Module Syllabus

MIM117
Blockchain Technology and Platforms

Lecturer:	Denis Boevskiy
Term, year:	Winter, 2025
Number of ECTS:	6
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1. Module Description

The unit introduces students to the main aspects of Blockchain technology and practical implementation cases of different Blockchain platforms. Students will understand how Blockchain technology stores and processes information and learn about distributed systems and the advantages of smart contracts. Blockchain technology can complement other breakthrough technologies and provide fundamentally new solutions in various business areas. Therefore, this unit covers the Blockchain technology concepts that can bring significant change to business operation processes, increase the overall effectiveness, and help companies to succeed in the competitive business environment. Upon completion of the unit, students will be able to differentiate between various features and characteristics of Blockchain technologies and platforms and make decisions associated with business processes transformation and innovation.

2. Module Learning Outcomes

Competencies – at the end of the module/unit the learner will have acquired the responsibility and autonomy to:

a) C.1. Demonstrate capability in using knowledge and skills of Blockchain technology and platforms to evaluate challenges associated with the use of Blockchain platforms and applications and analyze how businesses can benefit from what Blockchain technology brings in terms of potential opportunities and threats;

b) C.2. Adapt to the fast-changing business environment by critically assessing the real value and benefits that the deployment of Blockchain technologies brings to the specific sectors of the economy and by using the results of research on decentralized systems for expanding the capabilities of business operations;

c) C.3. Develop new skills in response to emerging knowledge on Blockchain technology, determine how Blockchain technology may compliment other emerging technologies and provide solutions to different business matters;

d) C.4. Demonstrate leadership skills and innovation in complex and unpredictable contexts related to Blockchain architecture formulation suitable for solving certain problems of an organization, reduce costs, increase the efficiency of interaction, or bring other benefits to business operations.

Skills – at the end of the module/unit the learner will have acquired the following skills:

Applying knowledge and understanding

The learner will be able to:

a) S.1. Demonstrate capability in using knowledge and skills of Blockchain technology and platforms to evaluate challenges associated with the use of Blockchain platforms and applications and analyze how businesses can benefit from what Blockchain technology brings in terms of potential opportunities and threats;

b) S.2. Adapt to the fast-changing business environment by critically assessing the real value and benefits that the deployment of Blockchain technologies brings to the specific sectors of the economy and by using the results of research on decentralized systems for expanding the capabilities of business operations;

c) S.3. Develop new skills in response to emerging knowledge on Blockchain technology, determine how Blockchain technology may compliment other emerging technologies and provide solutions to different business matters;

d) S.4. Demonstrate leadership skills and innovation in complex and unpredictable contexts related to Blockchain architecture formulation suitable for solving certain problems of an organization, reduce costs, increase the efficiency of interaction, or bring other benefits to business operations.

Judgement Skills and Critical Abilities – at the end of the module/unit the learner will have

acquired the following judgement skills and critical abilities:

The learner will be able to:

a) JS.1. Perform critical evaluation and analysis of various aspects of Blockchain projects and their business models with incomplete or limited information;

b) JS.2. Critically evaluate the risks associated with the implementation of Blockchain solutions based on their technical characteristics and reflect on how the external economic and legal environment limits the choice of a needed combination of Blockchain characteristics and of a suitable platform;

c) JS.3. Conduct a critical costs and benefits analysis of the business model transformation process that involves the implementation of decentralized applications and smart contracts and judge the Blockchain platform implementation implications for an organization in terms of cost reduction and effectiveness rate;

d) JS.4. Perform critical evaluation and analysis of the main concepts, structures and approaches related to the role of coins and tokens and mining mechanisms in the technological side of the company's business model.

3. Module Topics and Content

Week	Topics and Content	Class Activities	Assessment	Readings
Week 1	***Class 1:*** o Module Introduction o Blockchain Concept o Differences between: • Framework, • Network • Platform • Ecosystem • Blockchain Project	***Team building*** ***(15 min)*** In groups of 3-4, students get to know each other and share their own experience in cryptocurrencies, Blockchain and platforms. ***Debates and Discussions (20 min)*** Students will discuss the trends of Digitalization, Tokenization and Blockchain concepts.		Mulligan C. et al. (2018). *Blockchain Beyond the Hype: A Practical Framework for Business Leaders. White paper of the World Economic Forum.* p.p. 1-40.

