COMPUTING

Undergraduate

Goldsmiths
UNIVERSITY OF LONDON

Experience Goldsmiths' own brand of computing. From developing computers that can compose music and paint pictures, to defining and implementing new social media tools and applications, computing here is creative and innovative.

Our kind of study is founded on creativity, independence and learning by doing.

You'll get to create the software you want to create, and work on your own projects from day one.

Your computing degree has weight in the real world, because you'll be taught to apply computing to a whole range of real-life situations and to industries within the creative arts and business sectors.

You'll apply computing to other subjects such as music and media when you're here, so you'll be able to think on your feet and adapt within a fast-evolving field.

INTRODUCTION

1
2
3
4
5

Why choose Computing at Goldsmiths?

Your course is hands-on and focuses on practical work in real-world situations. You'll be working on your own software projects from the start.

Goldsmiths is not only up to date with current technology but is often instrumental in its development.

You'll investigate how computing interacts with a wide range of other subject areas. We have a particular focus on computing applied to the arts and creative industries including music, film, TV, games and animation.

Goldsmiths is ranked third in London for Computing (Guardian University Guide League Tables 2017).

Industrial placement year. Our single-honours degree programmes include an optional Industrial Placement Year between Year 2 and Year 3. You'll have the invaluable opportunity to develop the practical skills and real-world experience that is sought by employers. You're supported throughout the year by a placement tutor, who provides you with guidance and liaises between you and your employer.

OUR DEGREES

BSc (Hons) Business Computing
& Entrepreneurship

BSc (Hons) Computer Science

BSc (Hons) Creative Computing

BSc (Hons) Digital Arts Computing

BSc (Hons) Games Programming

BMus/BSc (Hons) Music Computing

BSc (Hons) Computing & Chinese

Foundation Year in Computing

BSc (Hons) Business Computing & Entrepreneurship

3 years full-time, or 4 years full-time including industry placement, or 4-6 years part-time
gold.ac.uk/ug/bsc-business-computing-entrepreneurship

This degree will provide you with a detailed understanding of the concepts and techniques of business computing. You'll be equipped with the skills to design, develop and deploy software systems for business and organisations.

In your first year you'll learn technical programming and web development while developing complete software products. You'll develop web and mobile apps, ranging from a website for a local business, to an iPhone app advertising a fantasy virtual band. In your Business Enterprise in the Digital Era module, you'll focus on the technologies used, and theories applied, by successful businesses across the world.

In your second year you'll take modules on advanced programming and be introduced to practical entrepreneurship skills. You'll work on a large-scale project that will deepen your development skills.

Your final year will prepare you for a major project in which you apply your technological and business skills to solve real-world problems in innovative and practical ways. You'll study specialist computing topics from a range of optional modules (see page 16). You will then undertake your final major project in which you will develop a business plan for a software or hardware product and then go on to implement and deploy that product.

Year 1

Introduction to Programming

Web Development

Designing Digital Interaction

Mathematical Modelling for Problem Solving

Perspectives on Capital: Financial, Physical, Human and Social

Business Enterprise in the Digital Era

Year 2

Principles and Applications of Programming

Data, Networks and the Web

Software Projects

Creative and Social Enterprises: Business Models, Value and Planning

Optional Placement Year

Year 3

Major Business Computing Project

Plus four computing options (see page 16)

BSc (Hons) Computer Science

3 years full-time, or 4 years full-time including industry placement, or 4-6 years part-time
gold.ac.uk/ug/bsc-computer-science

You'll be equipped with an in-depth understanding of the key conceptual and technological issues involved in building software systems. Right from the start, you'll work on your own projects developing games, mobile apps and music software.

In your first year you'll learn technical programming and web development while developing complete software products. In your maths module, you'll learn the basic mathematics required for the rest of your programme, with topics including set theory, Boolean logic, and probability.

