UNIVERSITY OF INFORMATION SCIENCE AND TECHNOLOGY

"ST. PAUL THE APOSTLE" IN OHRID

Faculty of Information and Communication Sciences

ELABORATE

FOR RE-ACCREDITATION AND DENOMINATION OF THE STUDY PROGRAMME

Digital Business Analytics

Second Cycle of Studies

One-year Studies

PROPOSING INSTITUTION:

UNIVERSITY OF INFORMATION SCIENCE AND TECHNOLOGY

"ST. APOSTLE PAUL" IN OHRID

Faculty of Information and Communication Sciences (FICS)

Ohrid, 2023

STRUCTURE OF THE STUDY PROGRAMME

Table 6.1. Schedule of courses by semesters and years for academic studies (AS)

No.	Course Code	Course Title	Semester	L	E	ECTS
FIRST YEAR						
1	ICS21M01	Data-Driven Business Systems	IX (winter)	2	1	6
2	ICS21M02	Consumer and Market Analytics	IX (winter)	2	1	6
3	ICS21M03	IT Risk Management	IX (winter)	2	1	6
4	ICS21M04	Data-Driven Decision Making	IX (winter)	2	1	6
5	ICS21Exx	Elective Course*	IX (winter)	2	1	6
6	ICS22M01	Financial Forecasting	X (summer)	2	1	6
7	ICS22Exx	Elective Course*	X (summer)	2	1	6
8	ICS22Exx	Elective Course*	X (summer)	2	1	6
9	ICS22M03	Master's Thesis	X (summer)	–	–	12
Total hours (lectures/exercises) and ECTS for the year				**16**	**8**	**60**

** Elective course from the list of elective courses proposed by the unit (Table 4.2.1)*

Table 6.2. Elective Courses of the Study Programme

Type of Elective Course	Number
Elective courses from the list of elective courses proposed by the unit	3
Elective courses provided by the unit from the University elective course list	0

Table 6.2.1. List of Elective Courses Proposed by the Unit

No.	Code	Course Title	Semester	L	E	ECTS	Unit
1	ICS21E01	Project and Quality Management	IX	2	1	6	FICS
2	ICS21E02	Marketing and Digital Communications	IX	2	1	6	FICS
3	ICS21E03	Python for Data Science	IX	2	1	6	FICS
4	ICS21E04	Digital Transformation	IX	2	1	6	FICS
5	ICS21E05	Pricing Analytics and Revenue Management	IX	2	1	6	FICS
6	ICS21E06	Data Modeling	IX	2	1	6	FICS
7	ICS21E07	Digital Marketing Strategies	IX	2	1	6	FICS
8	ICS21E08	Database Management Systems	IX	2	1	6	FICS
9	ICS21E09	Digital Forensics	IX	2	1	6	FICS
10	ICS21E10	Strategic Management	X	2	1	6	FICS
11	ICS22E11	Digital Business Platforms	X	2	1	6	FICS
12	ICS22E12	Big Data Analytics	X	2	1	6	FICS
13	ICS22E13	Business Analytics and Cloud Computing	X	2	1	6	FICS
14	ICS22E14	Financial Risk Analytics	X	2	1	6	FICS

15	ICS22E15	Communication Systems and Simulations	X	2	1	6	FICS
16	ICS22E16	Fog and Edge Computing	X	2	1	6	FICS
17	ICS22E17	Large-Scale Social Network Analysis	IX	2	1	6	FICS
18	ICS21E18	Business Analytics: Applied Modeling and Forecasting	X	2	1	6	FICS
19	ICS22E19	Business Process Mining	X	2	1	6	FICS
20	ICS22E20	Managing IT Startups	X	2	1	6	FICS
21	ICS22E21	Cybersecurity	X	2	1	6	FICS
22	ICS22E22	Supply Chain Analytics	X	2	1	6	FICS
23	ICS22E23	Business Analytics – Applied in a Project	X	2	1	6	FICS
24	ICS22E24	Digital Transformation and Society	X	2	1	6	FICS
25	ICS22E25	Privacy and Data Protection	X	2	1	6	FICS
26	ICS22E26	Applied e-Ethics	IX	2	1	6	FICS

Table 6.3. Overview of Mandatory and Elective Courses by Semester

Semester	Mandatory Courses	Elective Courses	Total
IX (ninth)	4	1	5
X (tenth)	2	2	4
Total	6	3	9
% representation	66.7%	33.3%	100%

Table 6.4. Overview of the Percentage Representation of Mandatory and Elective Courses

No.	Duration / Total ECTS	Total ECTS (A)	A1 – % of course ECTS	Mandatory ECTS (B)	B1 – % of mandatory ECTS	Elective ECTS (C)
1.	1 year / 60	60	100%	42	70%	18

ANNEX NO. 3

1. Course Syllabuses with Information Pursuant to Article 4 of the Regulation on Mandatory Components of Second Cycle Study Programmes

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Data-Driven Business Systems			
2.	Code	ICS21M01			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / IX semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Aleksandar Karadimche, PhD			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): Students will: • understand e-business systems and their components • learn and apply basic methods and procedures for creating and modifying e-Business systems in the organization • acquire knowledge and skills for using web and e-Business applications				
11.	Course content: Introduction to business information systems, Information systems in the operation of companies, Hardware and software elements, Data processing, Data exchange and internet technologies, E-commerce system, Supply chain system, Business intelligence and knowledge management, Development and creation of systems, Management of information systems in the company, Information security management.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests			60 points
	17.2.	Individual work/project (presentation: written and oral)			30 points
	17.3.	Activity and participation			10 points
18.	Evaluation criteria (points/grade)		up to 50 points		5 (five) (F)
			51 x to 60 points		6 (six) (E)
			61 x to 70 points		7 (seven) (D)
			from 71 to 80 points		8 (eight) (C)

			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	
19.	Requirement for signature and passing the final exam		Students should ensure regular attendance of classes according to the regulations of UINT		
20.	Language of instruction		English, Macedonian		
21.	A method of monitoring the quality of teaching		Monitoring of UINT control procedures		
22.	Literature				
	22.1.	Required reading			
		Ord. number	Author	Title	Publisher	Year
		1.	Paige Baltzan	Business driven information systems 7/ed	McGraw Hill	Paige Baltzan
		2.	Wayne Winston	Microsoft Excel Data Analysis and Business Modeling (Office 2021 and Microsoft 365)	Microsoft Press	Wayne Winston
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	R.Kelly Rainer, Brad Prince, Casey G. Ceglieski	Introduction to information systems 5/ed	Wiley	R.Kelly Rainer, Brad Prince, Casey G. Ceglieski
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Consumer and Market Analytics			
2.	Code	ICS21M02			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / IX semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Jovanka Damoska Sekuloska / Dr. Aneta Velkoska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): This course offers students methods, tools, and techniques for quantitative and qualitative analysis of market and consumer behavior. These are key in determining and deciding on product strategies and introducing new products and services.				
11.	Course content:				

	Introduction to Consumer Behavior in the Market – Consumer Analytics; Quantifying Customer Value; Micro-aspects of Consumption – Decision Making, Learning, Perception, Attitudes, Personality; Macro-aspects of Consumption – Groups, Culture, Behavioral Models; Digital Aspects; Sustainability; Future Trends in Consumer Behavior				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests			60 points
	17.2.	Individual work/project (presentation: written and oral)			30 points
	17.3.	Activity and participation			10 points
18.	Evaluation criteria (points/grade)		up to 50 points		5 (five) (F)
			51 x to 60 points		6 (six) (E)
			61 x to 70 points		7 (seven) (D)
			from 71 to 80 points		8 (eight) (C)
			from 81 to 90 points		9 (nine) (B)
			from 91 to 100 points		10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			
22.	Literature				
	22.1.	Required reading			
		Ord. number	Author	Title	Publisher	Year
		1.	Isabelle Szmigin and Maria Piacentini	Consumer Behaviour 3ed	Oxford	2022
		2.	Chuck Chakrapani	Analytics for Customer Insight: a non-technical introduction	Standard Research System	2018
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year

		1.	Mike Grigsby	Marketing Analytics: A Practical Guide to Improving Consumer Insights Using Data Techniques 3rd ed.	Kogan Page	2022
		2.	Jean Claude Larreche and Hubert Gatignon	MARKSTRAT3: The Strtegic Marketing Simulation 3ed.	South-Western College	1997