	Class 2: o **Blockchain Principles:** • Decentralization • Chronological record • Immutability • Transparency o **Public vs. private Blockchain:** • "Public" Blockchain, • "Limited public" Blockchain, • "Private" Blockchain, • "Extended private" Blockchain	**Debates and Discussions (30 min)** In groups of 2-3, discuss Estonia Blockchain case based on the following resources: https://e-estonia.com/wp-content/uploads/2019aug-nochanges-faq-a4-v03-blockchain-1-1.pdf https://investinestonia.com/business-opportunities/blockchain/overview/ https://vimeo.com/185278846		Recanatini, M. and Vagneur, K. (2018). *Distributed Ledger Technology Systems: A Conceptual Framework*. p.p. 41-74
Week 2	**Class 3:** o **Hashing Algorithm:** • The Hashing Algorithm • Example of SHA-256 • Hash trees (Merkle Binary Tree and Merkle Patricia Tree)	**Learning by Doing (15 min)** Before the class, students should read the following articles and videos: https://www.youtube.com/watch?v=YEBfamv-_do https://academy.binance.com/en/articles/history-of-cryptography https://academy.binance.com/en/articles/what-is-public-key-cryptography https://academy.binance.com/en/articles/what-is-a-digital-signature Students will generate their own SHA		Nakamoto S. et al. Bitcoin (2008): *A Peer-to-peer Electronic Cash System. The Paper That First Introduced Bitcoin.*

		functions. This activity is individual.		
	Class 4 ○ *Distributed Ledgers* ○ *Types of Cryptocurrency:* • The Structure of Information • Record Limitations of Recording a Transaction • The Types of Distributed Ledger – "documentary" • Technical and Economic Differences between "coins" and "tokens"	*Project-based Learning (30 min)* Before the class, students should read a paper of Nakamoto (2008) and analyze it. In class, students write short individual reports answering the questions: - Would you invest in Bitcoin now? And in 2020? - Is Bitcoin an asset, a commodity, or a currency? Does it matter? - How is Bitcoin separate from Blockchain? - What are the factors behind the price of Bitcoin? - What are the potential risks of buying Bitcoin now? This is followed by a class discussion on their answers.	*Formative Assessment 1* See the details in section 4.1-4.1.1. Weight of this assignment = 15%	Swan M. (2015). *Blockchain: Blueprint for a New Economy. O'Reilly Media, Inc.*, p.p. 1-60

Week 3	**Class 5:**
	
	○ **The Role of Public and Private Keys:**
	  • The role of Public and Private keys in Blockchain Technology
	  • Security of Various Types of Blockchain Wallets
		Direct Question and Response (20 min)
		
		Individual questions to check students' understanding, help them to identify what has been learned in previous classes.
		
		Each lecturer comes up with own questions based on their class.
				Swan M. (2015). *Blockchain: Blueprint for a New Economy. O'Reilly Media, Inc.*, p.p. 61-111

	Class 6:
	
	○ **Blockchain Transactions:**
	  • Concept of Transaction
	  • Technical Parameters
	  • Process of Forming Blocks
		Creativity Exercise (30 min)
		In groups of 3-4, students should propose a process of forming blocks (open book activity).
			Formative Assessment 2
			
			See the details in section 4.1.2.
			
			Weight of this assignment = 15%
				Swan M. (2015). *Blockchain: Blueprint for a New Economy. O'Reilly Media,* Inc., p.p. 112-138

Week 4	**Class 7:**
	
	○ **Consensus Mechanisms:**
	  • Principles of Network Performance
	  • Mining
	  • Main Principles of Consensus
	  • Proof-of-work, Proof-of-stake, Proof-of-authority, Proof- of-capacity
	  • Proof-of-burn
	  • Byzantine Fault Tolerance Consensus
	  • Hybrid Consensus
		Debates and Discussions (20 min)
		
		Students will form groups of 3-4 and discuss various consensus mechanisms, their advantages, and challenges.
				Swan M. (2015). B*lockchain: Blueprint for a New Economy. O'Reilly Media, Inc.*, p.p. 163-218

