

DESCRIPTION OF THE COLLEGE

GENERAL INFORMATION		
Course Holder	prof.dr.sc. Robert Kopal	
Name of the College	Social Physics	
Study program	Professional Graduate Study of Business Management - MBA	
Status of the College	Mandatory	
Code	SF-22	
Year	Year 2	
Point value and method of teaching	ECTS Student Workload Coefficient	5
	Number of hours (P+V)	28+28

DESCRIPTION OF THE COLLEGE
1.1. <i>Objectives of the course</i> Social physics is a quantitative social science that describes reliable, mathematical links between (1) information and the flow of ideas on the one hand, and (2) changes in human behavior on the other. It represents the evolution/upgrade of network science - the science of connection. Students are expected to develop: (a) general competences. - identify and analyze features of Network Science and Connection Science (<i>from Network Science to Connection Science</i>) - apply the acquired knowledge and contribute to solving complex business problems and business decision-making by applying social network analysis - apply the acquired knowledge and contribute to solving complex business problems and business decision-making by applying the methods of social physics (A) Specific competencies. - analyze network structures and the position and importance of entities and links within the network - Identify and apply the capabilities of different software in the analysis of social networks. - apply the knowledge and skills of network science and connection science (<i>from Network Science</i>)

- to Connection Science)
- apply knowledge and skills in the field of social network analysis in the fields of telecommunications, marketing, finance, research and development, health and medicine, HR, etc.
- apply knowledge and skills in the field of social physics in the fields of telecommunications, marketing, finance, research and development, health and medicine, HR, etc.

1.2. Requirements for enrolment in the course

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1.3. Expected learning outcomes for the course

1. Critically assess the basic goals of network analysis and the principles of network formation and rank them according to the complexity of the distribution of connections of several types of networks that occur in nature.
2. To argue an opinion when choosing centrality measures in network analysis.
3. Recommend measures of prestige and grouping in the network.
4. Critically judge the features of social physics.
5. To argue the application of social physics methods in business and everyday life.
6. Select the specific functionalities of the software used during exercises and lectures.

1.4. The content of the course

Introduction to the course

INTRODUCTION TO NETWORK ANALYSIS

What are networks and how are they formed

Types of networks we encounter

Basic techniques for creating and analyzing a connectivity map

ANALYSIS OF SOCIAL NETWORKS

What is Social Media Analysis (SNA) and Goals

Overview of the basic measures describing the network

Metrics diameter and density. Metrike centraliteta – degree, closeness

Metrike centraliteta – betweenness. Centralization of the network.

INTRODUCTION TO SOCIAL PHYSICS – Key features

Social network incentives
Information cascade probability & social conductivity & social friction
Peer pressure
Influence modelling
Engagement score vs. energy score vs. exploration score
Group thinking vs. wisdom of the crowd
Big data & digital bread crumbs
Reality mining
Living Lab & Imaging Chamber
Sociometric badge
Personal data store (PDS)
The Data-Driven Society

APPLICATION OF SOCIAL PHYSICS

telecom industry.
Finance and Banking.
R&D.
HR. Teamwork.
Health and Medicine.
Energy challenges.
Improving work efficiency and influencing KPIs.
Social Physics and Psychological Profiles.
Impact on consumers.
Emotional and behavioral analytics.
Voice analysis.

ANALYSIS OF GROUPING IN THE NETWORK

Subgraph. The dyad, the triad. Transitivity.
A clique. The coefficient of grouping.
Homophily and assortativity coefficient.
Analysis of grouping in a network with a large number of entities

SOCIAL MEDIA ANALYSIS SOFTWARE FUNCTIONALITIES - Gephi

Introduction to several types of software used for analysis and visualization of social networks

Focus on the specific functionalities of the software shown

Introduction to the prerequisites, installation, launch and capabilities of Gephi software.

Loading and displaying the network within the Gephi software.

Using basic functionalities for graphical data processing - Gephi.

Calculating metrics within the software - Gephi.

Visual data processing based on calculated metrics - Gephi.

Filtering of the revealed data and calculation of metrics. - Gephi

SOCIAL MEDIA ANALYTICS SOFTWARE - NodeXL

Introduction to the prerequisites, installation, launch and capabilities of the NodeXL software.

Loading and displaying the network within the NodeXL software.

Calculation and display of metrics - NodeXL.

Using the functionality for graphical data processing - NodeXL.

Visualization and processing of data on a graph - NodeXL.

Use of data from social networks (Facebook, Twitter and LinkedIn) in SNA - NodeXL.