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	IT Risk Management			
2.	Code	ICS21M03			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / IX semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Full Professor Dr. Ustijana Rechkoska Shikoska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): By the end of the course, students will be able to: Discuss the impact of the broader business environment on organizations and the risk management issues it raises; Illustrate the key features of a risk management framework; Explain the significance of culture, appetite, and tolerance in relation to risk management; Explain the key characteristics of corporate governance models, project risk management, and operational risk management systems; Discuss the nature and purpose of internal control, audit, and risk assurance techniques; Analyze real-life cases and identify key lessons in risk management; Manage IT risks in organizations in specific cases.				
11.	Course content: Introduction to IT Risk Management; Establishing the Risk Context; Risk Assessment (quantitative and qualitative); Risk Identification; Risk Analysis; Risk Evaluation; Risk Treatment (mitigation, transfer, acceptance, avoidance); Risk Monitoring and Review; Risk Assessment and Management Methods (NIST, OCTAVE, FRAP, COBRA, Risk Watch, FMEA); Development of Risk Management Methods; Risk Management Strategy. Global Business Environment – business environment and risk, organizational vision and values, contribution of risk management to business success. Risk Strategy and Framework – risk architecture, strategy, and protocols, risk management documentation and responsibilities. Risk Culture, Appetite, and Tolerance – organizational behavior and culture, risk appetite and tolerance, risk training and communication. Risk and Organizations – introduction to corporate governance, stakeholder identification, introduction to project risk management, operational risk management, and supply chain management. Risk Assurance and Reporting – the control environment, internal audit, risk assurance techniques, risk reporting, and corporate reputation. Case Studies in Organizational Risk – real-world case studies, new risks and future developments.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				

13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours		
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours		
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching	30 hours
		15.2.	Exercises (laboratory, classroom), teamwork	15 hours
16.	Other forms of activities	16.1.	Project tasks	50 hours
		16.2.	Independent tasks	35 hours
		16.3.	Home study - assignments	50 hours
17.	Method of assessment 60 + 30 + 10			
	17.1.	Tests		60 points
	17.2.	Individual work/project (presentation: written and oral)		30 points
	17.3.	Activity and participation		10 points
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)
			51 x to 60 points	6 (six) (E)
			61 x to 70 points	7 (seven) (D)
			from 71 to 80 points	8 (eight) (C)
			from 81 to 90 points	9 (nine) (B)
			from 91 to 100 points	10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT		
20.	Language of instruction	English, Macedonian		
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures		

22. Literature

22.1. Required reading

Ord. number	Author	Title	Publisher	Year
1.	Michel Crouhy, Dan Galai, Robert Mark	The Essentials of Risk Management	McGraw Hill	2014
2.	Hull, John C.	Risk Management and Financial Institutions (4th Edition)	Pearson	2015

		3.	Jake Kouns, Daniel Minoli	Information Technology Risk Management in Enterprise Environments: A Review of Industry Practices and a Practical Guide to Risk Management Teams	John Wiley & Sons	2010
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	The Institute of Internal Audit (IIA)	Information Technology Risk and Controls (2nd Edition)	Global Technology Audit Guide	2012
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Data-Driven Decision Making			
2.	Code	ICS21M04			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / IX semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Aneta Velkoska, PhD			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): This course is designed to introduce and train students for a wide range of problems they are likely to encounter in their workplace. The key objectives are: removing any doubts students may have about data analysis, advancing analysis and synthesis tools, and developing a broad analytical intuition.				
11.	Course content: Fundamentals of database modeling and design; accessing, integrating, organizing, preparing, and transforming data for analysis; introduction to concepts, methods, and processes of business analysis for creating competitive advantage; statistical methods for data analysis, descriptive and inferential techniques, and regression modeling.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours

		15.2.	Exercises (laboratory, classroom), teamwork	15 hours
16.	Other forms of activities	16.1.	Project tasks	50 hours
		16.2.	Independent tasks	35 hours
		16.3.	Home study - assignments	50 hours

17.	Method of assessment 60 + 30 + 10		
	17.1.	Tests	60 points
	17.2.	Individual work/project (presentation: written and oral)	30 points
	17.3.	Activity and participation	10 points

18.	Evaluation criteria (points/grade)	up to 50 points	5 (five) (F)
		51 x to 60 points	6 (six) (E)
		61 x to 70 points	7 (seven) (D)
		from 71 to 80 points	8 (eight) (C)
		from 81 to 90 points	9 (nine) (B)
		from 91 to 100 points	10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT	
20.	Language of instruction	English, Macedonian	
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures	

22. Literature

22.1. Required reading

Ord. number	Author	Title	Publisher	Year
1.	A. Sahay	Business Analytics, Volume I: A Data-Driven Decision Making Approach for Business	Business Expert Press	2015
2.				
3.				

22.2. additional literature

Ord. number	Author	Title	Publisher	Year
1.				
2.				

Attachment No. 3		**Subject program of the second cycle of studies**
1.	Title of the teaching subject	Financial Forecasting
2.	Code	ICS22M01
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS

4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Jovanka Damoska Sekuloska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): This course enables students to use methods, tools, and techniques to leverage available financial data for creating forecasted financial statements and indicators. The aim of financial forecasting is to support and facilitate the business and investment decision-making process.				
11.	Course content: Basic and advanced tools for financial analysis and forecasting; forecasting methods and models; forecasting financial statements; valuation of short-term securities; valuation of long-term securities and equity; financial risk management; financial decision-making models				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests			60 points
	17.2.	Individual work/project (presentation: written and oral)			30 points
	17.3.	Activity and participation			10 points
18.	Evaluation criteria (points/grade)		up to 50 points		5 (five) (F)
			51 x to 60 points		6 (six) (E)
			61 x to 70 points		7 (seven) (D)
			from 71 to 80 points		8 (eight) (C)
			from 81 to 90 points		9 (nine) (B)
			from 91 to 100 points		10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			
22.	Literature				
	22.1.	Required reading			
		Ord. number	Author	Title	Publisher	Year

		1.	Michael Samonas	Financial Forecasting, Analysis and Modeling: a framework for Long-term Forecasting 1ed	Wiley	2015
		2.	Simon Benninga and Tal Mofkadi	Financial Modeling 5th ed.	MIT Press	2022
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	Timothy R. Mayes	Financial Analysis with Microsoft Excel	Cengage Learning	2015
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Master's Thesis			
2.	Code	ICS22M03			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher				
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): The Master's Thesis must address the following key questions: Relevance of the research topic (justification of scientific and professional merit); Subject and objectives of the research; Plan for presenting the material (work plan); Research methodology; Literature for the research. The candidate must sign a declaration that the research represents their own original work and is not plagiarized.				
11.	Course content: The thesis volume for second cycle students should be between 60–80 pages for the narrative part. Technically, it should be prepared on A4 paper, portrait orientation, Times New Roman font with Macedonian language support, 12 pt. Left margin: 3.5 cm; right margin: 1.5 cm. Line spacing: 1.5. Text: justified. Single-sided printing. If the thesis includes survey forms or other data, these may be added in the appendices.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours

16.	Other forms of activities	16.1.	Project tasks	50 hours
		16.2.	Independent tasks	35 hours
		16.3.	Home study - assignments	50 hours
17.	Method of assessment 60 + 30 + 10			
	17.1.	Tests		60 points
	17.2.	Individual work/project (presentation: written and oral)		30 points
	17.3.	Activity and participation		10 points
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)
			51 x to 60 points	6 (six) (E)
			61 x to 70 points	7 (seven) (D)
			from 71 to 80 points	8 (eight) (C)
			from 81 to 90 points	9 (nine) (B)
			from 91 to 100 points	10 (ten) (A)
19.	Requirement for signature and passing the final exam		Students should ensure regular attendance of classes according to the regulations of UINT	
20.	Language of instruction		English, Macedonian	
21.	A method of monitoring the quality of teaching		Monitoring of UINT control procedures	

22. Literature

22.1.	Required reading				
	Ord. number	Author	Title	Publisher	Year
	1.	Violeta Panzova	Handbook for Writing Student Papers	Faculty of Philosophy – UKIM Skopje	2011
	2.				
	3.				
22.2.	additional literature				
	Ord. number	Author	Title	Publisher	Year
	1.				
	2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Project and Quality Management			
2.	Code	ICS21E01			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / IX semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Aleksandar Karadimche, PhD			

