NAME OF THE COURSE	Multidimensional information systems					
Code	EUB405	Year of study	II			
Course teacher	Full Professor Željko Garača, PhD Full Professor Maja Ćukušić, PhD	Credits (ECTS)	5 ECTS			
Associate teachers	Ivana Ninčević Pašalić	Type of instruction (number of hours)	L	S	E	F
			26		26	
Status of the course	Compulsory	Percentage of application of e-learning	40%			

COURSE DESCRIPTION

Course objectives	• Get a comprehensive understanding of the concepts and solutions for data storage and business data analysis. • Develop the ability to use tool(s) for the entire process of data warehousing and data processing (from data modeling and ETL, to presentation & visualization of data to end users using OLAP reports).
Course enrolment requirements and entry competences required for the course	Understanding of basic concepts of relational databases. Basic knowledge of MS Office Access.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Devise the process of business data analytical processing using multidimensional information systems. 1. Re-examine the importance of data warehouse and OLAP systems for business analysis. 2. Compare relational and multidimensional data model. 3. Develop an appropriate multidimensional data model for a specific business problem. 4. Develop ETL process for a specific business problem. 5. Present business data using interactive OLAP analyzes and reports.

Course content broken down in detail by weekly class schedule (syllabus)

Week	Lectures:		Exercises:	
	Topic	Hours	Topic	Hours
1	Defining multidimensional information systems. Different meanings of the OLAP concept.	2	ERP systems and reporting. Microsoft Dynamics NAV, the system and its functions. Introduction to OLAP component.	2
2	Functional requirements of OLAP systems. Logical and physical requirements. Limitations of SQL, relational databases and spreadsheets.	2	Microsoft Dynamics NAV OLAP component.	2
3	Dimensions. Multidimensional types of data. Hierarchical structuring. Dimension hierarchy.	2	Microsoft Dynamics NAV OLAP component. Connecting Dynamics NAV with MS Excel.	2

	4	Metrics. Visualization of multidimensional data.	2	Basics of Microsoft SQL Server.	2
	5	Hyper cubes. Multidimensional data scheme.	2	Microsoft SQL Server data warehouse. Database design for OLAP reporting.	2
	6	Star and snowflake data models.	2	Microsoft SQL Server and Business Intelligence Development Studio (Integration Services).	2
	7	Multidimensional formulas. Hierarchical formulas.	2	Microsoft SQL Server and Business Intelligence Development Studio (Analysis Services).	2
	8	Test			
	9	Complex multidimensional formulas. Aggregation formulas. Sources of data. Links to data sources. Types of connections.	2	Microsoft SQL Server and Business Intelligence Development Studio (Reporting Services). CubePlayer OLAP client, functionality and connectivity to MS SQL Server 2008.	2
	10	Transformations of data. Pre-aggregating.	2	Modelling in OLAP Cube Player.	2
	11	Designing OLAP models. Specification of user requirements.	2	Modelling in OLAP Cube Player.	2
	12	Problems and limitations of OLAP models.	2	Reporting with SAP Crystal Reports.	2
	13	OLAP applications.	2	Reporting with SAP Crystal Reports.	2
	14	Data visualization. Presentations of case studies OLAP system applications.	2	Reporting with IBM Cognos Insight. Final Assignment presentations.	2
	15	Test			

Format of instruction	x lectures x seminars and workshops x exercises ☐ *on line* in entirety x partial e-learning ☐ field work	x independent assignments x multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	The course work can be described as a method of continuous student progress evaluation since a model of accumulation of points has been formulated which enables the student to collect points through various activities. The goal is that every student collects sufficient number of points corresponding to a grade during the semester. In this model, a low result in one activity can be compensated by points in other activities and enabling students to decide how to allocate their efforts. Requirement for taking the test: 4 out of 7 assignments completed for the first test, and 4 out of 6 for the second test.	

	Requirements for the exam are completed final assignment and case study as well as participating in at least 50% of all class meetings (25% for the part-time students).					
Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1,7 ECTS	Research		Practical training	
	Experimental work		Report		Tests (Other)	
	Essay	0,5 ECTS	Seminar essay		Final assignment (Other)	1 ECTS
	Tests	1,6 ECTS	Oral exam		Workshop attendance (Other)	0,2 ECTS
	Written exam		Project		(Other)	
Grading and evaluating student work in class and at the final exam	Requirements for the exam exemption: a total of 71 points achieved overall based on the tests, assignments, and homework during the semester. Through additional engagement and active participation (for example by submitting critical review of the book chapters and coursework), the student can get up to 14 bonus points. In the case of exam exemption, the score is based on the total number of points where every five points give a higher grade. Up to 10 points can be achieved in the oral part of the exam. Threshold and related grades: 0-70 insufficient (1) 71-75 sufficient (2) 76-80 good (3) 81-85 very good (4) 86-100 excellent (5) If a student does not have enough points from the assessment activities during the semester, he or she is required to take the final exam. The final exam can be organized in a written and/or oral way. The questions in the exam are of the essay-type.					

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Garača, Ž. & Ćukušić, M. (Eds.) (2011) *Višedimenzijski informacijski sustavi: Skladištenje i analitička obrada podataka.* Split, Ekonomski fakultet u Splitu.		Available online (from the institutional repository and via Moodle LMS)
	Richardson, J. et al. (2021) *Magic Quadrant for Analytics and Business Intelligence Platforms*, Gartner.		Available online (via Moodle LMS)
Optional literature (at the time of submission of study	Stephen Few (2021) Now You See It: An Introduction to Visual Data Sensemaking, Second Edition, Analytics Press.		

programme proposal)	Papers: • Mijač, Tea; Jadrić, Mario; Ćukušić, Maja: The Potential and Issues in Data-Driven Development of Web Personas // mipro proceedings / Skala, Karolj (ur.). Rijeka : Croatian Society for Information and Communication Technology, Electronics and Microelectronics - MIPRO, 2018. 1427-1432. Other publications: • SAS: The future of big data is data management, 2015. (e-book) available in Moodle LMS and other sources (reports, papers, platform analyses) published in the e-course.
Quality assurance methods that ensure the acquisition of exit competences	• Monitoring attendance and performance of other student obligations (teacher) • Teaching Supervision (Vicedean for Teaching) • Analysis of the success of studies in all subject studies (Vicedean for Teaching) • Student Survey on the Quality of Teachers and Teaching for Each Subject Study (UNIST, Center for Quality Improvement) • The exam conducted by the subject teacher examines all learning outcomes of the subject. Periodic examination of the content of the exam is conducted on the basis of which the appropriateness of the method of checking the learning outcomes (Vicedean for Teaching)
Other (as the proposer wishes to add)	