	Class 8: ○ ***Forks in Blockchain:*** • Soft Forks • Hard Forks	***Case Study (30 min)*** Individually, students should analyze the DAO case https://www.coindesk.com/learn/2016/06/25/understanding-the-dao-attack/ and explain the Forks in Blockchain topic. When ready, students continue the case study analysis together.		Wood G., et al. (2014). *Ethereum: A Secure Decentralised Generalised Transaction Ledger. Ethereum Project Yellow Paper,* 1-32
Week 5	***Guest Speaker Session***			
Week 6	***Class 9:*** ○ ***Smart Contracts:*** • Concept of Smart Contracts • Algorithmic Paradox • Technological Base for Transaction Automation	***Debates and Discussions (20 min)*** Class discussion on Ethereum Blockchain business models and pros and cons of smart contracts based on the case of the DAO token.		Treiblmaier, H. and R. Beck. (2019). *Business Transformation Through Blockchain.* Palgrave Macmillan. ISBN 978-3-319-98911-2 and ISBN 978-3-319-99058-3.
	Class 10: ○ ***Blockchain Taxonomy:*** • Blockchain Platforms Taxonomy • Technical Characteristics of Blockchain Taxonomies	***Debates and Discussions (20 min)*** In groups of 3-4, students discuss advantages and disadvantages of various taxonomies.	***Formative Assessment 3*** See the details in section 4.1.3. Weight of this assignment = 15%	Tasca P. and Tessone C.J. (2017). *Taxonomy of Blockchain Technologies. Principles of Identification and Classification.* Xu X. et al. (2017). *A Taxonomy of Blockchain-based Systems for Architecture Design.*

| Week 7 | Class 11:

○ **Token Classification:**
  • Types of tokens
  • "Token" vs. "Coin,"
  • "Electronic money,"
  • "Digital money,"
  • "Recourse cryptocurrency,"
  • "Central bank cryptocurrencies" | **Learning by Doing (25 min)**

In groups of 2-3, students will create ideas of business models based on tokens, coins, electronic money, digital money, and CBDC and prepare a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis of them. 2-3 slides.

Public Presentation (5-7 min per group)

Students will present their diverse business models and the SWOT analysis.

Feedback from Classmates (10 min)

Students give each other feedback on their presentations. Feedback should focus on:

- Creativity
- Knowledge
- Presentation skills
- Depth of analysis
- Understanding of the class material
- Respect | | Rosenfeld M. (2012). *Overview of Colored Coins. White Paper.* |

	Class 12 ○ **Blockchain Structure:** • Transaction and Block Classification Level • Data Structure in the Block Header • UTXO and Traditional Ledger • Types of Information stored in the Blockchain	**Practical session (40 min)** Individually, students open a Blockchain account and create their own NFTs.	**Formative Assessment 4** See the details in section 4.1.4. Weight of this assignment = 15%	Ballandies M.C., Dapp M.M., Pournaras E. (2018). *Decrypting Distributed Ledger Design-taxonomy, Classification and Blockchain Community Evaluation.*
	Class 13: ○ **Programming Codes and Architecture Design:** • Programming Language • Architecture Software Design • Finality and various aspects of Blockchain Consensus	**Group work (30 min)** Students form groups of 3-4 and based on their experience in coding, present and explain basic codes running on Blockchain. During this activity, students can use existing codes found on the Internet.		Antonopoulos A. M. (2014). *Mastering Bitcoin: Unlocking Digital Cryptocurrencies.* O'Reilly Media, Inc., p.p. 101-258
Week 8	**Class 14:** ○ **Application of Blockchain Platforms:** • Bitcoin and its Potential for Traditional and New business Models • Ethereum Ecosystem for Corporate Purposes and "sharing economy" • Decentralized Finance (DeFi) Cases • Corporate Blockchain Ecosystems	**Debates and Discussions (25 min)** Students will form mini groups of 3-4 students and discuss various applications of Blockchain platforms, their advantages, and challenges.	**Formative Assessment 5** See the details in section 4.1.5. Weight of this assignment = 30%	Morabito V. (2017). *Business Innovation Through Blockchain. Spring er.*, p.p. 101-170

Week 9	**Class 15** **Wrap-up Session**	**Revision**		
Week 10 & 11	*Submission of the Summative Assessment Activities*			

4. Module Assessment

The assessment of this Module consists of Formative and Summative assessment activities listed in the table 1 below:

Table 1:

Face-to-Face 100%	
Formative	*Summative*
16.5 hours	13.5 hours
Report - 60% Formative Submission (in groups)	Report (1800 words) – 60%
Oral Presentation (in groups) – 30%	Written Assignment (1200 words) – 40%

Prefinal grade is based on the Formative Assessment activities, and it is not a part of a module final grade. **Students should have over 50 points of the prefinal grade to submit summative assessment activities representing module final grade.**

Table 2:

Formative	Summative
Oral Assessment/ Online Participation: Each week, students will have to participate in a discussion forum, with questions covering the week's topics. This will help students to be in contact with different perspectives due to the diversity of participation, as well as to develop proficiency in understanding and applying concepts and developing critical thinking.	
Report Formative Submission: Students must prepare an analysis of one of the hash algorithms or Blockchain consensus or examples of Blockchain frameworks, networks, platforms, projects, or ecosystems.	**Report:** In an individual report students should clearly specify the technical features of these elements, their advantages, disadvantages and provide real examples.