9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): The course covers key components of project management including project integration, scope management, time and cost management, quality management, human resources, communications, risk management, and procurement management. Students will also learn total quality management approaches, ethics and corporate responsibility, strategic alliances, quality culture, employee empowerment, leadership, team building, effective communication, and tools and techniques.				
11.	Course content: Quality Fundamentals: understanding quality in projects, evolution of quality, pioneers and paradigms. Quality Management: project quality planning, assurance, control, and improvement. Quality Management Tools: collecting and understanding project data, understanding and analyzing project processes, solving project problems. Quality in Practice: project systems and solutions.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching	30 hours	
		15.2.	Exercises (laboratory, classroom), teamwork	15 hours	
16.	Other forms of activities	16.1.	Project tasks	50 hours	
		16.2.	Independent tasks	35 hours	
		16.3.	Home study - assignments	50 hours	
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests		60 points	
	17.2.	Individual work/project (presentation: written and oral)		30 points	
	17.3.	Activity and participation		10 points	
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)	
			51 x to 60 points	6 (six) (E)	
			61 x to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			
22.	Literature				
	22.1.	Required reading			
		Ord. number	Author	Title	Publisher	Year

		1.	Kim H. Pries, Jon M. Quigley	Total Quality Management for Project Management	Auerbach Publications,CRC Press,	2012
		2.	Kenneth H Rose	Project Quality Management: Why, What and How	J. Ross Publishing, Second Edition	2014
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.				
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Marketing and Digital Communications			
2.	Code	ICS21E02			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / IX semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Jovanka Damoska Sekuloska / Dr. Mersiha Ismajloska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): The aim of the course is to provide both theoretical and practical knowledge of communications and digital marketing. Students will learn the specifics of communication using digital marketing tools.				
11.	Course content: Basic characteristics, forms, and channels of communication; Communication strategies; Content Marketing; Search Engine Optimization (SEO); Social Media Marketing; Digital forms of advertising; Web Analytics; E-mail Marketing; Search Engine Marketing (SEM).				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests			60 points

	17.2.	Individual work/project (presentation: written and oral)	30 points
	17.3.	Activity and participation	10 points

18.	Evaluation criteria (points/grade)	up to 50 points	5 (five) (F)
		51 x to 60 points	6 (six) (E)
		61 x to 70 points	7 (seven) (D)
		from 71 to 80 points	8 (eight) (C)
		from 81 to 90 points	9 (nine) (B)
		from 91 to 100 points	10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT	
20.	Language of instruction	English, Macedonian	
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures	

22. Literature

Required reading

Ord. number	Author	Title	Publisher	Year
1.	PR Smith and Ze Zook	Marketing communications: Integrating online and offline Customer engagement and digital technologies 7th ed.	Kogan Page	2019
2.	Simon Kingsnorth	Digital Marketing Strategy: an integrated approach to online marketing 3/ed	Kogan Page Limited	2022
3.				

22.1.

22.2. additional literature

Ord. number	Author	Title	Publisher	Year
1.	Tim Cameron	How to Get to the Top of Google: the Plain English Guide to SEO	Tim Cameron-Kitchen	2018
2.				

Attachment No. 3		**Subject program of the second cycle of studies**
1.	Title of the teaching subject	Python for Data Science
2.	Code	ICS21E03

3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / IX semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Ljubinka Sandzakoska / Dr. Daniela Mechkaroska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): Students will acquire knowledge of what data science is and in which domains it is applicable; become competent in creating data models and analyzing them using Python; be trained to process data with Python to extract knowledge/value for a company; gain specialization in using IPython, Jupyter, NumPy, Pandas, Matplotlib, and Scikit-Learn				
11.	Course content: Python Fundamentals Review; Concepts and Working Environment; Control Statements and Program Development, Functions; Sequences: Lists and Tuples; Dictionaries and Sets; NumPy; Array-Oriented Programming with NumPy; Strings; Files and Exceptions; Working with Pandas, Matplotlib, and Scikit-Learn packages – theoretical foundation and case studies.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests			60 points
	17.2.	Individual work/project (presentation: written and oral)			30 points
	17.3.	Activity and participation			10 points
18.	Evaluation criteria (points/grade)		up to 50 points		5 (five) (F)
			51 x to 60 points		6 (six) (E)
			61 x to 70 points		7 (seven) (D)
			from 71 to 80 points		8 (eight) (C)
			from 81 to 90 points		9 (nine) (B)
			from 91 to 100 points		10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			

22.	Literature					
	22.1.	Required reading				
		Ord. number	Author	Title	Publisher	Year
		1.	Laura Igual, Santi Seguí	Introduction to Data Science A Python Approach to Concepts, Techniques and Applications	Springer	2017
		2.	Paul Deitel, Harvey Deitel	Intro to Python for Computer Science and Data Science: Learning to Program with AI, Big Data and The Cloud 1st Edition	Pearson	2019
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	Jake VanderPlas	Python Data Science Handbook: Essential Tools for Working with Data 2nd Edition	Elsevier ISBN: 9780128117606	2016
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Digital Transformation			
2.	Code	ICS21E04			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / IX semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Aleksandar Karadimche, PhD			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): Upon successful completion, the student will understand how companies using digital technologies drive significantly higher levels of profit, productivity, and performance; recognize how traditional				

	businesses must reexamine their core assumptions across five strategic domains – customers, competition, data, innovation, and value; understand how to build digital capabilities by re-examining business processes, customer engagements, and business models; and learn how to leverage customer networks, platforms, big data, rapid experimentation, and disruptive business models.				
11.	Course content: Introduction to digital transformation; Creating close customer experiences; Harnessing the power of core operations; Reinventing business models; Crafting your digital vision; Engaging the organization at scale; Managing the transformation; Building technology leadership capabilities. The Five Domains of Digital Transformation: Customers, Competition, Data, Innovation, Value; Leveraging customer networks; Building platforms not just products; Turning data into assets; Innovating with rapid experimentation; Adapting your value proposition; Mastering disruptive business models.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching	30 hours	
		15.2.	Exercises (laboratory, classroom), teamwork	15 hours	
16.	Other forms of activities	16.1.	Project tasks	50 hours	
		16.2.	Independent tasks	35 hours	
		16.3.	Home study - assignments	50 hours	
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests		60 points	
	17.2.	Individual work/project (presentation: written and oral)		30 points	
	17.3.	Activity and participation		10 points	
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)	
			51 x to 60 points	6 (six) (E)	
			61 x to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			
22.	Literature				
	22.1.	Required reading			
		Ord. number	Author	Title	Publisher	Year

		1.	David L. Rogers	The Digital Transformation Playbook: Rethink Your Business for the Digital Age	Columbia University Press,	2016
		2.	George Westerman, Didier Bonnet, Andrew McAfee	Leading Digital: Turning Technology into Business Transformation	Harvard Business Review Press,	2014
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.				
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Pricing Analytics and Revenue Management			
2.	Code	ICS21E05			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / IX semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Jovanka Damoska Sekuloska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): This course offers students tools for understanding the tactical function of pricing and revenue optimization. Students will learn how to use analytical techniques for pricing management in complex and dynamic environments				
11.	Course content: Introduction to Revenue and Pricing Optimization; Demand Models; Price Response Estimation; Optimization; Price Differentiation; Pricing with Constrained Supply; Revenue Management; Capacity Allocation; Network Management; Overbooking Concept; Markdown Management; Customized Pricing; Behavioral Economics and Pricing				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours

16.	Other forms of activities	16.1.	Project tasks	50 hours
		16.2.	Independent tasks	35 hours
		16.3.	Home study - assignments	50 hours
17.	Method of assessment 60 + 30 + 10			
	17.1.	Tests		60 points
	17.2.	Individual work/project (presentation: written and oral)		30 points
	17.3.	Activity and participation		10 points
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)
			51 x to 60 points	6 (six) (E)
			61 x to 70 points	7 (seven) (D)
			from 71 to 80 points	8 (eight) (C)
			from 81 to 90 points	9 (nine) (B)
			from 91 to 100 points	10 (ten) (A)
19.	Requirement for signature and passing the final exam		Students should ensure regular attendance of classes according to the regulations of UINT	
20.	Language of instruction		English, Macedonian	
21.	A method of monitoring the quality of teaching		Monitoring of UINT control procedures	

22. Literature

22.1. Required reading

Ord. number	Author	Title	Publisher	Year
1.	Philips, R.	Pricing and Revenue Optimization	Stanford University Press	2005
2.	Tudor B. and Ferguso, M.	Segmentation, Revenue Management and Pricing Analytics	Routledge	2013
3.	Gallego, G and Topaloglu, H.	Revenue Management and Pricing Analytics	Springer	2019

22.2. additional literature

Ord. number	Author	Title	Publisher	Year
1.				
2.				

