer science]. For more information about other Joint Honours subjects, including any special entry requirements, please visit: [www.tcd.ie/courses/undergraduate]
Get in touch!

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