Students will be divided into several groups and each group will consider different issues.	
Oral Presentation: Students research Blockchain platforms, their features and use cases.	**Written Assignment:** Students should provide a technical description of the platform in accordance with the classification, and an overview of implementation cases.

The passing grade for the module is 60%.

4.1. Formative Assessment

Students must work in groups of 3-4, and each group will consider different issues.

4.1.1. Formative Assessment 1: Report Deliverable 1

Before class 4, students should write Report 1 on their analysis of Value proposition and Business Model Canvas of the topic chosen for four formative assignments (one of the hash algorithms or Blockchain consensus or examples of Blockchain frameworks, networks, platforms, projects, or ecosystems).

Group work (3-4 students): Write an essay (400-500 words).

Assessment of the report:

- o Analysis 50%
- o Knowledge / Use of sources 35%
- o Expression 15%

4.1.2. Formative Assessment 2: Report Deliverable 2

Before class 6, students should write Report 2 on their analysis of Use cases of the topic chosen for four formative assignments.

Same Group: Write an essay (400-500 words).

Assessment of the report:

- o Analysis 50%
- o Knowledge / Use of sources 35%
- o Expression 15%

4.1.3. Formative Assessment 3: Report Deliverable 3

Before class 10, students should write Report 3 on their analysis of Processes and technology mapping of the topic chosen for four formative assignments.

Same Group: Write an essay (400-500 words).

Assessment of the report:

- o Analysis 50%
- o Knowledge / Use of sources 35%
- o Expression 15%

4.1.4. Formative Assessment 4: Report Deliverable 4

Before class 12, students should write Report 4 on their analysis of the future trends and perspectives of the topic chosen for four formative assignments.

Same Group: Write an essay (400-500 words).

Assessment of the report:

- o Analysis 50%
- o Knowledge / Use of sources 35%
- o Expression 15%

4.1.5. Formative Assessment 5: Oral Presentation

Class 8: In final project groups of 3-4, Students research Blockchain platforms, their features and use cases.

Assessment of the presentation:

- o Analysis 50%
- o Knowledge / Use of sources 20%
- o Expression 30%

4.2. Summative Assessment

4.2.1. Summative Assessment: Report

Task
In an individual report students should clearly specify the technical features of these elements, their advantages, disadvantages and provide real examples.

Guidelines

Type of work: Individual work
Font size = 12
Font = Arial
Form of submission: Word /PDF (1800 words)
Way of submission: VLE
In-Text citation and a complete reference list in APA referencing style required.

Objectives

Students should:

- C.1. Demonstrate capability in using knowledge and skills of Blockchain technology and platforms to evaluate challenges associated with the use of Blockchain platforms and applications and analyze how businesses can benefit from what Blockchain technology brings in terms of potential opportunities and threats;

- C.2. Adapt to the fast-changing business environment by critically assessing the real value and benefits that the deployment of Blockchain technologies brings to the specific sectors of the economy and by using the results of research on decentralised systems for expanding the capabilities of business operations;

- S.1. Demonstrate capability in using knowledge and skills of Blockchain technology and platforms to evaluate challenges associated with the use of Blockchain platforms and applications and analyze how businesses can benefit from what Blockchain technology brings in terms of potential opportunities and threats;

- S.2. Adapt to the fast-changing business environment by critically assessing the real value and benefits that the deployment of Blockchain technologies brings to the specific sectors of the economy and by using the results of research on decentralised systems for expanding the capabilities of business operations;

- JS.1. Perform critical evaluation and analysis of various aspects of Blockchain projects and their business models with incomplete or limited information;

- JS.2. Critically evaluate the risks associated with the implementation of Blockchain solutions based on their technical characteristics and reflect on how the external economic and legal environment limits the choice of a needed combination of Blockchain characteristics and of a suitable platform;

- JS.3. Conduct a critical costs and benefits analysis of the business model transformation process that involves the implementation of decentralized applications and smart contracts and judge the Blockchain platform implementation implications for an organization in terms of cost reduction and effectiveness rate;

Allocation of Marks

- Introduction 10%
- Analysis of technical features 30%
- Their advantages and disadvantages 20%
- Real examples 30%
- Conclusion / executive summary 10%