In your second year, you'll take modules such as Principles and Applications of Programming, in which you'll learn about fundamental data structures and algorithms, and develop programs in Java and for an Android platform. The module will continue to develop your programming skills in preparation for your major project in your final year.

In your final year you'll choose from a range of computing options (see page 16) and then complete your major project, which will showcase your theoretical and practical knowledge of computer science.

Year 1

Fundamentals of Computer Science
Mathematical Modelling for Problem Solving
Introduction to Programming
Web Development
Problem Solving for Computer Science

Year 2

Algorithms and Data Structures
Principles and Applications of Programming
Data, Networks and the Web
Software Projects

Optional Placement Year

Year 3

Major Project
Plus computing options (see page 16)

BSc (Hons) Creative Computing

3 years full-time, or 4 years full-time including industry placement, or 4-6 years part-time
gold.ac.uk/ug/bsc-creative-computing

This degree is designed to prepare you for a career as a technology-led creative in the media industries. It will nurture your development not just as a technical expert, but also as a creative thinker, allowing you to learn and explore through a combination of technology and imagination. It will prepare you for a career in computation for media, games and related areas by giving you both the technical understanding and the creative freedom to develop your ideas.

You'll study core elements of computing, including programming for audio and visual media, using a variety of programming languages. Modules will offer you the opportunity for in-depth studies of audiovisual computation techniques, and include elements of cognition and perception, history, and appreciation of contemporary media. You'll also complete practical projects with a view to developing a portfolio.

In your final year you'll choose from a range of computing options (see page 16) and then complete your major project, which will showcase your theoretical and practical knowledge of computer science.

Year 1

Graphics
Generative Drawing
Sound and Signal
Introduction to Programming I
Numerical Maths
Designing Digital Interaction
Web Development
Year 1 Creative Projects

Year 2

Principles and Applications of Programming
Data, Networks and the Web
Creative Projects
Perception and Multimedia Computing

Optional Placement Year

Year 3

Major Project
Plus four computing options (see page 16)

BSc (Hons) Digital Arts Computing

3 years full-time, or 4 years full-time including industry placement, or 4-6 years part-time
gold.ac.uk/ug/bsc-digital-arts-computing

You'll be a part of one of the top interdisciplinary computing departments in the country - working across art, music, journalism, gaming, and many other subject areas. Your creative programming skills and fine arts perspectives will allow you to create software and hardware informed by a critical awareness of contemporary fine arts.

In your first year specialist modules you'll explore and examine the historical and critical context in which art is made, seen and understood. You'll consider how the critical debates about art can support opportunities for discussion in the studio. You'll develop and articulate your own ideas and thoughts about art, and examine key concepts underpinning 20th-century and contemporary art production. You'll also develop your own creative computing practices, with a strong focus on fine arts practice and an emphasis on relating the theoretical and contextual material learned in critical studies to your practice.

In the specialist modules in Year 2 you'll consider how software development, digital art and design and e-commerce have been noted for the predominance of independent thinkers who have had major impact on both the development of ground-breaking technologies and the production of cutting-edge cultural products. You'll also engage and extend your critical faculties and develop your ability to analyse, judge and write about contemporary art. You'll be supported in your studio practice and make informed and independent judgements about your own work.

In your third year you'll take modules from a range of computing options (see page 16). You'll also complete your dissertation in critical studies, and a major project in computational arts.

Year 1

Introduction to Programming I
Numerical Maths
Designing Digital Interactions
Critical Studies in Computational Arts I
Introduction to Computational Arts Practice
Graphics
Generative Drawing

Year 2

Principles and Applications of Programming
Perception and Multimedia Computing
Computational Arts Practice
Critical Studies in Computational Arts II

Optional Placement Year

Year 3

Dissertation in Critical Studies
Major Project in Computational Arts
Plus two computing options (see page 16)

BSc (Hons)
Games Programming

3 years full-time, or 4 years full-time including industry placement, or 4-6 years part-time
gold.ac.uk/ug/bsc-games-programming

Prepare yourself for a career as a programmer in the video games industry, including mobile games, casual games, social media games, and AAA console game development.