Attachment No. 3		**Subject program of the second cycle of studies**
1.	Title of the teaching subject	Data Modeling
2.	Code	ICS21E06
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS

4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / IX semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Atanas Hristov			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): Understand the fundamentals of normalization and why it is important for transactional databases; develop logical and physical data models; model data security, privacy, and protection requirements; understand when and where to model specific database requirements; understand how model-driven development fits in DevOps or agile environments; model data warehouses.				
11.	Course content: Fundamentals of database modeling and design; accessing, integrating, organizing, preparing, and transforming data for analysis; introduction to concepts, methods, and processes of business analysis for creating competitive advantage; statistical methods for data analysis, descriptive and inferential techniques, and regression modeling.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests			60 points
	17.2.	Individual work/project (presentation: written and oral)			30 points
	17.3.	Activity and participation			10 points
18.	Evaluation criteria (points/grade)		up to 50 points		5 (five) (F)
			51 x to 60 points		6 (six) (E)
			61 x to 70 points		7 (seven) (D)
			from 71 to 80 points		8 (eight) (C)
			from 81 to 90 points		9 (nine) (B)
			from 91 to 100 points		10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			

22.	Literature					
	22.1.	Required reading				
		Ord. number	Author	Title	Publisher	Year
		1.	Simison, Graeme. C. & W	Data Modeling Essentials.3rd Edition	Morgan Kauffman Publishers	5
		2.	Andy Oppel	Data Modeling: A Beginner's Guide 1st Edition	McGraw-Hill Education	2010
		3.	Steve Hoberman	Data Modeling Made Simple: A Practical Guide for Business and IT Professionals, 2nd Edition	Technics Publications	
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.				
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Digital Marketing Strategies			
2.	Code	ICS21E06			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / IX semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Jovanka Damoska Sekuloska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): The aim of the course is for students to acquire theoretical and practical knowledge about the types of strategies applied in digital marketing. Through use of various tools and techniques in practical exercises and projects, students will gain practical knowledge of applying digital channels to achieve marketing goals.				
11.	Course content: Introduction to digital marketing strategies and channels; Search Marketing; E-mail Marketing; Advertising and the Advertising Environment; Social Media Marketing; Mobile and Location-Based Marketing; Content Marketing; Marketing Strategy through New Emerging Technologies; Digital Product Strategies; Digital Pricing Strategies.				

12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests			60 points
	17.2.	Individual work/project (presentation: written and oral)			30 points
	17.3.	Activity and participation			10 points
18.	Evaluation criteria (points/grade)		up to 50 points		5 (five) (F)
			51 x to 60 points		6 (six) (E)
			61 x to 70 points		7 (seven) (D)
			from 71 to 80 points		8 (eight) (C)
			from 81 to 90 points		9 (nine) (B)
			from 91 to 100 points		10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			

22. Literature

22.1. Required reading

Ord. number	Author	Title	Publisher	Year
1.	Jeremi Kagan	Digital Marketing: Strategy and Tactics 2nd ed	Wessex inc	2020
2.	Simon Kingsnorth	Digital Marketing Strategy: an integrated approach to online marketing 3/ed	Kogan Page Limited	2022
3.				

22.2. additional literature

Ord. number	Author	Title	Publisher	Year

		1.	Tim Cameron	How to Get to the Top of Google: the Plain English Guide to SEO	Tim Cameron-Kitchen	2018
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Database Management Systems			
2.	Code	ICS21E08			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / IX semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Dijana Capeska Bogatinoska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): This course aims to provide knowledge of advanced concepts in database management systems. Upon completion, students should: have solid knowledge of data modeling and database design; gain solid knowledge of SQL and its use for data manipulation; use SQL at a higher level including correlated sub-queries, set operators, and existential qualification; understand query processing and optimization; compare ACID and BASE transaction models. Students will also be introduced to advanced concepts of performance, reliability, and security in database management systems				
11.	Course content: Introduction to database management systems; Data modeling and database design; SQL for data manipulation, table movement, and report selection; Correlated sub-querying, set operators, and existential qualification in SQL; Query processing in SQL; Big data analytics; Storage Management; Transaction processing; Parallel and distributed databases; Advanced topics (advanced indexing, Blockchain databases); ACID characteristics of relational and BASE characteristics of non-relational databases; Concurrency control; Database recovery systems; Backup and recovery techniques; Data security in database systems.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests			60 points
	17.2.	Individual work/project (presentation: written and oral)			30 points

	17.3.	Activity and participation		10 points
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)
			51 x to 60 points	6 (six) (E)
			61 x to 70 points	7 (seven) (D)
			from 71 to 80 points	8 (eight) (C)
			from 81 to 90 points	9 (nine) (B)
			from 91 to 100 points	10 (ten) (A)
19.	Requirement for signature and passing the final exam		Students should ensure regular attendance of classes according to the regulations of UINT	
20.	Language of instruction		English, Macedonian	
21.	A method of monitoring the quality of teaching		Monitoring of UINT control procedures	

22. Literature

22.1. Required reading

Ord. number	Author	Title	Publisher	Year
1.	Avi Silberschatz Henry F. Korth S. Sudarshan	Database System Concepts, Seventh Edition	McGraw-Hill	
2.	Ramez Elmasri, Shamkant B. Navathe	Fundamentals of Database Systems 7th Edition	Pearson	
3.	Ron Ben Natan	Implementing Database Security and Auditing	Digital Press	

22.2. additional literature

Ord. number	Author	Title	Publisher	Year
1.	Hector Garcia-Molina, Jeff Ullman, Jennifer Widom.	Database Systems: The Complete Book	Prentice Hall	
2.				

Attachment No. 3		**Subject program of the second cycle of studies**
1.	Title of the teaching subject	Digital Forensics
2.	Code	ICS21E09
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid

5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / IX semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Professor Dr. Ustijana Rechkoska Shikoska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): This course provides a way to understand internet security and various computer forensics technologies. Upon completion, the student should: understand the importance of firewalls and their types; analyze and validate data from computer forensic sciences; learn different threats related to information security and cyber warfare; learn tools and tactics related to cyber forensics.				
11.	Course content: 1. Network and Transport Layer Security – IPSec protocol, SSL/TLS protocols. 2. E-mail Security and Firewalls – PGP, S/MIME, internet firewalls, e-commerce transaction security. 3. Introduction to Computer Forensics – Fundamentals, types, forensic technologies, computer investigations, data collection. 4. Evidence Collection and Forensic Tools – Processing crime scenes, Windows/DOS systems, current software/hardware forensic tools. 5. Analysis and Evaluation – Forensic data evaluation, data concealment techniques, remote acquisition, network forensics, e-mail investigations, mobile device forensics				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests			60 points
	17.2.	Individual work/project (presentation: written and oral)			30 points
	17.3.	Activity and participation			10 points
18.	Evaluation criteria (points/grade)		up to 50 points		5 (five) (F)
			51 x to 60 points		6 (six) (E)
			61 x to 70 points		7 (seven) (D)
			from 71 to 80 points		8 (eight) (C)
			from 81 to 90 points		9 (nine) (B)
			from 91 to 100 points		10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			

22.	Literature					
	22.1.	Required reading				
		Ord. number	Author	Title	Publisher	Year
		1.	Man Young Rhee	Internet Security: Cryptographic Principles", "Algorithms and Protocols	Wiley Publications	
		2.				
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	John R.Vacca	Computer Forensics	Firewall Media,	2005
		2.	Marjie T.Britz	Computer Forensics and Cyber Crime: An Introduction	Pearson Education, 1st Edition,	2012

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Strategic Management			
2.	Code	ICS21E10			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Jovanka Damoska Sekuloska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): Students will: be able to effectively identify and structure competitive circumstances; use analytical tools to evaluate competitive scenarios; critically evaluate strategic alternatives available to a company.				
11.	Course content: Fundamentals of Strategic Management; Ethics, Social Responsibility, and Sustainability; Types of Strategies; Business Vision and Mission Analysis; Internal and External Audit; Strategy Formulation and Selection; Strategy Implementation; Strategy Execution; Strategy Monitoring.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours

		15.2.	Exercises (laboratory, classroom), teamwork	15 hours
16.	Other forms of activities	16.1.	Project tasks	50 hours
		16.2.	Independent tasks	35 hours
		16.3.	Home study - assignments	50 hours
17.	Method of assessment 60 + 30 + 10			
	17.1.	Tests		60 points
	17.2.	Individual work/project (presentation: written and oral)		30 points
	17.3.	Activity and participation		10 points
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)
			51 x to 60 points	6 (six) (E)
			61 x to 70 points	7 (seven) (D)
			from 71 to 80 points	8 (eight) (C)
			from 81 to 90 points	9 (nine) (B)
			from 91 to 100 points	10 (ten) (A)
19.	Requirement for signature and passing the final exam		Students should ensure regular attendance of classes according to the regulations of UINT	
20.	Language of instruction		English, Macedonian	
21.	A method of monitoring the quality of teaching		Monitoring of UINT control procedures	