Evaluation Criteria: Rubric

Criteria	Identification of Main Issues	Analysis	Solutions	Research	APA structure and format
	Clear explanation of key strategic issues. The problems, scope, and seriousness were clearly identified in the discussions. There was a well-focused diagnosis of strategic issues and key problems that demonstrated a good grasp of the company's present situation and strategic issues. Effective Executive Summary. Did not waste space summarizing	Logically organized, key points, key arguments, and important criteria for evaluating business strategies were easily identified. Critical issues and key problems that supported the Case Analysis were identified and clearly analyzed and supported.	Specific recommendations and/or plans of action provided. Specific data or facts were referred to when necessary to support the analysis and conclusions. Recommendations and conclusions were presented and supported in an effective manner.		Proper organization, professional writing, and logical flow of analysis. APA formatting. Logically organized, key points, key arguments, and important criteria for evaluating the business logic easily identified. Key points were supported with a well thought out rationale based on applying specific concepts or analytical frameworks to the data provided in the case.

					Proper grammar, spelling, punctuation, third person objective view, professional writing, and syntax.
	information already found in the case.				
0 to 60 pts	Identifies and understands a few of the issues.	Incomplete or no analysis of the issues.	Little or no action suggested, and/or inappropriate solutions to all the issues.	Incomplete research and links to any readings.	Many errors and lack of organization.
60 to 70 pts	Identifies and understands some of the issues.	Superficial analysis of some of the issues.	Superficial and/or inappropriate solutions to some of the issues.	Limited research and documented links to any readings.	There are more than occasional errors. Variety of formatting styles, with some inconsistencies throughout the paper.
70 to 80 pts	Identifies and understands most of the main issues.	Thorough analysis of most of the issues.	Appropriate, well thought out comments about solutions, or proposals for solutions, to most of the issues.	Good research and documented links to the material read.	There are occasional errors. Good skill level in formatting and organizing material in assignment. Above average level of preparedness, with few formatting errors.
80 to 100 pts	Identifies & understands all the main issues.	Insightful and thorough analysis of all the issues.	Well documented, reasoned and pedagogically appropriate comments on solutions, or proposals for solutions, to all issues.	Excellent research into the issues with clearly documented links to the course text and/or outside readings.	Writing is free of errors. Meets all APA standards. Formatting is excellent.
Grade					

4.2.2. Summative Assessment: Written Assignment

Task

Students individually select ONE platform they work on for their presentation and provide a technical description of the platform in accordance with the classification, and an overview of implementation cases.

Guidelines

Form of submission: Word (1200) submission
Type of work: Individual work
Font size = 12
Font = Arial
Way of submission: VLE
In-text citation and a complete reference list in APA referencing style required.

Objectives

Students should:

- C.1. Demonstrate capability in using knowledge and skills of Blockchain technology and platforms to evaluate challenges associated with the use of Blockchain platforms and applications and analyze how businesses can benefit from what Blockchain technology brings in terms of potential opportunities and threats;

- C.3. Develop new skills in response to emerging knowledge on Blockchain technology, determine how Blockchain technology may compliment other emerging technologies and provide solutions to different business matters;

- S.1. Demonstrate capability in using knowledge and skills of Blockchain technology and platforms to evaluate challenges associated with the use of Blockchain platforms and applications and analyze how businesses can benefit from what Blockchain technology brings in terms of potential opportunities and threats;

- S.3. Develop new skills in response to emerging knowledge on Blockchain technology, determine how Blockchain technology may compliment other emerging technologies and provide solutions to different business matters;

- JS.3. Conduct a critical costs and benefits analysis of the business model transformation process that involves the implementation of decentralised applications and smart contracts and judge the Blockchain platform implementation implications for an organization in terms of cost reduction and effectiveness rate;

