

NAME OF THE COURSE		Innovations in financial technology: cryptocurrencies, blockchain, DeFi and artificial intelligence					
Code	EUAB06	Year of study	3rd year of undergraduate studies (summer semester)				
Course teacher	Prof Zdravka Aljinović Ante Toni Vrdoljak, PhD	Credits (ECTS)	5				
Associate teachers	Ante Toni Vrdoljak, PhD	Type of instruction (number of hours)	L	S	E	F	
			26		26		
Status of the course	Elective	Percentage of application of e-learning	70%				
COURSE DESCRIPTION							
Course objectives	- To familiarize students with the basic terms and technical aspects of cryptocurrencies, blockchain technology, decentralized finance (DeFi), and the role of artificial intelligence in these areas; - Develop the ability to analyse the application of new digital technologies in financial systems; - Encourage critical thinking about the benefits, risks and ethical issues related to these technologies; - Equip students with practical skills through work in the Infolab and team projects, and develop research competencies through the analysis of recent professional and scientific articles.						
Course enrolment requirements and entry competences required for the course	There are no prerequisites for enrolment. Students of all undergraduate studies at the FEBT can enrol this elective course. Recommended competencies: - Basic understanding of IT concepts and computer skills; - Basic knowledge of financial concepts; - Ability to read professional literature; - Interest in new digital technologies and innovations.						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Main learning outcome: Students will analyse, interpret, and apply key concepts and technologies (cryptocurrencies, blockchain, DeFi and artificial intelligence) for critical evaluation, innovative problem solving and informed decision-making in the context of digital economy and financial systems. Individual learning outcomes: - Identify the basic concepts and principles of cryptocurrencies, blockchain technology, DeFi systems and applications of artificial intelligence. - Recognize the various roles of cryptocurrencies and assess their value as assets. - Evaluate the technical aspects of blockchain, including cryptography and consensus algorithms. - Create smart contracts with transaction simulations. - Critically evaluate the advantages, risks and ethical implications of the application of decentralized financial solutions and new technologies in the financial sector. - Analyse recent research and professional articles to identify current challenges and innovations in the field of digital economy.						
Course content broken down in detail by weekly class schedule (syllabus)							
	Lectures			Exercises			
	Topic	Hours	Topic	Hours			
	Foundations of the digital revolution: Cryptocurrencies, blockchain, DeFi and artificial intelligence.	2	Foundations of the digital revolution: Cryptocurrencies, blockchain, DeFi and artificial intelligence.	2			

	Traditional finance vs. digital currencies: The evolution of money and the birth of Bitcoin.	2	Traditional finance, Bitcoin and the development of cryptocurrencies.	2		
	Cryptocurrencies in focus – Bitcoin, Ethereum and altcoins.	2	Comparative analysis of the characteristics of different cryptocurrencies. Simulation of creating a digital portfolio.	2		
	Principles of blockchain, the role of cryptography and types of consensus algorithms.	2	Basics of blockchain technology. Simulation of transactions and work with blockchain.	2		
	Decentralized Finance (DeFi).	2	Analysis of selected DeFi projects.	2		
	Smart Contracts.	2	Development and creation of a simple smart contract and code analysis.	2		
	Artificial intelligence in the context of blockchain.	2	Artificial intelligence in blockchain system optimization, security analysis and predictive methods.	2		
	Application of artificial intelligence in the financial sector.	2	Application of artificial intelligence in financial analyses, trading algorithms and risk management.	2		
	Safety, regulation and ethical issues.	2	Security, regulation and ethical issues (hacking, regulatory interventions, ethical challenges).	2		
	Analysis of current research in the field of cryptocurrencies, blockchain, DeFi and artificial intelligence.	2	Workshop: Analysis of recent professional and scientific articles in the field of cryptocurrencies, blockchain, DeFi and AI.	2		
	The Future of Digital Finance: Legal, Economic and Ethical Perspectives.	2	Case Studies and Debate Workshop: The Future of Digital Finance.	2		
	Practical work - Analysis and critical evaluation of the chosen topic.	2	Practical work - Analysis and critical evaluation of the chosen topic.	2		
	Project - Development and implementation of a practical solution.	2	Project - Development and implementation of a practical solution.	2		
Format of instruction	× <u>lectures</u> × <u>seminars and workshops</u> × <u>exercises</u> ☐ <i>on line</i> in entirety × <u>partial e-learning</u> ☐ field work		× <u>independent assignments</u> ☐ multimedia ☐ laboratory × <u>work with mentor</u> ☐ (other)			
Student responsibilities	Students are obliged to attend classes. Condition for taking the exam is to attend at least 70% of lectures and 70% of exercises, as well as completing and documenting all independent assignments. Students are required to actively participate in classes, discussions, and group assignments.					
Screening student work (<i>name the</i>	Class attendance	2 ECTS	Research		Practical work	1 ECTS

proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Experimental work		Report		Individual tasks	1 ECTS
	Essay		Seminar essay		(Other)	
	Tests		Oral exam		(Other)	
	Written exam		Project	1 ECTS	(Other)	
Grading and evaluating student work in class and at the final exam	The intention is that all students who have fulfilled conditions for taking the exam by attending classes and completing independent tasks pass the course during/until the end of the class. By working in a team, students are obliged to create and present within the class, the Practical work - Analysis and critical evaluation of the chosen topic, and the Project - Development and implementation of a practical solution, where individual contribution is mandatory. Both the practical work and the project must be positively evaluated in order for the student to be entitled to a final positive evaluation. The overall grade is formed as an average of the grades obtained for practical work and the project. If students do not pass the course in the manner described, they can create and present a practical work and project, or the missing part (practical work or project) during the exam deadlines. Once a practical work or project is positively evaluated, it remains valid until the end of the academic year.					
Required literature (available in the library and via other media)	Title				Number of copies in the library	Availability via other media
	Burniske, C., Tatar, J. (2018). Cryptoassets – The Innovative Investor's Guide to Bitcoin and Beyond. McGraw Hill.					
	Drescher, D. (2017). Blockchain basics: A non-technical introduction in 25 steps. Apress.					
	Harvey, C.R., Ramachandran, A., Santoro, J. (2021). DeFi and the Future of Finance. Wiley.					
	Vrdoljak, A. T. (2024). The relationship between the concept of financial literacy and investments in cryptocurrencies. Doctoral dissertation. FEBT Split.					
	Teaching materials on the Merlin course.page					Merlin
Optional literature (at the time of submission of study programme proposal)	- Allen, F., Gu, X., & Jagtiani, J. (2022). Fintech, Cryptocurrencies, and CBDC: Financial Structural Transformation in China. <i>Journal of International Money and Finance</i>, Vol. 124. https://doi.org/10.1016/j.jimonfin.2022.102625. - Aljinović, Z., Šestanović, T., Škrabić Perić, B. (2022). A New Evidence of the Relationship between Cryptocurrencies and other Assets from the COVID- 19 Crisis. <i>Ekonomický časopis</i>, 70, 7-8; 603-621. - Aljinović, Z., Marasović, B., Kalinić Miličević, T. (2021). AN EVIDENCE ON RISK AND RETURN OF CRYPTOCURRENCIES. <i>Proceedings of the 16 th International Symposium on Operational Research in Slovenia</i>, SOR'21. Ljubljana: Slovensko društvo informatika, 495-500. - Aljinović, Z., Marasović, B., Šestanović, T., (2021). Cryptocurrency Portfolio Selection—A Multicriteria Approach. <i>Mathematics</i>, 9, 14; 1677, 21.					

	• Ammous, S. (2020). Bitcoin standard – Decentralizirana alternativa središnjem bankarstvu. Wiley. MATE. • Aydaner, G., & Okuyan, H. A. (2024). Decentralized finance: A comparative bibliometric analysis in the Scopus and WoS databases. <i>Futur Business Journal</i>, 10(88). https://doi.org/10.1186/s43093-024-00380-y. • Baer, K., De Mooij, R. A., Hebous, S., & Keen, M. (2023). Taxing Cryptocurrencies. <i>CESifo Working Paper No. 10372</i>. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4422847. • Buterin, V. (2014). Ethereum whitepaper: A next-generation smart contract and decentralized application platform. • Calcaterra, C.J., Kaal, W.A. (2021). Decentralization – Technology's Impact on Organizational and Societal Structure. De Gruyter. • De Marchi, L. (2021). Financial capital goes to heaven: Bitcoin, fintech 3.0 and the massification of the indebted man. <i>MATRIZes</i>, 15(2), 205–227. • Le, T. L., Abakah, E. J. A., & Tiwari, A. K. (2021). Time and frequency domain connectedness and spill-over among fintech, green bonds and cryptocurrencies in the age of the fourth industrial revolution. <i>Technological Forecasting and Social Change</i>, Vol. 162. https://www.sciencedirect.com/science/article/pii/S0040162520312087. • Makarov, I., & Schoar, A. (2022). Cryptocurrencies and decentralized finance (DeFi). <i>Brookings Papers on Economic Activity</i>, Spring, 141–196. • Makarov, I., & Schoar, A. (2022). Cryptocurrencies and decentralized finance (DeFi) (<i>NBER Working Paper No. 30006</i>). National Bureau of Economic Research. http://www.nber.org/papers/w30006. • Makridis, C. A., Fröwis, M., Sridhar, K., & Böhme, R. (2023). The rise of decentralized cryptocurrency exchanges: Evaluating the role of airdrops and governance tokens. <i>Journal of Corporate Finance</i>, Vol. 79. https://doi.org/10.1016/j.jcorpfin.2023.102358. • McFarland, E. (2021). Blockchain wars – The Future of Big Tech Monopolies and the Blockchain Internet. Evan McFarland. • Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System. • Ozili, P. K. (2022). Decentralized finance research and developments around the world. <i>Journal of Banking and Financial Technology</i>, Vol. 6, 117–133. • Rane, N., Choudhary, S., & Rane, J. (2023). Blockchain and artificial intelligence (AI) integration for revolutionizing security and transparency in finance. SSRN. https://doi.org/10.2139/ssrn.4644253. • Schär, F. (2021). Decentralized finance: On blockchain- and smart contract-based financial markets. <i>Federal Reserve Bank of St. Louis Review</i>. • Taherdoost, H. (2023). Smart Contracts in Blockchain Technology: A Critical Review. <i>Information</i>, 14, 117. • Weichbroth, P., Wereszko, K., Anacka, H., & Kowal, J. (2023). Security of Cryptocurrencies: A View on the State-of-the-Art Research and Current Developments. <i>Sensors</i>, 23(6), 3155. • Online sources: Web portals and journals such as CoinDesk, CoinTelegraph, and IEEE Xplore.
Quality assurance methods that ensure the acquisition of exit	• Monitoring of class attendance and the successful performance of other student obligations (teacher) • Supervision of teaching (vice dean for teaching) • Analysis of study success in all study subjects (vice dean for teaching)

competences	• Student survey on the quality of teachers and teaching for each course (UNIST, Center for Quality Assurance) • All the learning outcomes of the course are checked with practical papers evaluated by the subject teacher. Evaluation of the content of practical works is periodically carried out in order to determine the appropriateness of the way of checking learning outcomes, and the supervision of this process is carried out by the vice dean for teaching.
Other (as the proposer wishes to add)	