

IB99W-15 Blockchain and Distributed Ledger Technologies

26/27

Department

Warwick Business School

Level

Taught Postgraduate Level

Module leader

Yi Ding

Credit value

15

Module duration

9 weeks

Assessment

100% coursework

Study location

University of Warwick main campus, Coventry

Description

Introductory description

The main aim of this module is to introduce students to technologies behind distributed ledgers in general and blockchain in particular. Blockchain is a distributed ledger technology that provides proof of ownership and allows for the efficient, secure exchange of ownership. The central topic of the course is understanding blockchain technology and its application to decentralized finance or DeFi. Blockchain is a distributed ledger technology with very special features such as immutability and a high level of security. The advantage of blockchain is that it provides a transactional or verification framework without the need for trust-ensuring central parties (e.g., banks). This reduces transaction costs and lowers the possibility of fraud.

[Module web page](#)

Module aims

The module is designed specifically for MSc in FinTech students. The main objectives are to develop 1. A general understanding of cryptography behind distributed ledgers (hashing, digital signatures, public/private keys, ciphers, etc.); 2. introduce and describe most popular public blockchains and derivative technologies that build on top of them; 3. the ability to critically evaluate

security of different blockchain designs and protocols/smart contracts built on top of them; 4. the skills and methodologies to design and build new blockchains and smart contracts. As a main foundation module of the course, this module is closely integrated with the other Term 1 core modules (for example, the Foundations of Finance where main economics and financial ideas behind different blockchain applications will be developed).

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Introduction to cryptography and ciphers, Hashing
Public/private key cryptography and Digital signatures
Distributed ledgers, Byzantine fault tolerance
Bitcoin blockchain, congestion, mining
Scaling blockchains and Forks
Ethereum blockchain and distributed computing
Smart contracts and DeFi
Oracles and outside blockchain interfaces
Governance of distributed protocols

Learning outcomes

By the end of the module, students should be able to:

- Demonstrate a comprehensive understanding of the problems that cryptography solves and how it is used in blockchain designs.
- Define and explain, intuitively and formally, the fundamental constraints on public distributed ledgers/smart contracts and how technology resolves them. Explain whether some limitations are critical for the functioning of large-scale systems.
- Comprehensively understand and explain interactions of blockchains with outside world via oracles.
- Critically evaluate empirical research

Indicative reading list

[Reading lists can be found in Talis](#)

Research element

Research element will be included during the group project, where the students have to identify the most relevant methodology to perform the task and critically review the existing literature.

Interdisciplinary

Given that the nature of the programme is inherently interdisciplinary, links to other disciplines, such as finance, statistics will arise naturally throughout the module.

International

Distributed ledgers and blockchains are a global phenomenon operating across borders, so many examples and cases will naturally involve global and international markets.

Subject specific skills

Design and implement smart contract protocols that can be deployed on public blockchains.

Assess security of existing smart contracts and oracles

Use a programming tools to analyze distributed ledgers and smart contracts, assess security of protocol designs both critically and using tools

Transferable skills

Demonstrate academic writing skills;

Study

Study time

Type	Required
Project supervision	1 session of 1 hour (1%)
Online learning (scheduled sessions)	9 sessions of 1 hour (6%)
Other activity	18 hours (12%)
Private study	49 hours (33%)
Assessment	73 hours (49%)
Total	150 hours

Private study description

private study and pre-reading

Other activity description

9 x 2 hrs face-to-face workshops

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group A1

	Weighting	Study time	Eligible for self-certification
Assessment component			
Group written report	20%	15 hours	No
Reassessment component			
1000 word individual assignment			Yes (extension)
Assessment component			
Individual assignment	80%	58 hours	Yes (extension)
Reassessment component is the same			

Feedback on assessment

via my.wbs

Availability

Courses

This module is Core for:

- Year 1 of TIBS-H60Z MSc Financial Technology