

Technology  
Ireland  
ICT

Skillnet



# MSc in Blockchain (Distributed Ledger Technologies)

ONLINE • PART-TIME • NFAQ LEVEL 9



[www.ictskillnet.ie](http://www.ictskillnet.ie)

**DCU**

Ollscoil Chathair  
Bhaile Átha Cliath  
Dublin City University

# Unleash your unstoppable potential, with Technology Ireland ICT Skillnet

Technology is ever-changing. No matter what stage you are at in business or your career, there is always more to learn.

At Technology Ireland ICT Skillnet, our vision is to create **progressive futures**, helping organisations to **transform at scale** and individuals to **develop a competitive edge**, through the **power of learning**.

For almost two decades, Ireland's leading technology companies have trusted us to build the critical skills needed to thrive in a rapidly evolving market.

**Let us connect you to the infinite possibilities shaping the world of tomorrow.**



## Supercharged skills

Each of our programmes are designed, developed, and validated by specialists from academia and industry, working together, with a constant focus on:

**1** **Creating opportunity and momentum** for experienced professionals and those starting out or transitioning career.

**2** Delivering learning solutions in a way that **balances work and study**.

**3** Providing practical skills, along with the theoretical, allowing businesses to **navigate new frontiers in the world of tech**.



# 5,000+

companies supported

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# 12,000+

learners upskilled

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# 30+

professional programmes

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Online, blended, and  
in-company training supports

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Government-subsidised  
programme fees, up to 100%

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# MSc in Blockchain (Distributed Ledger Technologies)

## Linking digital innovation to business success

As blockchain technology develops in capacity, it has the potential to revolutionise industries across manufacturing, supply-chain, health, food, finance and the public sector – the list is endless. Being able to identify the right blockchain solutions to support your business is critical.

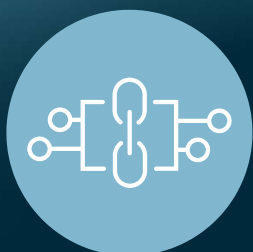


**As blockchain and distributed ledger technologies (DLT) continue to move beyond the realms of cryptocurrency and digital finance and into the mainstream of business applications, there is ever greater demand for blockchain experts. The lack of technical blockchain skills, however, is of national and international concern.**

Working with Blockchain Ireland, Ireland's leading blockchain industry group, Technology Ireland ICT Skillnet identified the critical skills gaps for developers and IT professionals. We created this Level 9 online Masters in Blockchain, delivered part-time with our academic partners at the School of Computing at DCU, as a direct response to this need.

This comprehensive programme delves deep into the core principles, applications, and intricacies of blockchain technologies, offering a hands-on learning experience crafted by industry leaders and renowned experts. Join our programme to be best-prepared to take on challenging projects and contribute to developing this revolutionary technology.





## At a glance

### Start Date

September 2024

### Award

Level 9 NFQ (90 ECTS)

### Delivery

Online – This course is delivered asynchronously using the Futurelearn platform.

### Duration

2 years part-time

### Fees

Skillnet subsidised: €2,950 per year  
Non-subsidised: €3,875 per year

### Programme Partner

School of Computing at  
Dublin City University (DCU)



## Programme delivery

This Masters in Blockchain is designed to fit your busy schedule, with part-time online delivery over two years. This course is delivered asynchronously using the Futurelearn platform. All the course materials will be online for the students to work through at their own pace.

With this programme, you'll gain hands-on experience and develop practical skills that will help you stand out in the job market. The faculty at DCU School of Computing includes experts in the field and you'll have access to state-of-the-art technology and resources. While continuous assessment elements for the modules will be submitted electronically, there will also be end-of-term examinations for which attendance in person at DCU is required.



*By 2030, blockchain will add \$3.1 trillion in business value. As blockchain and distributed ledger technologies (DLT) continue to move beyond the realms of cryptocurrency and digital finance and into the mainstream of business applications, there is ever greater demand for blockchain experts.*

**Gartner**<sup>®</sup>

## Who is this programme for

This programme has been uniquely designed to cater for:

### Software Developers and Engineers

For professionals experienced in software development or engineering, this programme serves as a gateway to advance their expertise in blockchain technology. Understanding blockchain's architecture, smart contracts, and decentralised applications (dApps) enhances their skillset, empowering them to develop robust, scalable, and secure blockchain-based solutions.