22. Literature

22.1. Required reading

Ord. number	Author	Title	Publisher	Year
1.	Frank Rothaermel	Strategic Management 5/ed	McGraw Hill	2021
2.	Dess, Lumpkin, Eisner and McNamara	Strategic Management: Text and Cases	McGraw Hill	2020
3.	Charles W.L.Hill, Melissa A. Shilling and Gareth R. Jones	Strategic Management: Theory & Cases: An Integrated Approach 13/ed	Cengage	2019

22.2. additional literature

Ord. number	Author	Title	Publisher	Year
1.	Michael A. Hitt, R. Duane Ireland and Robert E. Hoskisson	Strategic Management: Concepts and Cases 13/ed	Cengage	2019

		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Digital Business Platforms			
2.	Code	ICS22E11			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Jovan Karamachoski			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): The goal of the programme is to enable students to identify, design, and evaluate business models for digital platforms, and to understand the dynamics of digital platform ecosystems. The course aims to give students a competitive advantage in preparing for their future careers.				
11.	Course content: Introduction; Ecological approach to strategy and digital business ecosystems; Open innovation and crowdsourcing models; The future of digital media; Business models in social and professional networks; Business platform models; Expanding digital businesses in the platform world; User-generated content; Long-tail models; Revenue generation; Internet of Things (IoT); Implications of smart connected products; Defining the digital ecosystem scope; Orchestrating business platforms; API definition; Reviewing factors that will change future business platforms				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching	30 hours	
		15.2.	Exercises (laboratory, classroom), teamwork	15 hours	
16.	Other forms of activities	16.1.	Project tasks	50 hours	
		16.2.	Independent tasks	35 hours	
		16.3.	Home study - assignments	50 hours	
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests		60 points	
	17.2.	Individual work/project (presentation: written and oral)		30 points	
	17.3.	Activity and participation		10 points	
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)	
			51 x to 60 points	6 (six) (E)	
			61 x to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	

			from 91 to 100 points	10 (ten) (A)	
19.	Requirement for signature and passing the final exam		Students should ensure regular attendance of classes according to the regulations of UINT		
20.	Language of instruction		English, Macedonian		
21.	A method of monitoring the quality of teaching		Monitoring of UINT control procedures		
22.	Literature				
	22.1.	Required reading			
		Ord. number	Author	Title	Publisher	Year
		1.	Parker, Geoffrey G; van Alstyne, Marshall W; Choudary, Sangeet Paul	Platform Revolution: How Networked Markets Are Transforming the Economy--And How to Make Them Work for You	W. W. Norton & Company	2016
		2.				
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	David L. Rogers	The Digital Transformation Playbook	Columbia University Press	2016
		2.	Chaffey, D., Hemphill, T. and Edmundson-Bird, D.	Digital Business and E-Commerce Management	Pearson Education Ltd.	2019

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Big Data Analytics			
2.	Code	ICS22E12			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Atanas Hristov			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies):				

	Big data analytics is one of the fastest growing areas in IT. The goal is to gain insight into which tools, algorithms, and platforms are best for solving real use cases. Students will acquire knowledge of big data analysis and be equipped to handle storage, processing, analysis, visualization, and application of big data for professional and research purposes.				
11.	Course content: 1. Introduction to Big Data Analytics; 2. Big Data Platforms; 3. Big Data Storage and Analytics; 4. Algorithms for Big Data Analytics; 5. Working with Hadoop; 6. Working with databases – Spark.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching	30 hours	
		15.2.	Exercises (laboratory, classroom), teamwork	15 hours	
16.	Other forms of activities	16.1.	Project tasks	50 hours	
		16.2.	Independent tasks	35 hours	
		16.3.	Home study - assignments	50 hours	
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests	60 points		
	17.2.	Individual work/project (presentation: written and oral)	30 points		
	17.3.	Activity and participation	10 points		
18.	Evaluation criteria (points/grade)	up to 50 points	5 (five) (F)		
		51 x to 60 points	6 (six) (E)		
		61 x to 70 points	7 (seven) (D)		
		from 71 to 80 points	8 (eight) (C)		
		from 81 to 90 points	9 (nine) (B)		
		from 91 to 100 points	10 (ten) (A)		
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			
22.	Literature				
	22.1.	Required reading			
		Ord. number	Author	Title	Publisher	Year
		1.				
		2.	Tom White	Hadoop: The Definitive Guide	O'Reilly Media	2015
		3.				
	22.2.	additional literature			
		Ord. number	Author	Title	Publisher	Year

		1.				
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Business Analytics and Cloud Computing			
2.	Code	ICS22E13			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Aleksandar Karadimche			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): Business analytics and knowledge of cloud computing technologies – privacy risks and economic benefits; applying systematic approach to assess advantages and disadvantages of alternatives; identifying customer needs; designing fault-tolerant corporate networks; creating virtual server solutions; installing and configuring virtual servers and clients; using cloud storage and virtualization services; deploying software applications via thin clients; implementing and managing virtual servers and data centers; developing Service Level Agreement skills				
11.	Course content: The course examines business cases and then focuses on the technologies needed to support them. Cloud computing technology principles; Virtualization, data communications, network management and operations, security and identity management; Cloud technology business models; Cloud to network operator delivery; Processor virtualization; Hypervisors; Data networks – the nervous system of the cloud; Cloud storage and modern data center structure; Cloud operations, management, and orchestration. Open-source case studies (based on OpenStack).				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching	30 hours	
		15.2.	Exercises (laboratory, classroom), teamwork	15 hours	
16.	Other forms of activities	16.1.	Project tasks	50 hours	
		16.2.	Independent tasks	35 hours	
		16.3.	Home study - assignments	50 hours	
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests		60 points	
	17.2.	Individual work/project (presentation: written and oral)		30 points	
	17.3.	Activity and participation		10 points	
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)	
			51 x to 60 points	6 (six) (E)	

				61 x to 70 points	7 (seven) (D)	
				from 71 to 80 points	8 (eight) (C)	
				from 81 to 90 points	9 (nine) (B)	
				from 91 to 100 points	10 (ten) (A)	
19.	Requirement for signature and passing the final exam			Students should ensure regular attendance of classes according to the regulations of UINT		
20.	Language of instruction			English, Macedonian		
21.	A method of monitoring the quality of teaching			Monitoring of UINT control procedures		
22.	Literature					
	22.1.	Required reading				
		Ord. number	Author	Title	Publisher	Year
		1.	Steve Jones and Frank M. Groom.	Enterprise cloud computing for non-engineers	CRC Press Taylor & Francis Group, 2nd edition	2018
		2.	Igor Faynberg, Hui-Lan Lu, Dor Skuler	Cloud Computing: Business Trends and Technologies	Wiley	2016
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.				
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Financial Risk Analytics			
2.	Code	ICS22E14			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Jovanka Damoska Sekuloska / Dr. Aneta Velkoska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies):				

	Upon course completion, students will be familiar with the basic concepts of risk management in the financial sector, equipped to measure and assess risk using appropriate methods and models, and able to apply instruments for dealing with risks and integrated risk management				
11.	Course content: Fundamentals of Financial Risk Management; Risk and Returns; Financial Implications and Risk Management; Measuring, Modeling, and Managing Market Risk; Interest Rate Risk; Credit Risk; Liquidity Risk; Operational Risk; Derivative Instruments for Risk Management; Integrated Risk Management Approach.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching	30 hours	
		15.2.	Exercises (laboratory, classroom), teamwork	15 hours	
16.	Other forms of activities	16.1.	Project tasks	50 hours	
		16.2.	Independent tasks	35 hours	
		16.3.	Home study - assignments	50 hours	
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests		60 points	
	17.2.	Individual work/project (presentation: written and oral)		30 points	
	17.3.	Activity and participation		10 points	
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)	
			51 x to 60 points	6 (six) (E)	
			61 x to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			

22. Literature

22.1. Required reading

Ord. number	Author	Title	Publisher	Year
1.	Poblacion Garcia, F.J.	Financial Risk Management: Identification, Measurement and Management	Palgrave Macmillan	2017

		2.	Edward Hon Khay Ng	Risk Analytics: From Concept to deployment	World Scientific	2021
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	John C. Hull	Risk Management & Financial Institutions 4th ed.	Willey	2010
		2.	Crouhy M., Galai D. and Mark R.	The Essentials of Risk Management 2nd ed.	McGraw Hill	2014

