



MODULE DESCRIPTION

Module code	full-time studies:	Z-ZIP1-E-303b
	part-time studies:	Z-ZIPN1-E-303b
Module name	Discrete Mathematics	
Module name in Polish	Matematyka dyskretna	
Valid from academic year	2019/2020	

MODULE PLACEMENT IN THE SYLLABUS

Field of study	MANAGEMENT AND PRODUCTION ENGINEERING
Level of education	1st degree
Studies profile	General
Form and method of conducting classes	Full-time and Part-time
Specialisation	All
Unit conducting the module	Department of Mathematics and Physics
Module co-ordinator	Artur Maciąg, PhD, DSc, ProfTit
Approved by:	Dariusz Bojczuk, PhD, DSc

MODULE OVERVIEW

Type of subject / group of subjects	Basic
Module status	Non-compulsory
Language of conducting classes	English
Module placement in the syllabus - semester	Semester III
Initial requirements	No requirements
Examination (YES/NO)	NO
Number of ECTS credit points	3

Method of conducting classes		Lecture	Classes	Laboratory	Project	Other
Per semester	full-time studies:	20	15			
	part-time studies:	12	9			

TEACHING RESULTS AND THE METHODS OF ASSESSING TEACHING RESULTS

Category	Symbol	Learning outcomes	Assignations to the directional learning out-comes
Knowledge	W01	A student has the necessary knowledge from the field of discrete mathematics in order to formulate and solve simple tasks in production engineering.	ZIP1_W01
	W02	A student knows standard methods with regard to modelling and optimisation in production engineering.	ZIP1_W14
Skills	U01	A student can apply the learnt methods and theoretical models to formulate and solve tasks in the range of production engineering.	ZIP1_U14
	U02	A student can, according to a given specification, plan, project and realise a simple process in logistics using proper methods.	ZIP1_U19
Social competences	K01	A student understands the need of constant learning and knows the possibilities of improving his/her professional, personal, and social competences.	ZIP1_K01

TEACHING CONTENTS

Method of conducting classes	Teaching contents
Lecture	Elements of logic Mathematical induction Recursion Basics of graph theory, Euler paths and cycles, Fleury's algorithm Graphs with weights, the shortest path between vertices Directed graphs Event networks and critical paths Transport networks and maximum flow Tree theory - binary trees, linking trees - algorithms Boolean algebras
Classes	Elements of logic Mathematical induction, recursion Basics of graph theory, Euler paths and cycles, Fleury's algorithm Graphs with weights, the shortest path between vertices, directed graphs Event networks and critical paths Transport networks and maximum flow Tree theory - binary trees, linking trees - algorithms Boolean algebras

METHODS OF ASSESSING TEACHING RESULTS

Symbol	Methods of checking the learning outcomes (select X)					
	Oral exam	Written exam	Test	Project	Statement	Other
W01			X			
W02			X			
U01			X			
U02			X			
K01			X			

FORM AND CONDITIONS OF PASSING

Form of classes	Form of credit	Passing conditions
Lecture	Credit with grade	Completion of the lecture is based on the completed exercises.
Classes	Credit with grade	During the course, students can earn 10 activity points. The test is scored on a scale of 0-90 points. In order to obtain a pass, it is necessary to obtain a total of at least 50% of the points from the colloquiums and activity during the classes.

STUDENT WORKLOAD

Balance of ECTS points												
No.	Type of student's activity	Student's workload										Unit
		full-time					part-time					
1.	Participation in the activities	Lc	C	Lb	P	O	Lc	C	Lb	P	O	h
		20	15				12	9				
2.	Other (consultation, exam)	2	2				2	2				h
3.	Number of hours of a student's as- sisted work	39					25					h
4.	Number of ECTS credit points which are allocated for assisted work	1,6					1,0					ECTS
5.	Number of hours of a student's un- assisted work	36					50					h
6.	Number of ECTS credit points which a student receives for unassisted work	1,4					2,0					ECTS
7.	Work input connected with practical classes	32					32					h
8.	Number of ECTS credit points which a student receives for practical classes	1,3					1,3					ECTS
9.	Total number of hours of a stu- dent's work	75					75					h
10.	Punkty ECTS za modul <i>1 ECTS=25 hours</i>	3										ECTS

LITERATURE

1. Levin O. (2022), *Discrete Mathematics: An Open Introduction*, open access: <https://discrete.openmathbooks.org/dmoi3/>
2. Ross K.A., Wright C.R. (1999), *Discrete Mathematics*, Pearson.
3. Epp S.S. (2011), *Discrete Mathematics with Applications*, open access: https://notesack.files.wordpress.com/2017/07/ebooksclub-org__discrete_mathematics_with_applications.pdf