- JS.4. Perform critical evaluation and analysis of the main concepts, structures and approaches related to the role of coins and tokens and mining mechanisms in the technological side of the company's business model.
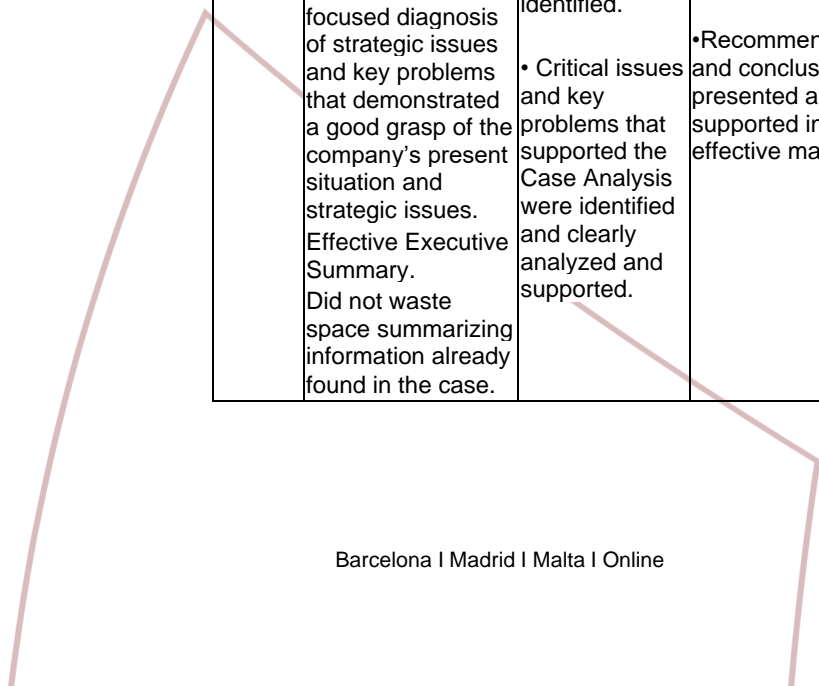
Allocation of Marks

- Introduction - 10%
- Technical description of the platform in accordance with the classification – 45%
- Overview of implementation cases - 35%
- Conclusion / executive summary 10%

Evaluation Criteria: Rubric

Criteria	Identification of Main Issues	Analysis	Solutions	Research	APA structure and format
	Clear explanation of key strategic issues. The problems, scope, and seriousness were clearly identified in the discussions. There was a well-focused diagnosis of strategic issues and key problems that demonstrated a good grasp of the company's present situation and strategic issues. Effective Executive Summary. Did not waste space summarizing information already found in the case.	• Logically organized, key points, key arguments, and important criteria for evaluating business strategies were easily identified. • Critical issues and key problems that supported the Case Analysis were identified and clearly analyzed and supported.	• Specific recommendations and/or plans of action provided. • Specific data or facts were referred to when necessary to support the analysis and conclusions. •Recommendations and conclusions were presented and supported in an effective manner.		Proper organization, professional writing, and logical flow of analysis. APA formatting. Logically organized, key points, key arguments, and important criteria for evaluating the business logic easily identified. Key points were supported with a well-thought-out rationale based on applying specific concepts or analytical frameworks to the data provided in the

					case. Proper grammar, spelling, punctuation, third person objective view, professional writing, and syntax.
0 to 60 pts	Identifies and understands a few of the issues.	Incomplete or no analysis of the issues.	Little or no action suggested, and/or inappropriate solutions to all the issues.	Incomplete research and links to any readings.	Many errors and lack of organization.
60 to 70 pts	Identifies and understands some of the issues.	Superficial analysis of some of the issues.	Superficial and/or inappropriate solutions to some of the issues.	Limited research and documented links to any readings.	There are more than occasional errors. Variety of formatting styles, with some inconsistencies throughout the paper.
70 to 80 pts	Identifies and understands most of the main issues.	Thorough analysis of most of the issues.	Appropriate, well thought out comments about solutions, or proposals for solutions, to most of the issues.	Good research and documented links to the material read.	There are occasional errors. Good skill level in formatting and organizing material in assignment. Above average level of preparedness, with few formatting errors.
80 to 100 pts	Identifies & understands all the main issues.	Insightful and thorough analysis of all the issues.	Well documented, reasoned and pedagogically appropriate comments on solutions, or proposals for solutions, to all issues.	Excellent research into the issues with clearly documented links to the course text and/or outside readings.	Writing is free of errors. Meets all APA standards. Formatting is excellent.
Grade					

5. Module Requirements

A. Core Readings List

1) Ballandies M.C., Dapp M.M., Pournaras E. (2018). Decrypting Distributed Ledger Design-taxonomy, Classification and Blockchain Community Evaluation. Retrieved from:

https://arxiv.org/pdf/1811.03419.pdf

2) Felin, T., Lakhani, K. (2018). What Problems Will You Solve With Blockchain? *MIT Sloan Management Review,* September.

3) Lacity, M., Van Hoek, R. (2021). What We've Learned So Far About Blockchain for Business. *MIT Sloan Management Review,* February.

4) Morabito V. (2017). *Business Innovation Through Blockchain.* Springer.

5) Mulligan C. et al. (2018). Blockchain Beyond the Hype: A Practical Framework for Business Leaders. White paper of the World Economic Forum.