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Communication Systems and Simulations			
2.	Code	ICS22E15			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Atanas Hristov			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): This course aims to: provide comprehensive coverage of simulation concepts including random number and variable generation, channel modeling, noise, fading, receiver modeling, and performance evaluation; generate and test properties of random variables and processes; understand channel, filter, and noise models in communication systems; analyze receivers based on estimation of parameters such as SNR and BER; analyze cellular radio systems via simulation.				
11.	Course content: Introduction to Simulation – concepts, roles, types, limitations, mapping problems to simulation models, real-time simulations. Random Variables and Processes Simulation – random number generation, Gaussian and uniform numbers, Markov and ARMA sequences. Communication Systems Modeling – individual communication blocks, channel models, filter models, noise and fading models, receiver models. Performance Measure Estimation – SNR estimation, BER, Monte Carlo simulation. Cellular Radio System Simulation – system-level modeling, simulation methodology, processing simulation results.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours

		15.2.	Exercises (laboratory, classroom), teamwork	15 hours
16.	Other forms of activities	16.1.	Project tasks	50 hours
		16.2.	Independent tasks	35 hours
		16.3.	Home study - assignments	50 hours

17.	Method of assessment 60 + 30 + 10		
	17.1.	Tests	60 points
	17.2.	Individual work/project (presentation: written and oral)	30 points
	17.3.	Activity and participation	10 points

18.	Evaluation criteria (points/grade)	up to 50 points	5 (five) (F)
		51 x to 60 points	6 (six) (E)
		61 x to 70 points	7 (seven) (D)
		from 71 to 80 points	8 (eight) (C)
		from 81 to 90 points	9 (nine) (B)
		from 91 to 100 points	10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT	
20.	Language of instruction	English, Macedonian	
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures	

22. Literature

22.1. Required reading

Ord. number	Author	Title	Publisher	Year
1.	Jeruchim M.C, Philip Balboan and Sam Shanmugam K,	Simulation of Communication System, modeling methodology and techniques	Plenum Press, New York,	2009
2.				
3.				

22.2. additional literature

Ord. number	Author	Title	Publisher	Year
1.	Law M, and Davide Kelton W,	Simulation Modeling and Analysis	McGraw Hill Inc., New York,	2010
2.	William H. Tranter, K. Sam Shanmugam, Theodore S. Rappaport, Kurt L. Kosbar ,	Principles of Communication System Simulation with Wireless Application	Pearson Education Private Limited,	2010

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Fog and Edge Computing			
2.	Code	ICS22E16			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Full Professor Dr. Ustijana Rechkoska Shikoska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): This course aims to familiarize students with the need for new computing paradigms, understand the main components of fog and edge computing architectures, identify potential technical challenges of the transition process, propose new solutions, analyze requirements driven by large data volumes and applications, and design and model appropriate infrastructures..				
11.	Course content: New Computing Paradigms; Business and IoT Challenges; C2F2T Integration Infrastructures; Autonomous Management and Orchestration; 5G Slicing; Software-Defined Cloud Slicing; Fog and Edge Slicing Management; Optimization and Modeling Frameworks; Middleware Edge Cloud Architectures; Elementary Edge Clouds; IoT Integration and Blockchain-Based Orchestration; Data in Fog; Big Data Analysis; Data Management; Privacy by Design; GDPR Constraints; Applications: Smart e-Health, Smart Surveillance, Smart Transportation; Predictive Analysis for Fog App Deployment; Testing Fog IoT Applications; ML Techniques for IoT System Defense.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests			60 points
	17.2.	Individual work/project (presentation: written and oral)			30 points
	17.3.	Activity and participation			10 points
18.	Evaluation criteria (points/grade)		up to 50 points		5 (five) (F)
			51 x to 60 points		6 (six) (E)
			61 x to 70 points		7 (seven) (D)
			from 71 to 80 points		8 (eight) (C)

				from 81 to 90 points	9 (nine) (B)	
				from 91 to 100 points	10 (ten) (A)	
19.	Requirement for signature and passing the final exam			Students should ensure regular attendance of classes according to the regulations of UINT		
20.	Language of instruction			English, Macedonian		
21.	A method of monitoring the quality of teaching			Monitoring of UINT control procedures		
22.	Literature					
	22.1.	Required reading				
		Ord. number	Author	Title	Publisher	Year
		1.	Rajkumar Buyya, Satish Narayana Srirama	Fog and Edge Computing: Principles and Paradigms	Wiley	2019
		2.	S. Balamurugan	Principles of Fog and Edge Computing: With Applications and Case Studies	Scholars' Press	2018
		3.	Jeremiah Ginn	Diving into Secure Access Service Edge: A technical leadership guide to achieving success with SASE at market speed	Packt Publishing	2022
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	Glen D. Singh	The Ultimate Kali Linux Book: Perform advanced penetration testing using Nmap, Metasploit, Aircrack-ng, and Empire, 2nd Edition	Packt Publishing	2022
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**
1.	Title of the teaching subject	Large-Scale Social Network Analysis
2.	Code	ICS22E17

3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Aneta Velkoska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): Complex networks represent a large number of natural and social systems. This course introduces students to the latest aspects of complex networks, focusing on the statistical mechanisms of structure and dynamics of complex networks..				
11.	Course content: Basic Concepts: undirected and directed networks, weighted networks, bipartite networks; nodes, links, and their general characteristics. Matrix Representation. Graph Theory: vertices, edges. Connectivity, Clustering Coefficient, Neighborhoods. Centrality Measures: degree, closeness, betweenness, PageRank. Search Patterns: BFS, DFS, Shortest Path Problem. Partitions, Cluster Detection, Community Detection. Special Random Graph Models: Erdos-Renyi; Barabasi-Albert; Watts & Strogatz. Hubs, Preferential Attachment, Cumulative Advantage, Small-World Networks. Graph Representations: adjacency matrices, weight matrices, pair sets. Additional Matrix Characteristics: degree matrix and Laplacian matrix. Graph Operations: subgraphs, concatenation, hybrid links. Algorithm Performance on Large Networks. Various Graph Analysis Tools.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching	30 hours	
		15.2.	Exercises (laboratory, classroom), teamwork	15 hours	
16.	Other forms of activities	16.1.	Project tasks	50 hours	
		16.2.	Independent tasks	35 hours	
		16.3.	Home study - assignments	50 hours	
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests		60 points	
	17.2.	Individual work/project (presentation: written and oral)		30 points	
	17.3.	Activity and participation		10 points	
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)	
			51 x to 60 points	6 (six) (E)	
			61 x to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	

19.	Requirement for signature and passing the final exam			Students should ensure regular attendance of classes according to the regulations of UINT		
20.	Language of instruction			English, Macedonian		
21.	A method of monitoring the quality of teaching			Monitoring of UINT control procedures		
22.	Literature					
	22.1.	Required reading				
		Ord. number	Author	Title	Publisher	Year
		1.	Carrington, P.J., Scott, J., Wasserman S.	Models and Methods in Social Network Analysis	Cambridge University Press	2005
		2.				
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	Albert, R., Barabasi, A.L.	Statistical Mechanics of Complex Networks	Reviews of Modern Physics 74, 47-97	2002
		2.	Barabasi, A.L., Albert, R	Emergence of Scaling in Random Network	Science, 286, 509-512	1999

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Business Analytics: Applied Modeling and Forecasting			
2.	Code	ICS22E18			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Aleksandar Karadimche			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): The course aims to transfer knowledge of business analysis, business management, and key analytical skills for business decision-making. After completing the core content, students will be able to: apply modeling at various levels to support decision-making; understand the basic principles of analyzing complex multivariate datasets to extract important messages; demonstrate the broad applicability of mathematical models while identifying their limitations.				
11.	Course content: Introduction to data analysis and decision-making; Time series data; Outliers and missing values; Pivot tables; Probability distributions; Decision-making under uncertainty; Random sampling				

	methods; Non-parametric tests; Stepwise regression; Time series forecasting; Regression-based trend models; Random walk model; Autoregressive and moving average models; Exponential smoothing; Seasonal models; Introduction to linear programming; Product mix models; Sensitivity analysis; Monte Carlo simulation; Applied simulation examples.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests			60 points
	17.2.	Individual work/project (presentation: written and oral)			30 points
	17.3.	Activity and participation			10 points
18.	Evaluation criteria (points/grade)		up to 50 points		5 (five) (F)
			51 x to 60 points		6 (six) (E)
			61 x to 70 points		7 (seven) (D)
			from 71 to 80 points		8 (eight) (C)
			from 81 to 90 points		9 (nine) (B)
			from 91 to 100 points		10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			
22.	Literature				
	22.1.	Required reading			
		Ord. number	Author	Title	Publisher	Year
		1.	Albright, S., W. Winston and C.J. Zappe	*Data Analysis and Decision Making 4*/ed.	South-Western Publishing Co.	2011
		2.	Jeffrey D. Camm, James J. Cochran, Michael J. Fry, Jeffrey W. Ohlmann	Business Analytics, Fourth Edition	Cengage Learning, Inc.	2021
		3.				
	22.2.	additional literature				