You'll take a three-pronged approach: programming, technologies, and practice. You'll build your technical programming skills in C++, learn about graphics, audio and artificial intelligence and current hot platforms such as mobile games, HTML5-based web games and social media games.

In your first year you'll take a specialist module in games development in which you'll be introduced to industry standard tools. These include game engines, middleware, and editing tools. You'll then propose and implement your first game project, documenting the process through sound, music, images, video, commented code, binaries, or websites.

In your second year you'll work on a substantial games development project, including technical, professional and creative aspects of that project. You'll be taken through the entire games development process, from user-centred design, of which you'll gain an in-depth understanding, to proposal development and implementation.

In your final year you'll choose options from a range of computing modules (see page 16) and complete your major project, designing and implementing a game or piece of games technology, or pursuing research in computing or games.

Year 1

Graphics
Generative Drawing
Introduction to Programming I
Mathematical Modelling for Problem Solving
Web Development
Introduction to Games Development Practice

Year 2

Principles and Applications of Programming
Perception and Multimedia Programming
Games Development Group Project
Plus one from:
Algorithms and Data Structures
Data, Network and the Web

Optional Placement Year

Year 3

Major Project
Plus four computing options (see page 16)

BMus/BSc (Hons)
Music Computing

3 years full-time, or 4 years full-time including industry placement, or 4-6 years part-time
gold.ac.uk/ug/bmus-bsc-music-computing

You'll engage in a creative discipline that combines performance, composition, musicology, design, psychoacoustics, digital signal processing, and computer science. You'll create your own music software to further your artistic goals and help pioneer the future of electronic music and digital audio production.

You'll have the choice to pursue a more technical or artistic path of study, leading to either a Bachelor of Science (BSc) or a Bachelor of Music (BMus).

In your first year you'll begin to explore the interrelationships between theories of music and computing, and between theoretical understanding and creative practice.

In your second year you'll continue to explore current issues in program design, sonic art, contemporary composition, music theory and musicology. You'll look at the way computers listen and analyse sounds and music, and how they can generate or 'invent' processes and structures for music. You'll then consider how these processes are rendered into music in the form of audio or printed musical text.

In your third year you'll complete your major project in music or computing, focusing on the artistic or technical side of your work. You'll also have the choice of a range of options from both computing (see page 16) and music.

Year 1

Introduction to Programming I
Sound and Signal
Numerical Maths
Music Computing I
Electronic Music Composition and History
Approaches to Contemporary Music
Live Performance Systems

Year 2

Perception and Multimedia Computing
Music Computing II
Plus one computing module from:
Principles and Applications of Programming
Creative Projects
and Music options from a large selection such as:
Music in Film
Sonic Art Techniques
Romanticism and its Legacy

Optional Placement Year

Year 3

Major Project in Computing or Music
Plus computing options (see page 16) and Music options such as:
Creative Orchestration and Arrangement
Music/Modernities
Musical Structure and Understanding

BSc (Hons) Computing & Chinese

4 years full-time (including a year in China)
gold.ac.uk/ug/bsc-computing-chinese

With China poised to become the next superpower and the rise of technological industries, Chinese IT and computing companies have a vast potential for future growth and are likely to spread throughout the world and hold great influence in the global field of computing.

On this degree you'll spend a year at Capital Normal University in Beijing where you'll achieve advanced proficiency in Mandarin Chinese and gain first-hand information and cultural experiences. You'll develop an understanding of real market need, and enrich your creativity with knowledge of the nuances of Chinese culture.

In your first and second years, you'll learn programming languages such as Java, PHP and Javascript and be introduced to creative computing, web programming, databases and server slide programming, graphics and animation, interaction design, artificial intelligence, audio and music computing, and data mining. You'll gain these skills alongside a programme of intensive Mandarin Chinese with Goldsmiths' Confucius Institute, which will prepare you for your year in China.