Ways of collecting and preparing data from social networks

USING SOCIAL MEDIA FOR SLEEP ANALYSIS

Collection and preparation of data for software analysis from social media profiles (Twitter) - NodeXL..

PRACTICAL EXAMPLES OF SOCIAL MEDIA ANALYSIS

An overview of the application of calculations, metrics and software in a business environment.

1.5. Types of teaching (put X)

- ☒ Lectures
- ☐ Seminars and workshops
- ☒ Exercises
- ☐ Distance education
- ☐ Field Teaching

- ☒ Independent tasks
- ☐ Multimedia & Network
- ☐ Laboratory
- ☐ mentoring work
- ☐ other _____

1.6. Obligations of students

Student obligations are prescribed in detail by the Statute, the Study Regulations and the Instructions on Student Obligations. The key obligations of students are:

ATTENDANCE AT CLASSES: students are obliged to attend classes, actively follow lectures and exercises and participate constructively in classes, and in order to acquire the right to take the exam, it is necessary to attend classes in the percentages prescribed by the Study Regulations. For each student, their presence in class is recorded through the Infoeduka digital office system. The minimum commitments are;

- Full-time students must attend at least 70% of the total number of classes to be eligible to sign.
- Part-time students need to attend at least 50% of the total number of teaching hours to be eligible to sign.

EXAM: in order to achieve a positive grade in a subject, it is necessary to achieve at least 54 points in the subject, but also at least 50% of points for each learning outcome. The method of taking the exam is described in more detail in the item Assessment and evaluation of students' work during classes and at the final exam

***FINAL EXAM** – a student who has not met the conditions for passing the exam during the continuous examination (has achieved a total of at least 54 points in the course and met the lower point threshold for the acquisition of each learning outcome, i.e. at least 50% of the points of each learning outcome), may take the learning outcomes of the course at the final exam.

WRITTEN EXAM: the student is required to take a written exam that verifies the acquisition of advanced theoretical knowledge about the characteristics and goals of social physics and network analysis and the principles of network formation.

PRACTICAL WORK: the student is obliged to participate in solving individual and group practical tasks and exercises with the aim of practicing the skill of network analysis and calculation of network metrics and the application of social physics methods in solving business challenges.

GROUP PROJECT: the student is obliged to participate in a group project that tests the practical application of knowledge in the field of social physics and the skills of practical application in specific business cases using the selected software.

***CONTINUOUS ASSESSMENT OF KNOWLEDGE:** In order to improve the efficiency of students' progress in teaching, continuous examinations (3 intermediate exams) are carried out. In this way, students acquire smaller teaching units and master the subject material more easily.

1.7. Monitoring of student work (add X with the appropriate form of monitoring)

Attendance	x	Teaching activity		Term paper		Experimental work	
Written exam	x	Oral exam		Essay		Research	
Design	x	Continuous assessment*		Paper		Practical work	x
Portfolio							

1.8. Assessment and evaluation of students' work during classes and at the final exam

Assessment and evaluation of students' work during classes and at the final exam is carried out on the basis of the Study Regulations of the EFFECTUS University of Applied Sciences.

Allocation of points according to the forms of student work monitoring:

	Attendance	Written exam	Design	Practical work	Total
I1		16			16
I2				16	16
I3				16	16
I4		16			16
I5				16	16
I6			16		16
OUT OF THE BOX	4				4

TOTAL

4

32

16

48

100

Linking learning outcomes, teaching methods and methods of assessment of knowledge:

FORMS OF TRACKING	NAME OF LEARNING OUTCOMES	TEACHING METHOD	METHOD OF ASSESSMENT KNOWLEDGE	Maximum number of rating points
Written exam	OUTCOME 1 <i>Critically assess the basic goals of network analysis and the principles of network formation and rank them according to the complexity of the distribution of connections of several types of networks that occur in nature.</i>	Lecture	<i>Essay-problem questions to which an answer is sought that demonstrates the identification and definition of key concepts, their connection and corresponding arguments of a higher degree of complexity</i>	16
		Asking questions		
		Discussion		
Practical work	OUTCOME 2 <i>Argue an opinion when choosing centrality measures in network analysis</i>	Lecture	<i>Computational tasks with appropriate argumentation and interpretation</i>	16
		Asking questions		
		Guided training		
	OUTCOME 3 <i>Recommend measures of prestige and grouping in the network</i>	Lecture	<i>Computational tasks with appropriate argumentation and interpretation</i>	16
		Asking open-ended questions		
		Training and feedback		
Written exam	OUTCOME 4	Lecture	<i>Essay-problem questions to which an</i>	16