		Ord. number	Author	Title	Publisher	Year
		1.	Jeffrey D. Camm, James J. Cochran, Michael J. Fry, Jeffrey W. Ohlmann	*Business Analytics*, Fourth Edition	Cengage Learning, Inc.	2021
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Business Process Mining			
2.	Code	ICS22E19			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Anis Sefidanoski			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): The objectives of this course are to master methodologies and techniques for business process management. The BPM lifecycle will be studied: (re)designing, modeling, executing, monitoring, and optimizing business processes. Additionally, methodological aspects of BPM such as modeling languages, model discovery, qualitative and quantitative analysis of process models will be explored. In the second part, the focus shifts to Data Science methodology for BPM – process mining – covering the three basic steps: model discovery, conformance checking, and performance analytics.				
11.	Course content: Understanding basic and advanced process modeling methodologies and notation; Informal modeling methods such as BPMN and Petri Nets; Correctness and performance analysis using Petri Nets; Data-driven process modeling applications; Process mining including automated discovery, quality dimensions in process discovery, data-driven conformance checking, performance analysis, and process improvement; Process redesign and improvement concepts; Business application implementation using course methodologies.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				

	17.1.	Tests	60 points
	17.2.	Individual work/project (presentation: written and oral)	30 points
	17.3.	Activity and participation	10 points

18.	Evaluation criteria (points/grade)	up to 50 points	5 (five) (F)
		51 x to 60 points	6 (six) (E)
		61 x to 70 points	7 (seven) (D)
		from 71 to 80 points	8 (eight) (C)
		from 81 to 90 points	9 (nine) (B)
		from 91 to 100 points	10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT	
20.	Language of instruction	English, Macedonian	
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures	

22. Literature

22.1. Required reading

Ord. number	Author	Title	Publisher	Year
1.				
2.				
3.				

22.2. additional literature

Ord. number	Author	Title	Publisher	Year
1.				
2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Managing IT Startups			
2.	Code	ICS22E20			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Atanas Hristov			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): Students will understand the opportunities for creating new startups, how to manage and develop resources, and the basic prerequisites for starting such companies. Students will learn how to plan,				

	start, and manage a technology startup and will gain confidence for starting their own business. They will develop entrepreneurial capabilities, skills, and competencies..				
11.	Course content: Developing a startup company from idea to realization; Business models and idea generation; Analyzing initial capital requirements; Legal factors; Identifying entrepreneurial opportunities; Innovation; Business Plan; Feasibility analysis for financing; Growth stages of new ventures; Financial stability assessment; Competitive advantages and strategies; Market research; Financing; Company formation and operationalization; Types of companies; Company valuation concepts				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching	30 hours	
		15.2.	Exercises (laboratory, classroom), teamwork	15 hours	
16.	Other forms of activities	16.1.	Project tasks	50 hours	
		16.2.	Independent tasks	35 hours	
		16.3.	Home study - assignments	50 hours	
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests		60 points	
	17.2.	Individual work/project (presentation: written and oral)		30 points	
	17.3.	Activity and participation		10 points	
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)	
			51 x to 60 points	6 (six) (E)	
			61 x to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			

22. Literature

22.1. Required reading

Ord. number	Author	Title	Publisher	Year
1.				
2.				
3.				

22.2. additional literature

Ord. number	Author	Title	Publisher	Year
1.				

		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Cybersecurity			
2.	Code	ICS22E21			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Full Professor Dr. Ustijana Rechkoska Shikoska			
9.	Prerequisites for enrolling in the course				
10.	Upon completion of this course, the student will be able to: Examine basic cybersecurity concepts and elements from the perspective of people, processes, and technologies; Apply a comprehensive overview of cybersecurity concepts and terminology; Examine basic threats and protective mechanisms for physical, personal, computer, and application-level security; Identify basic threats and protective mechanisms for Internet, network, mobile, wireless, and web security; Apply basic information security principles in defense against cybersecurity threats; Explore common cybersecurity laws, standards, and best practices.				
11.	Course content: Computer and Cyber Forensics Fundamentals – introduction to computers, hardware, software, Windows/DOS commands, networking, storage, mobile phone forensics, computer ethics. Cyber Forensics Basics – file system concepts, data recovery, OS software, basic terminology. Data and Evidence Recovery – recovering deleted documents, recovering formatted partitions, data recovery tools, chain of custody documentation, timeline analysis. Internet data recovery, Swap files, Temporary and Cache files. Introduction to Encase Forensic Edition, FTK, etc. Cybercrime and Cyber Law – ICT law, hacking, cracking, viruses, privacy of software, intellectual property, social engineering, exploiting vulnerabilities, cybersecurity. Cyber Forensic Investigation – e-Discovery, digital evidence collection, email investigation, IP tracking, encryption/decryption methods, password discovery. Cybersecurity – hardware-based security, software-based firewall, security standards, incident response, reporting cybercrime, OS attacks, application attacks, reverse engineering, financial fraud				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests			60 points

	17.2.	Individual work/project (presentation: written and oral)	30 points
	17.3.	Activity and participation	10 points

18.	Evaluation criteria (points/grade)	up to 50 points	5 (five) (F)
		51 x to 60 points	6 (six) (E)
		61 x to 70 points	7 (seven) (D)
		from 71 to 80 points	8 (eight) (C)
		from 81 to 90 points	9 (nine) (B)
		from 91 to 100 points	10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT	
20.	Language of instruction	English, Macedonian	
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures	

22.	Literature					
	22.1.	Required reading				
		Ord. number	Author	Title	Publisher	Year
		1.				
		2.				
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.				
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Supply Chain Analytics			
2.	Code	ICS22E22			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Jovanka Damoska Sekuloska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): The aim of the course is to introduce students to the fundamental role and significance of supply chains. Supply chains represent a dominant model in the modern economy and play a key role in				

	creating the competitiveness of modern companies. Understanding, analyzing, and optimizing supply chains is of fundamental importance for company growth..				
11.	Course content: Introduction to Supply Chains; Data and Supply Chains; Data Manipulation and Visualization in Supply Chains; Customer Management in Supply Chains; Supplier Management; Warehouse and Inventory Management; Demand Management; Logistics; Using Analytics to Improve Strategic Processes; Using Analytics to Improve Supply Chain Design Processes; Using Analytics to Improve Execution Processes; Using Analytics to Improve Human Processes in Supply Chains				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching	30 hours	
		15.2.	Exercises (laboratory, classroom), teamwork	15 hours	
16.	Other forms of activities	16.1.	Project tasks	50 hours	
		16.2.	Independent tasks	35 hours	
		16.3.	Home study - assignments	50 hours	
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests		60 points	
	17.2.	Individual work/project (presentation: written and oral)		30 points	
	17.3.	Activity and participation		10 points	
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)	
			51 x to 60 points	6 (six) (E)	
			61 x to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			
22.	Literature				
	22.1.	Required reading			
		Ord. number	Author	Title	Publisher	Year
		1.	Kurt Y. Liu	Supply Chain Analytics: Concepts, Techniques and Application 1st ed.	Palgrave Macmillan	2022
		2.	Peter W. Robertson	Supply Chain Analytics 1st ed	Routledge	2020

		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	Nicoleta Tipi	Supply Chain Analytics and Modelling: Quantitative Tools and Applications 1st ed	Kogan Page	2021
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Business Analytics – Applied in a Project			
2.	Code	ICS22E23			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Atanas Hristov			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): Students will master quantitative analysis tools and apply them in a specific project. Students will learn how data analysts describe, predict, and inform business decisions in specific domains of marketing, human resources, finance, and operations. They will develop basic data literacy and an analytical mindset to help make strategic data-driven decisions.				
11.	Course content: Developing business analytics models; Business analytics strategies; Development and implementation of functional-level information; Customer analysis; HR development; Pricing; Finance; Inventory management. Business analytics at the analytical level: Descriptive statistical methods, lists and reports; Hypothesis-based methods; Data mining methods; Exploratory methods (data reduction, cluster analysis, cross-selling and up-selling models). Business requirements. Business analytics at the data warehouse level.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching	30 hours	
		15.2.	Exercises (laboratory, classroom), teamwork	15 hours	
16.	Other forms of activities	16.1.	Project tasks	50 hours	
		16.2.	Independent tasks	35 hours	
		16.3.	Home study - assignments	50 hours	
17.	Method of assessment 60 + 30 + 10				