In your final year you'll use your skills and knowledge gained abroad to advance your Mandarin reading and writing skills alongside studying further computing. You'll choose from a range of advanced modules that include advanced graphics and animation, data mining, artificial intelligence, interaction design and neural networks.

After graduating from Goldsmiths, you'll have the opportunity to enrol for one further year of study in China and, upon passing the additional year at the Capital Normal University, this will lead to the award of their BA Chinese Language.

TYPICAL MODULES

Year 1
Mandarin 1
Mandarin 2
Introduction to Programming
Plus computing options such as:
Web Programming
Audio-Visual Computing
Mathematical Modelling for Problem Solving
Introduction to Games Development

Year 2
Mandarin 3
Mandarin 4
Plus computing options such as:
Principles and Applications of Programming
Databases, Networks and the Web
Software Projects
Algorithms and Data Structures
Perception and Multimedia Computing

Year in Capital Normal University, Beijing

Final year
Compulsory modules:
Advanced Audio-Visual News Comprehension
Advanced Practical Chinese Writing
Advanced Chinese Journal Reading
Contemporary Chinese Issues
Computing Major Project
Plus computing options

Foundation Year in Computing

1 year full-time (Foundation) followed by 3 years full-time (undergraduate degree)
gold.ac.uk/ug/foundation-computing

This degree is ideal for those who are re-entering education after some time away from formal study. You'll combine your lively interest in the world of computing with the skills and confidence to progress to an undergraduate degree in computing following successful completion of the foundation year.

In this foundation year you'll take four modules that introduce you to computing and set you up with the study skills you'll need to succeed:

Study Skills and Introduction to the Use of Computers

You'll gain the basic knowledge and skills necessary for the operation of computer systems. This will help in your transition to higher education, and will strengthen the benefit you'll get from the learning environment in the Department of Computing.

Foundations of Problem-Solving

You'll work on practical examples of computing applications so that, even with little or no prior experience with computer programming, you'll begin to understand what is interesting and important about algorithms.

Foundations of Programming

You'll develop and execute simple software programs. This will prepare you to undertake the programming components in our undergraduate courses.

Foundations of Mathematics for Computing

You'll be introduced to some basic yet fundamental mathematics that underpins many of the information technology and software systems of today.

Please note that modules listed in this booklet were correct at the time of printing (June 2017) and may change year to year depending on staff research leave. You can find the most up-to-date information about our degree programmes on our website.

OUR STUDENTS

Natalie
BSc Creative Computing

A passion for gaming becomes a skill-set in user experience

"When I started my degree, I had an interest in computing in general, and in gaming. I wanted to gain knowledge in computing but also combine this with creative elements, coming from both an academic and a creative background.

During the summer after my second year, I worked as an intern for Goldsmiths Digital, carrying out user interaction/experience research and development for various types of briefs.

I carried out a number of briefs covering different types of applications and subjects. My role within each brief was to conduct user interaction/experience research leading onto interface design of products or analysing a product idea and seeing how or whether it could be improved to be successful within the market.

The work I did included redesigning a website. This entailed a full analysis of the original site: understanding relevant content, making contact with people within the industry, and understanding the target market with the objective of redesigning the interface.

Another example of a brief I took was for an architectural-based platform. My role was to look at other similar types of systems and see whether there was a gap in the market for this new product and if it would actually be sustainable. The result was a report I wrote that was then sent on to the client.

The brief of my final year project is to analyse a new virtual learning environment (VLE) that the university is trialling. I'm conducting background

> "I'm conducting background research into virtual learning environments and finding what the key elements of importance are."

research into virtual learning environments and finding what the key elements of importance are. I'm also analysing other systems to compare against the new system, and collecting data to understand how well the system works for the users. I've been exploring new ways of collecting data and gaining an understanding of what the most effective ways of doing this are, specifically for this product.