	<i>Critically judge the features of social physics</i>	<i>Discussion</i>	<i>answer is sought that demonstrates the identification and definition of key concepts, their connection and corresponding arguments of a higher degree of complexity</i>	
<i>Practical work</i>	OUTCOME 5 <i>To argue the application of social physics methods in business and everyday life</i>	<i>Lecture</i>	<i>Problem questions with explanations and argumentation that require problem identification, analysis, synthesis, linking and critical judgment</i>	16
		<i>Asking open-ended questions</i>		
		<i>Training and feedback</i>		
<i>Design</i>	OUTCOME 6 <i>Select specific functionalities of the software used during exercises and lectures</i>	<i>Training and feedback</i>	<i>A group project that tests the practical application of knowledge, understanding and problem-solving skills on a given business case. In addition to the above, the ability to use adequate software and lead, coordinate, collaborate and operationally perform the task is also checked</i>	16
<i>Attendance</i>	<i>All outcomes</i>	<i>Lectures and exercises</i>	<i>Attendance records</i>	4
	TOTAL POINTS			100

<i>Type of student workload</i>	<i>Hours of student workload</i>	<i>ECTS credits</i>
Attending face-to-face classes	56	1,87
Field trips/visits outside the college	0	0
Independent study/research	30	1
Out-of-classroom preparation and preparation of seminars/presentations	0	0
Work on an out-of-classroom project assignment	30	1
Independent preparation for exams and exam time	30	1
Consultation activities	4	0,13
Other	0	0
TOTAL ECTS credits	150	5

JUDGING:

In order to achieve a positive grade in the course, the student must cumulatively meet two conditions: achieve a total of at least 54 (fifty-four) points in the course and meet the lower point threshold for the adoption of each individual learning outcome, which is 50% of the total points of the learning outcomes.

Grades are calculated based on the following distribution of points:

NUMBER POINTS	OF	RATING
0,00 – 53,90		Insufficient (1)
54,00 – 64,90		Sufficient (2)
65,00 – 79,90		Good (3)
80,00 – 89,90		Very Good (4)
90.00 and more		Excellent (5)

The evaluation is carried out in a transparent manner by collecting points. The course is valued with 100.00 points (with the possibility of achieving an additional 8 points on the Challenge learning outcome).

CHALLENGE LEARNING OUTCOME - the student has the opportunity to earn an additional maximum of 8 points through the Challenge learning outcome; The student independently chooses one of the activities proposed in the first lesson, and has the opportunity to independently propose an activity by which he wants to increase the number of points and, with the consent of the course holder, achieves them according to the criteria of the subject. Points for the Challenge learning outcome are not distributed according to the learning outcomes, but the number achieved is an additional number of points to the total number of points achieved according to the learning outcomes.

Before taking the final written exam, each student must meet the prescribed conditions, which primarily means that they have attended the % of classes determined

by the Study Regulations and that they have received an electronically encrypted permission to take the exam.

1.9. Required literature and number of copies in relation to the number of students currently attending classes in the course

<i>Title</i>	<i>Number of copies</i>	<i>Number of students</i>
<i>Kopal, R., Korkut, D. and Krnjašić, S. (2020). Social Media Analysis: Practical Application, Third Updated Edition. Effectus University of Applied Sciences</i>	5* *students receive compulsory literature in permanent ownership	60

1.10. Supplementary literature

Alex Pentland (2014.): Social Physics: How Social Networks Can Make Us Smarter, Penguin Books, USA

Alex Pentland (2010.): Honest Signals: How They Shape Our World, The MIT Press

R.A. Hanneman, M. Riddle (2005): Introduction to Social Network Methods

Carlos Andre Reis Pinheiro (2011): Social Network Analysis in Telecommunications, Wiley

Scott, J. and Carrington, P. J. (eds) (2001) The SAGE Handbook of Social Network Analysis, SAGE Publication

1.11. Quality monitoring methods that ensure the acquisition of output knowledge, skills and competences

- *analysis of exam results, achieved results, level of understanding and knowledge during exercises, practical tasks and group work,*
- *conducting a survey among students,*
- *The teacher's evaluation,*
- *the achieved results and the level of knowledge presented during the preparation and defense of the final thesis (of students who choose the graduate thesis in this subject),*
- *analysis of the reports of the Quality Center and*
- *Feedback from students who have already graduated and their employers on the usefulness of the content of this course in the performance of the work they do.*