### Cybersecurity Experts

Cybersecurity specialists aiming to fortify their knowledge in blockchain technology will find our programme invaluable. With a focus on blockchain's cryptographic principles and its resistance to tampering, experts can augment their skill set to secure and protect blockchain networks against emerging threats and vulnerabilities.



### Technical Project and Operations Managers

Professionals in project and operations management within the tech sector can enhance their strategic understanding of blockchain through our MSc programme. Equipped with insights into blockchain's implementation challenges, governance frameworks, and regulatory considerations, they can effectively lead and execute blockchain-based projects within their organisations.

### Recent Graduates

Recent graduates from computer science-related fields who want to gain the technical expertise in Blockchain to complement their existing skills enabling them to build and scale blockchain technologies in their career.

### Tech Entrepreneurs

Tech-savvy entrepreneurs seeking to integrate blockchain technology into their ventures can greatly benefit from our MSc in Blockchain. This programme equips them with the knowledge to leverage blockchain's decentralised and secure nature, enabling them to innovate across various industries, creating disruptive solutions.

# Semester and module breakdown

The MSc in Blockchain (Distributed Ledger Technologies) is a 2-year 90-ECTS course.

Learners must take eight core modules over four semesters (years 1 and 2).



## Semester 1 [Year 1]

<b>Research Methods and Professional Skills</b>	Gain the skills and understanding to plan and manage the practical aspects of the Practicum for the course.
<b>Blockchain Basics and Applications</b>	Understand blockchain as a technology and how it can be used in applications.

## Semester 2 [Year 1]

<b>Cryptography and Number Theory</b>	Gain a deep appreciation of the significance of cryptography as a means of securing information in the modern world.
<b>Cloud Systems</b>	Develop critical analysis and problem solving skills in a cloud systems project.

Semester 3 [Year 2]	
<b>Blockchain Scalability</b>	Gain the knowledge of the many technologies which underpin distributed ledger implementations and smart contract architectures, and how they scale.
<b>Public Key Cryptography and Security Protocols</b>	Learn the concepts and techniques that underpin modern public key cryptography and how they are used to build and implement security protocols.

Semester 4 [Year 2]	
<b>Developing Blockchain Systems</b>	Understand system analysis and design for applications using blockchain technologies as well as developing blockchain applications using two modern blockchain technologies (Ethereum and Hyperledger).
<b>Computer Security</b>	Gain a thorough understanding of the theory and practice of computer security, examining different threat vectors, and the policies and mechanisms that address these.

### Blockchain Practicum – Semester 3 and 4

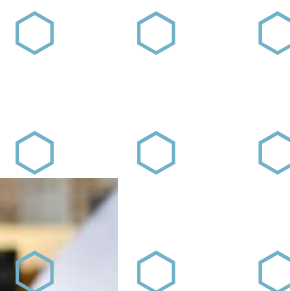
Learners must complete a blockchain practicum during the second year, including the summer following Semester 4, which accounts for one-third of the marks for the masters award.

During the practicum, you'll have the opportunity to apply your knowledge to a real-world problem, or analyse blockchain subsystems and propose improvements. Work individually or in small teams to develop a prototype in a software system to solve a real-world problem or analyse blockchain subsystems and propose improvements. This could be sponsored by external clients or involve your own ideas.

The projects will require feasibility studies followed by the creation of a project plan, and the development of a blockchain application or a rigorous theoretical analysis.



# Outcomes for you



## Award



Participants will receive a parchment for the Master of Science in Blockchain (Distributed Ledger Technologies) upon successful completion of the programme.

**Upon completion of this course, you will have an advanced understanding of how to:**

Analyse ethical cases in the field of computing and apply professional codes of ethics to computing environments.