Once I finish my degree, I'd like to work within user interaction/experience as well as coding, preferably for a game developing company."

Sophie
BSc Computer Science

"I chose this degree because I wanted to focus on practical skills and do something that would be challenging and interesting. I have learned a lot. I have acquired many programming languages, an understanding of algorithms, knowledge of discrete mathematics, databases, clients and servers, computer architecture... the list is endless.

With support from my tutors and lecturers, I've also added achievements to my CV such as work placements. Every year after exams I've been encouraged to have some sort of placement during the summer break. In the first year I worked at the 2012 Olympics. When I went along to the interview I found my course was my best asset. I was placed in a security team. I loved working with X ray

machines and met lots of people who worked in IT and other backgrounds, which helped me build a contacts base.

After the second year I went to India to work during the summer on an IT development project funded by the UK Department for International Development. This was very challenging. I studied the digital divide between the rich and the poor, and assessed the IT infrastructure in the state I was working in.

This meant using the skills and knowledge that I'd learned on my course: understanding data analysis, how the internet works, and how to store vast amounts of data."

Zebedee
BMus/BSc Music Computing

"Above all others, there are two subjects that have captivated me for my entire life: music and technology... On this degree I learned to program computers as a compositional technique; I learned how effects and synthesisers work by building them in code; I even learned how to utilise advanced artificial intelligence to create my own virtual musicians."

Advanced computing options
in your third year include:

Advanced Audio-Visual
Processing

3D Virtual Environments
and Animation

Artificial Intelligence

Computer Security

Data Mining

Digital Venture Creation

Game AI Programming

Interaction Design

Natural Computing

Neural Networks

Physical Computing

Interaction Design

You'll explore the notion of 'interaction with technology' with a focus on the design concepts of modern user experience design and production. The module begins by making sure you have a grounding in the specification, design, prototyping and evaluation of advanced interactive systems. You will study human/user attributes and requirements, interaction paradigms, and you'll explore the human in HCI and available types of interaction.

Digital Venture Creation

You'll look at current and emerging electronic commerce technologies using the internet, and be equipped with a detailed understanding of the major issues regarding the deployment of internet technologies within and between organisations. You'll explore topics such as internet technology for business advantage, managing electronic commerce funds transfer, reinventing the future of business through electronic commerce, electronic commerce website design, social, political and ethical issues associated with electronic commerce, and business plans for technology ventures.

3D Virtual Environments and Animation

This course is an introduction to: virtual reality and its application; computer graphics; VR hardware, tracking and display; and 3D interaction and navigation. Through seminars we will explore Haptic in VR 2, spatial audio, augmented reality, Telepresence 5. 360 Video 6, Photogrammetry, and Avatar 3D reconstruction. You'll also learn how to use Unity in the lab session: Modelling, lighting, animation, raycasting, physical simulation, shader, character animation, and GUI.

Artificial Intelligence

You'll be introduced to the essential principles of artificial intelligence as part of computer science, with an emphasis on independent problem solving methods. You'll explore topics such as independent search techniques, knowledge representation, rule-based systems for deductive problem solving, search-based planning, and inductive machine learning.

As a computing graduate you'll have an ever-growing range of job options, in a variety of sectors. You could end up working in:

Software development firms

New media and advertising companies

Financial institutions

Tourism, leisure and entertainment industries

IT consultancies

Computer games development

Engineering companies

Retail and service industries

IT support for the design industry

YOUR FUTURE

The IT sector is well ahead of most other industrial and commercial sectors in terms of job opportunities and salaries. There's a shortage of innovative and creative people who have training in IT, software design, and computing technology in general.

Your optional industrial placement year will help you demonstrate that you have achieved professional competence and maturity, so that you can hit the ground running when you graduate.

Jobs you might want to explore range from app and web developers to film special effects and post-production roles, and from systems analysts to database managers.