	17.1.	Tests	60 points
	17.2.	Individual work/project (presentation: written and oral)	30 points
	17.3.	Activity and participation	10 points

18.	Evaluation criteria (points/grade)	up to 50 points	5 (five) (F)
		51 x to 60 points	6 (six) (E)
		61 x to 70 points	7 (seven) (D)
		from 71 to 80 points	8 (eight) (C)
		from 81 to 90 points	9 (nine) (B)
		from 91 to 100 points	10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT	
20.	Language of instruction	English, Macedonian	
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures	

22.	Literature					
	22.1.	Required reading				
		Ord. number	Author	Title	Publisher	Year
		1.				
		2.				
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.				
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Digital Transformation and Society			
2.	Code	ICS22E24			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Asst. Prof. Dr. Goran Shibakoski			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies):				

	The aim of the subject is to introduce students to the history, terms, theories, and methods of researching the effects of digitalization on society. Students will discuss and explore technical design, usage patterns, and the mutual influence of digitalization and society. Research methods for studying digitalization and society will be presented in the context of current and international case studies.				
11.	Course content: Introduction; Challenges; Control; Culture; Information Environments and Public Arena; Data; Artificial Intelligence; Data, AI, and the State; USA; EU; China; Digital Geopolitics; Discussion of Open Questions.				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching	30 hours	
		15.2.	Exercises (laboratory, classroom), teamwork	15 hours	
16.	Other forms of activities	16.1.	Project tasks	50 hours	
		16.2.	Independent tasks	35 hours	
		16.3.	Home study - assignments	50 hours	
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests		60 points	
	17.2.	Individual work/project (presentation: written and oral)		30 points	
	17.3.	Activity and participation		10 points	
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)	
			51 x to 60 points	6 (six) (E)	
			61 x to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			

22. Literature

22.1. Required reading

Ord. number	Author	Title	Publisher	Year
1.	Abbas Strømmen-Bakhtiar	Introduction to Digital Transformation and its impact on society	Informing Science Press	2020
2.				
3.				

	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	Babu George, Justin Pau	Digital Transformation in Business and Society: Theory and Cases	Palgrave Macmillan	2019
		2.				

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Privacy and Data Protection			
2.	Code	ICS22E25			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Dr. Ivan Bimbilovski			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): To introduce students to various legal obligations arising from personal data protection; explain that personal data protection in the EU is largely regulated by the GDPR; examine controller obligations and data subject rights; compare these with the national legal framework. Introduce students to pseudonymization and encryption advantages, introduce the legal framework and case studies. Present examples and case law in the field of data protection. Explain complex aspects of data protection in cloud computing. Explain the difference between privacy and data protection; identify the broad and changing nature of 'personal data' as a legal term.				
11.	Course content: The course focuses on fundamental data protection standards, rights, and obligations through the legal framework and practice, relying on the European Court of Justice. Topics include: GDPR as successor to Directive 95/46/EC; definitions, categories of personal data; principles for processing; legal bases, children's consent, legitimate interest; controller obligations; DPIA; Data Protection Officer (DPO); data subject rights; Privacy Shield; enforcement in data protection sector; national laws. Pseudonymization and encryption under GDPR; anonymization as a tool; AOL data leak case study. Contractual aspects, liability, legal remedies, significant ECJ cases (Nowak, Lindqvist, Ryneš, Schrems, Google Spain). Cloud computing: server localization, contractual issues, encryption, data subject rights, supervisory authority jurisdiction. Privacy as a human right; international framework; cross-border data flows; Privacy 2.0 and 3.0; GDPR and cybersecurity; ISP liability				
12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours

16.	Other forms of activities	16.1.	Project tasks	50 hours
		16.2.	Independent tasks	35 hours
		16.3.	Home study - assignments	50 hours
17.	Method of assessment 60 + 30 + 10			
	17.1.	Tests		60 points
	17.2.	Individual work/project (presentation: written and oral)		30 points
	17.3.	Activity and participation		10 points
18.	Evaluation criteria (points/grade)		up to 50 points	5 (five) (F)
			51 x to 60 points	6 (six) (E)
			61 x to 70 points	7 (seven) (D)
			from 71 to 80 points	8 (eight) (C)
			from 81 to 90 points	9 (nine) (B)
			from 91 to 100 points	10 (ten) (A)
19.	Requirement for signature and passing the final exam		Students should ensure regular attendance of classes according to the regulations of UINT	
20.	Language of instruction		English, Macedonian	
21.	A method of monitoring the quality of teaching		Monitoring of UINT control procedures	

22. Literature

22.1. Required reading

Ord. number	Author	Title	Publisher	Year
1.	European Union Agency for Fundamental Rights Council of Europe	Handbook on European Data Protection Law	European Union Agency for Fundamental Rights Council of Europe	2014
2.	Paul Voigt Axel von dem Bussche	The EU General Data Protection Regulation (GDPR): A Practical Guide	Springer International Publishing AG	2017
3.	Mariusz Krzysztofek Kluwer	Post-reform Personal data Protection in the European Union: General Data Protection Regulation	Law International	2016

		4.	Anne S.Y. Cheung Rolf H. Weber Edward	Privacy and Legal issues in Cloud Computing	Elgar Publishing Limited	2015
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	Karen Lawrence Oqvist Filip Johnssen	Privacy Principles and Data Protection Practices: A Professional's Guide to EU GDPR	BCS Learning & Development Limited	2017
		2.	European Union European Parliament Council of EU	Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)	European Union European Parliament Council of EU	2016

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Applied e-Ethics			
2.	Code	ICS22E26			
3.	Study program / Faculty	Digital Business Analytics/Faculty of ICS			
4.	Organizer of the study program (unit, i.e. institute , department, department)	Faculty of ICS, University of Information Sciences and Technologies "St. Apostle Paul" - Ohrid			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	1st year / X semester	7.	Number of ECTS credits	6 (six)
8.	A teacher	Asst. Prof. Dr. Mersiha Ismajloska			
9.	Prerequisites for enrolling in the course				
10.	Course objectives (competencies): Fundamentals of Ethics; e-Ethics; Applied Ethics; Applied Ethics in Digital Business Analytics.				
11.	Course content: Ethics; e-Ethics; Applied Ethics; Forming e-Ethics Concepts; Communication Ethics; Public Engagement in Science and Technology; Science and Engineering Ethics; Scientific Publishing; Scientific Responsibility and Misconduct; Ethics, Privacy, and Technology; Computer and Information Ethics; Internet, Regulation and Censorship; Concept of Ethical Hacking.				

12.	Learning methods: This course is based on 45 hours of lectures and 30 hours of exercises , supplemented by the study of a specific case, consultation with the subject professor and the creation of a project.				
13.	Total available time	6 ECTS credits x 30 hours/credit = 180 hours			
14.	Allocation of available time	Lectures: 30 hours; Exercises: 15 hours; Independent preparation, projects, homework: 135 hours = Total time of 180 hours			
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching		30 hours
		15.2.	Exercises (laboratory, classroom), teamwork		15 hours
16.	Other forms of activities	16.1.	Project tasks		50 hours
		16.2.	Independent tasks		35 hours
		16.3.	Home study - assignments		50 hours
17.	Method of assessment 60 + 30 + 10				
	17.1.	Tests			60 points
	17.2.	Individual work/project (presentation: written and oral)			30 points
	17.3.	Activity and participation			10 points
18.	Evaluation criteria (points/grade)		up to 50 points		5 (five) (F)
			51 x to 60 points		6 (six) (E)
			61 x to 70 points		7 (seven) (D)
			from 71 to 80 points		8 (eight) (C)
			from 81 to 90 points		9 (nine) (B)
			from 91 to 100 points		10 (ten) (A)
19.	Requirement for signature and passing the final exam	Students should ensure regular attendance of classes according to the regulations of UINT			
20.	Language of instruction	English, Macedonian			
21.	A method of monitoring the quality of teaching	Monitoring of UINT control procedures			

22.	Literature					
	22.1.	Required reading				
		Ord. number	Author	Title	Publisher	Year
		1.	Ruth Chadwick	Encyclopedia of Applied Ethics	Academic Press	2012
		2.	Stuart Russell, Peter Norvig	Artificial Intelligence, a modern approach, 4rd Ed.	Pearson Series in Artifical Intelligence	2020
		3.				
	22.2.	additional literature				
		Ord. number	Author	Title	Publisher	Year

		1.	Immanuel Kant, Abbott Thomas Kingsmill	Critique of Practical Reason (Dover Philosophical Classics)	Dover Publications; 1st Pub 2004 edition	2004
		2.	Isaac Asimov	The Complete Stories of Isaac Asimov	Harpercollins Sf&F	1994