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Implement smart contracts using blockchain technology and critically evaluate blockchain weaknesses and attack vectors.

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Integrate cryptographic algorithms into software projects and solve elementary problems in number theory.

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Analyse public-key encryption schemes and digital signature schemes, and design and write software to implement security protocols.

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Identify and understand the elements, installation, and operation of the Ethereum and Hyperledger infrastructure.

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Critically evaluate the basic components of security and examine vulnerability analysis and intrusion detection.

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Summarise the main concepts of cloud systems and demonstrate the rationale behind cloud-related choices.

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## Academic eligibility



To qualify for direct entry applicants must have a Level 8 Honours Degree (2.2) or higher in Computer Science, Computing, Computer Applications or a related discipline.

The college operates a Recognition of Prior Experiential Learning (RPEL) scheme meaning applicants without these entry requirements (e.g., Level 7 degree or lower than an Honours 2.2 in a Level 8 degree) may be considered if they can demonstrate previously obtained competence equivalent to the entry requirements.

Non-English speaking applicants must demonstrate fluency in the English language as demonstrated by IELTS academic score of at least 6.0 or equivalent.

## Funding eligibility

The fees for this programme are part-funded by Technology Ireland ICT Skillnet. The reduced programme fees are €2,950 per year.

Applicants must be working in a private or commercial semi-state organisation registered in the Republic of Ireland (Business, Consultant, Freelancer) to avail of the grant-aided fees. As a government-funded training network, we can only support those meeting these criteria.

Applicants who do not meet our funding criteria may in some cases be able to apply and pay the full fee of €3,875 (per year) if there are available places.

Please speak with our programme team to learn more about the availability of funding.

[info@ictskillnet.ie](mailto:info@ictskillnet.ie)



Covering topics such as Development, Security and Operations (DevSecOps) and uses of Agile, really hit the mark for me. In my day job, I was able to apply these straight away. From application management and a development perspective, covering intellectual property law, GDPR, were very beneficial.

Fintan Duffy  
Development Manager, Ocuco

Programme delivered in partnership with:

# DCU

Ollscoil Chathair  
Bhaile Átha Cliath  
Dublin City University

## DCU School of Computing

The School of Computing at Dublin City University (DCU) is Ireland's largest computer science department and has earned a strong reputation for excellence in research and teaching. It is ranked in the top 200-250 schools globally for computer science. With close industry links, the school's teaching and research programmes reflect the current and anticipated needs of Ireland's industrial and commercial sectors while at the same time meeting the most rigorous national and international academic standards.



# Ready to develop your career in Blockchain?

Our team is ready to answer any questions you might have regarding this programme. Send an email to [info@ictskillnet.ie](mailto:info@ictskillnet.ie) or use the enquiry form on our programme page and one of our programme leads will be delighted to assist you.

Successful applicants will be required to complete registration details both for Technology Ireland ICT Skillnet and for DCU. Programme participants will become registered students of DCU.

**Start your learning journey today**  
with Technology Ireland ICT Skillnet

**Learn More**

Embrace the future with confidence, with Technology Ireland ICT Skillnet as your training partner.



## Programme pillars

Our wide range of programme channels allows you to access training in the latest technologies driving business development.

 Artificial Intelligence	 Blockchain	 Cloud	 Cybersecurity
 Data Analytics	 Fintech	 Global Business Services	 Innovation & Transformation
 Leadership	 Quantum	 Software Architecture	 Software Development

## Industry approved

With the support of our Industry Steering Group, made up of some of Ireland's most progressive companies, you can be assured that our programmes will provide you with the most relevant and cutting-edge skills that industry demands.



## Certification you can trust

Through our strategic partnerships with some of Ireland's most influential higher education institutions, we offer a range of certificate, diploma, and masters programmes, with awards accredited on the National Framework of Qualifications.



Join 12,000+ learners who have transformed their careers with us. **Explore our range of courses >**

[www.ictskillnet.ie](http://www.ictskillnet.ie)





UNLEASH YOUR  
UNSTOPPABLE POTENTIAL



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Rialtas na hÉireann  
Government of Ireland



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