Career journey

Eric Brotto (BSc Creative Computing, 2011), Account Director at Smile Machine

"I started out as a Software Developer making creative iPhone and iPad Apps and then was appointed as an Account Director to help raise awareness of the company and grow the business. I regularly meet with clients and write specific briefs to meet their needs. I'm currently participating in a project exploring how young people can harness the digital revolution and computing. I've had the opportunity to work with a number of young people, from all different backgrounds, and will present the project alongside a number of creative agencies at South by South West.

The academics at Goldsmiths were so creative, and understood exactly what I wanted to achieve. And by working with the Goldsmiths Careers Service I was able to secure a job before I graduated."

Watch Goldsmiths graduates talk about how their experiences at university have given them a real advantage in their career: vimeo.com/channels/career
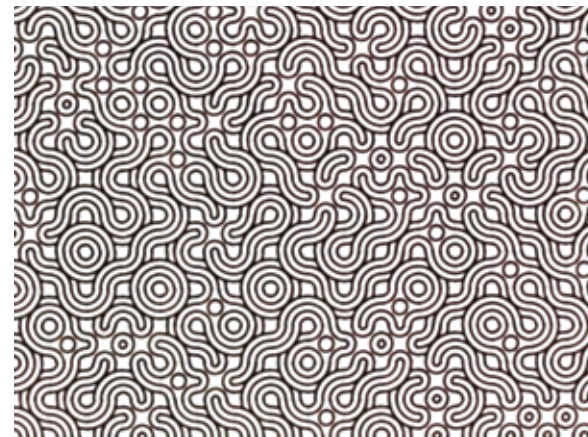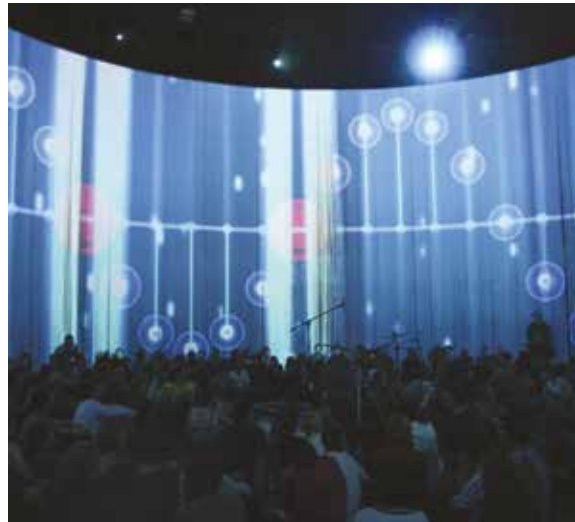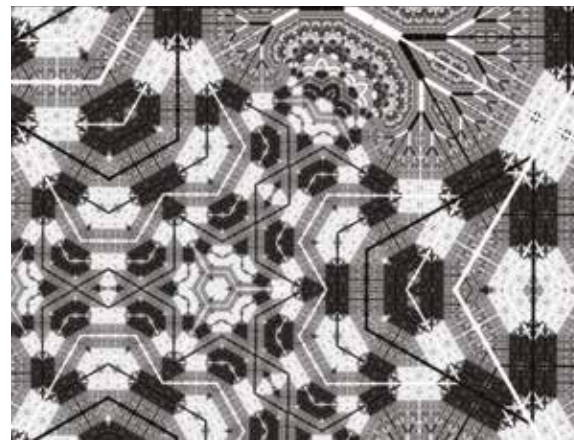
1

3

2

4

5

FIND OUT MORE

Find out more about the department and degrees at: gold.ac.uk/computing or www.doc.gold.ac.uk/blog, and follow us on Twitter: @goldcomputing

Watch our departmental film at: vimeo.com/goldsmiths/ computing

Get in touch with our Enquiries team:
+44 (0)20 7078 5300
course-info@gold.ac.uk