6) Nakamoto S. et al. Bitcoin: A Peer-to-peer Electronic Cash System. The Paper That First Introduced Bitcoin. Retrieved from: https://bitcoin.org/en/bitcoin-paper

7) Puthal D., et al. (2018). Everything You Wanted to Know about the Blockchain: Its Promise, Components, Processes, and Problems, *IEEE Consumer Electronics Magazine*, 4, 6-14.

8) Recanatini, M. and Vagneur, K. (2018). Distributed Ledger Technology Systems: A Conceptual Framework. *In Cambridge Centre for Alternative Finance Reports from Cambridge Centre for Alternative Finance, Cambridge Judge Business School, University of Cambridge*

9) Rosenfeld M. (2012). Overview of Colored Coins. White Paper. Retrieved from: https://bitcoil.co.il/BitcoinX.pdf

10) Tasca P. and Tessone C.J. (2017). Taxonomy of Blockchain Technologies. Principles of Identification and Classification. *Ledger Journal,* ISSN 2379-5980 (online).

11) Xu X. et al. (2017). A Taxonomy of Blockchain-based Systems for Architecture Design. IEEE International Conference on Software Architecture (ICSA), 243-252. Sweden.

12) Wood G., et al. (2014). Ethereum: A Secure Decentralised Generalised Transaction Ledger. *Ethereum Project Yellow Paper*, 1-32.

B. Supplementary Reading List

1) Antonopoulos A. M. (2014). *Mastering Bitcoin: Unlocking Digital Cryptocurrencies.* O'Reilly Media, Inc.

2) Armknecht F. et al. (2015). Ripple: Overview and Outlook. International Conference on Trust and Trustworthy Computing, 163-180. Springer, Cham.

3) Bahga, A. and Madisetti, V.K. (2016). Blockchain Platform for Industrial Internet of Things. *Journal of Software Engineering and Applications, 9 (10).*

4) Ballandies M.C., Dapp M.M., Pournaras E. (2018). Decrypting Distributed Ledger Design-taxonomy, Classification and Blockchain Community Evaluation. Retrieved from: https://arxiv.org/pdf/1811.03419.pdf

5) Bell D., Grimson J. (1992). *Distributed Database Systems*. Reading, Mass.: Addison-Wesley.

6) Benos E., Garratt R., Gurrola-Perez P. (2017). The Economics of Distributed Ledger Technology for Securities Settlement. *Staff Working Paper. Bank of England.*

7) Benos E., Garratt R., Gurrola-Perez P. (2017). The Economics of Distributed Ledger Technology for Securities Settlement. Staff Working Paper Staff Working Paper. Bank of England.

8) Dziembowski S. et al. (2015). Proofs of Space /Annual Cryptology Conference. – Springer, Berlin, Heidelberg, 585-605.

9) Ethereum Wiki. Proof of Stake FAQ. URL: https://github.com/ethereum/wiki/wiki/Proof-of-Stake-FAQ

10) Larimer D. (2014). Delegated Proof-of-stake (dpos) //Bitshare whitepaper.

11) MacBrough E. (2018). Cobalt: BFT Governance in Open Networks. Retrieved from https://arxiv.org/abs/1802.07240

12) Morabito V. (2017). *Business Innovation Through Blockchain*, Springer.

13) Morrison D.R. (1968). Practical Algorithm to Retrieve Information Coded in Alphanumeric. *Journal of the ACM (JACM),* 4, 514-534.

14) NEO. dBFT 2.0 Algorithm. URL: https://docs.neo.org/docs/en-us/tooldev/concept/consensus/consensus_algorithm.html

15) Rauchs M. et al. (2018). Distributed Ledger Technology Systems: A Conceptual Framework. SSRN 3230013.

16) Stellar Consensus Protocol. URL: https://www.stellar.org/papers/stellar-consensus-protocol

17) Swan M. (2015). *Blockchain: Blueprint for a New Economy*. O'Reilly Media, Inc.

18) Szabo, N. "Bit Gold". URL: http://nakamotoinstitute.org/literature/bit-gold/

19) Szabo, N. "Measuring Value". URL: https://nakamotoinstitute.org/literature/measuring-value/

20) Treiblmaier, H. and R. Beck. (2019). *Business Transformation Through Blockchain*. Palgrave Macmillan. ISBN 978-3-319-98911-2 and ISBN 978-3-319-99058-3.

21) Treiblmaier, H. and R. Beck. (2019). *Business Transformation Through Blockchain*. Palgrave Macmillan. ISBN 978-3-319-98911-2 and ISBN 978-3-319-99058-3.

