

# IS3101: BLOCKCHAIN AND DIGITAL CURRENCY

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**Effective Term**

Semester B 2022/23

## Part I Course Overview

**Course Title**

Blockchain and Digital Currency

**Subject Code**

IS - Information Systems

**Course Number**

3101

**Academic Unit**

Information Systems (IS)

**College/School**

College of Business (CB)

**Course Duration**

One Semester

**Credit Units**

3

**Level**

B1, B2, B3, B4 - Bachelor's Degree

**Medium of Instruction**

English

**Medium of Assessment**

English

**Prerequisites**

CB2500 Information Management and one programming course (either IS3230 Java Programming for Business or IS2240 Python Programming for Business or CB2240 Introduction to Business Programming in Python)

**Precursors**

Nil

**Equivalent Courses**

Nil

**Exclusive Courses**

Nil

## Part II Course Details

### Abstract

The course will cover cryptocurrencies (e.g., Bitcoin), blockchain technologies, distributed ledger technology, and their applications, implementation and security concerns. Students will learn how these systems work; analyse the security and regulation issues relating to blockchain technologies; and understand the impact of blockchain technologies on financial services and other industries. In addition, students also get hands-on learning opportunities to develop decentralized applications related with cryptocurrency and blockchain.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the concepts related with cryptocurrency, blockchain, and distributed ledger technologies.	20	x		
2	Analyse the application and impact of blockchain technology in the financial domain and other markets.	30	x	x	
3	Evaluate security issues related to blockchain and its business applications.	25	x	x	
4	Develop applications related to blockchain.	25		x	x

#### A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

#### A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

#### A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

### Teaching and Learning Activities (TLAs)

TLAs		Brief Description	CILO No.	Hours/week (if applicable)
1	TLA1: Lecture	Concepts, frameworks, and technologies of cryptocurrency and blockchain are explained.	1, 3	Seminar:3 Hours/Week
2	TLA2: Cases studies	Students are required to analyse how blockchain technology be used in different industries and evaluate its impact on businesses.	1, 2, 3, 4	Seminar:3 Hours/Week

3	TLA3 : Online discussion	It is a means of self-reflection and sharing concepts, techniques, and methods of knowledge management among students within or after formal classes.	2, 3, 4	Seminar:3 Hours/Week
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**Assessment Tasks / Activities (ATs)**

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)	
1	AT1:Participation Students should participate in class activities, such as small group discussions and presentations, self-reflection, raise and answer questions, and the like. Class participation is used to assess students’ understanding of the topics and their abilities to apply the knowledge and concepts taught in class.	1, 2, 3, 4	20	
2	AT2:Individual Assignments Students will answer questions and solve problems in the area of blockchain technologies and applications.	1, 2, 3, 4	10	
3	AT3:Group Project A group project requires students to work in a team and solve a specific business problem by applying the concepts and tools learned in the course via hands-on experiences. A project report and presentation will be required to demonstrate the applications designed and developed by each team.	1, 2, 3, 4	30	

**Continuous Assessment (%)**

60

**Examination (%)**

40

**Examination Duration (Hours)**

2

**Assessment Rubrics (AR)**

**Assessment Task**

AT1: Participation

**Criterion**

Ability to accurately explain the concepts related with cryptocurrency, blockchain, and distributed ledger technologies.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

AT1: Participation

**Criterion**

Ability to accurately analyse the application and impact of blockchain technology in the financial domain and other markets.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

AT1: Participation

**Criterion**

Ability to accurately assess security issues related with cryptocurrency and blockchain.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

AT1: Participation

**Criterion**

Capability to effectively apply blockchain technology and develop business applications related with cryptocurrency and blockchain.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

AT2: Individual Assignments

**Criterion**

Ability to demonstrate understanding of the course topics through assignments.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

AT2: Individual Assignments

**Criterion**

Ability to accurately analyse the application and impact of blockchain technology in the financial domain and other markets.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

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**Failure (F)**

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**Assessment Task**

AT2: Individual Assignments

**Criterion**

Ability to accurately assess security issues related with cryptocurrency and blockchain.

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**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

### **Assessment Task**

AT2: Individual Assignments

### **Criterion**

Capability to effectively apply blockchain technology and develop business applications related with cryptocurrency and blockchain.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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### **Assessment Task**

AT3:Group Project

### **Criterion**

Ability to demonstrate understanding of the course topics through assignments.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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### **Assessment Task**

AT3:Group Project

### **Criterion**

Ability to accurately analyse the application and impact of blockchain technology in the financial domain and other markets.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

AT3:Group Project

**Criterion**

Ability to accurately assess security issues related with cryptocurrency and blockchain.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

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**Assessment Task**

AT3:Group Project

**Criterion**

Capability to effectively apply blockchain technology and develop business applications related with cryptocurrency and blockchain.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate



**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

AT4. Final Examination

**Criterion**

Ability to critically explain and evaluate the blockchain and cryptocurrency eco-systems and its underlining technologies, i.e., Solidity, Smart contract & Dapps.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

AT4. Final Examination

**Criterion**

Ability to accurately analyse the application and impact of blockchain technology in the financial domain and other markets.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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### **Assessment Task**

AT4. Final Examination

#### **Criterion**

Ability to accurately assess security issues related with cryptocurrency and blockchain.

#### **Excellent (A+, A, A-)**

High

#### **Good (B+, B, B-)**

Significant

#### **Fair (C+, C, C-)**

Moderate

#### **Marginal (D)**

Basic

#### **Failure (F)**

Not even reaching marginal levels

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### **Assessment Task**

AT4. Final Examination

#### **Criterion**

Capability to effectively apply blockchain technology and develop business applications related with cryptocurrency and blockchain.

#### **Excellent (A+, A, A-)**

High

#### **Good (B+, B, B-)**

Significant

#### **Fair (C+, C, C-)**

Moderate

#### **Marginal (D)**

Basic

#### **Failure (F)**

Not even reaching marginal levels

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## **Part III Other Information**

### **Keyword Syllabus**

Cryptocurrencies; Bitcoin; Blockchain technology; Smart contracts; Data blocks; Internet of money; Decentralization; Peer-to-peer network; Distributed ledger; Security; Privacy; Regulation; Banking; Financial services; Decentralized Applications; New business models; Entrepreneurship; Programming and Application Development.

### **Reading List**

**Compulsory Readings**

Title	
1	Andreas M. Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies, O'Reilly Media, 1st edition, December 20, 2014.
2	Arshdeep Bahga, Vijay Madisetti, Blockchain Applications: A Hands-On Approach, VPT, 1st edition, January 31, 2017.

**Additional Readings**

Title	
1	Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press, July 19, 2016.
2	William Mougayar, The Business Blockchain: Promise, Practice, and Application of the Next Internet Technology, Wiley, 1st edition, May 9, 2016.
3	Don Tapscott, Alex Tapscott, Blockchain Revolution: How the Technology Behind Bitcoin is Changing Money, Business, and the World, Portfolio / Penguin, May 10, 2016.
4	Narayan Prusty, Building Blockchain Projects: Building decentralized Blockchain applications with Ethereum and Solidity, Packt Publishing, April 27, 2017.