B. General Rules for Submitting Written Assignments

Prior to the assessment and grading, all homework assignments submitted via Virtual Learning Environment (VLE) are checked for plagiarism with the software embedded to the system. Before turning in the first assignment each student is responsible to familiarise him/herself with the *Plagiarism Handbook* available in the VLE.

Written assignments should be typewritten and will only be marked and graded if they are submitted via VLE by the requested time. **Late submissions will not be accepted under any circumstances!** *Being virtually absent shall not be an accepted excuse for not submitting the required homework for the following session.*

Technical issues: The VLE system works functionally well and technical issues almost non-existent. Failure to submit the assignment on a timely basis is typically a result of a misuse of the VLE instructions or simply a missed deadline.

In case a student experiences issues with the submission of a particular assignment, an email should be sent <u>before the submission deadline</u> to the lecturer (with a copy to the Academic Coordinator) along with the screenshot of the technical issue. Each case will be thoroughly investigated, and the ultimate decision will be made by the Academics Department whether the homework should be accepted for evaluation and grading.
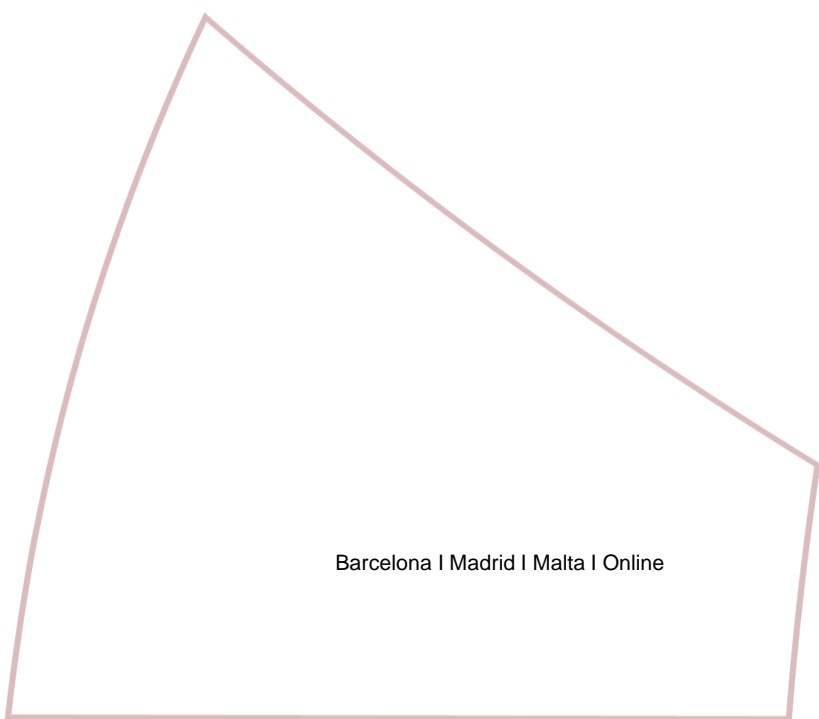
C. Attendance

80% attendance is compulsory. Students who miss more than 20% of classes without a justified reason (e.g., medical certificate) will automatically fail the module.

All appointments, including regular medical appointments, should be scheduled outside of class time, as any absence will affect the participation component of the module evaluation. If you are ill and you cannot attend a class, you will need to fill in the Absence Excuse form and provide a valid certificate from a credible medical institution. Under no circumstances is the lecturer involved in consideration of absence excuses. This responsibility lies with the Academic Coordinator and the Academic Committee. Please refer to the **Academic Policies and Student Guidelines** for further information.

Students who are late (not more than the first 10 minutes) will be allowed to enter the classroom upon the consideration of a lecturer meaning that if a lecturer started the class and believes that those arriving late may disturb the class, he/she has a right not to allow any late students to enter the classroom. Students over 10 minutes late should NOT be allowed into the classroom until the next break. In case the student is not allowed to enter the classroom in the first part of the class or is late more than 10 min, then the attendance will be rated at **50%** or a half class. This margin of time is not applicable after the mid-class break, i.e., students coming late or not returning after the break will not be allowed into the class and/or will get documented only 50% of presence. Continuous late arrivals by a student gives the lecturer the right to dismiss that student from their class, with a failing grade.

Note: *As entering in the middle of a class session disrupts the entire class and is regarded as disrespectful, students should strictly adhere to the rules. Arriving late or leaving early will be noted and the total time of absences will be calculated by applying the same corresponding rules for continuous tardiness.*

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