

# CONTENS

1. Authorship or Co-authorship in the Creation of Teaching Materials and Texts.....	4
2. Citation.....	6
3. Citation registered in the database Web of Science or Scopus.....	10
4. Citation registered in the database Web of Science or Scopus (co-authorship).....	12
5. Co-worker of a scientific grant project.....	40
6. Computer vision.....	26
7. Dissertation Defense.....	20
8. Editorial work.....	36
9. English Professional Language for PhD Students.....	2
10. ICT and E-learning in Teaching Mathematics and Informatics.....	16
11. Individual Study of Scientific and Specialised Literature.....	18
12. Information visualizations.....	52
13. Membership in the conference organizing committee.....	8
14. Participation in a scientific event with the presentation of own results.....	50
15. Preparing a Dissertation Project and Dissertation Examination.....	14
16. Publication in a journal registered in the databases Web of Science or SCOPUS – ADC, ADD, ADM, ADN, BDC, BDD, BDM, BDN.....	22
17. Publication in a journal registered in the databases Web of Science or SCOPUS – co-authorship – ADC, ADD, ADM, ADN, BDC, BDD, BDM, BDN.....	24
18. Publication in a peer-reviewed journal - ADE, ADF, BDE, BDF.....	28
19. Publication in a peer-reviewed journal - co-authorship - ADE, ADF, BDE, BD.....	30
20. Publication in peer-reviewed proceedings (co-authorship) - AEC, AED, AFC, AFD.....	34
21. Publication in peer-reviewed proceedings - AEC, AED, AFC, AFD.....	32
22. School Mathematics in the Light of Higher Mathematics.....	38
23. Selected Topics in Discrete Mathematics.....	54
24. Selected Topics in Mathematical Analysis.....	56
25. Selected Topics in Number Theory.....	58
26. Supervision of the Final Work of Bachelor Studies.....	60
27. Theories of Mathematics Education.....	48
28. Theory and Practice of Didactic Research.....	44
29. Theory and tools of modeling and simulation.....	42
30. Theory of Teaching Informatics.....	46

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ AOJD/22	<b>Name:</b> English Professional Language for PhD Students
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> Seminar <b>Recommended extent of course ( in hours ):</b> <b>Per week:</b> 2 <b>For the study period:</b> 26 <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b> 3.	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Examination: oral. For an A grade, at least 90% of the marks must be obtained, for a B grade at least 80% of the marks, for a C grade at least 70% of the marks, for a D grade at least 60% of the marks and for an E grade at least 50% of the marks.	
<b>Results of education:</b> The student develops his/her communication skills in a foreign language and acquires specific knowledge of the language for academic purposes and is able to communicate fluently on professional topics. Subsequently, he/she applies knowledge and skills in making oral presentations and is able to prepare and present a professional conference paper in a foreign language. The student independently produces professional articles and presents the results of professional research in a foreign language.	
<b>Brief syllabus:</b> Specifics of academic language. Vocabulary of academic English, useful and most frequently used nominal and verbal collocations, idiomatic compounds, phrasal verbs. Vocabulary (formal/informal) and sentence structures useful for communication on campus, at conferences, etc.. Linguistic interference. Correct pronunciation. Theoretical and linguistic preparation of professional presentation in English - Basic language functions (defining, referring to sources, interpreting graphs/tables).	
<b>Literature:</b> McCarthy, M., O'Dell, F.: Academic Vocabulary in Use. CUP, 2008 Dušková, L. a kol.: Hovorová angličtina pre vedeckých a odborných pracovníkov. Veda. Bratislava, 1982 Oxford Collocations Dictionary for students of English, OUP 2002 Armer, T.: Cambridge English for Scientists. CUP, 2011	
<b>Language, knowledge of which is necessary to complete a course:</b>	

<b>Notes:</b>					
<b>Evaluation of subjects</b>					
Total number of evaluated students: 4					
A	B	C	D	E	FX
75.0	0.0	0.0	0.0	0.0	25.0
<b>Teacher:</b> Dr. habil. Anna Tóthné Litovkina, PhD.					
<b>Date of last update:</b> 03.03.2023					
<b>Approved by:</b> prof. RNDr. János Tóth, PhD.					

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ ATUP/22	<b>Name:</b> Authorship or Co-authorship in the Creation of Teaching Materials and Texts
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 5	
<b>Recommended semester/trimester of study:</b> 3., 4., 5., 6., 7., 8..	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Authorship or co-authorship of teaching aids and texts consists in the preparation and publication of teaching aids.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she understands and knows concrete scientific methods of basic or applied research in the fields of mathematics and theory of teaching of mathematics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• He/she is able to formulate new hypotheses and strategies for further research and development of the scientific field.</li> <li>• He/she is able to formulate logical and true mathematical statements with exact specification of their conditions and main consequences.</li> <li>• He/she is able to recognize routine professional problems, use accessible literature for their theoretical and practical solutions and apply appropriate research methods.</li> </ul> <b>Competence:</b> <ul style="list-style-type: none"> <li>• He/she has independent, critical and analytic thinking.</li> <li>• He/she takes part in popularization of research in community.</li> <li>• He/she is able appropriately and professionally present his/her opinion on solving mathematical problems to various audiences.</li> </ul>	
<b>Brief syllabus:</b> The process of preparing teaching aids and texts of at least 1 authoring sheet.	
<b>Literature:</b> According to the focus of the research area.	
<b>Language, knowledge of which is necessary to complete a course:</b>	

Slovak and Hungarian.	
<b>Notes:</b>	
<b>Evaluation of subjects</b> Total number of evaluated students: 1	
a	n
100.0	0.0
<b>Teacher:</b> tutor	
<b>Date of last update:</b> 03.03.2023	
<b>Approved by:</b> prof. RNDr. János Tóth, PhD.	

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ CND/22	<b>Name:</b> Citation
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 4	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Doctoral students are obliged to confirm their publishing and scientific research activities with photocopies of publication outputs or citations, confirmations from the organizers of the scientific event about the presentation at the scientific event or membership in the organizing committee of conferences, confirmations from the project leader about the scope and form of participation in the project, etc. The outputs of the doctoral student's publishing activity and citations must be registered in the information system of the UJS University Library. Credits can be awarded for the course only if: - the publication or citation output is registered and approved in the indicated category in the university library information system, - the relevant confirmation with a written statement of acceptance by the supervisor is placed in the doctoral student's personal file for non-publication and non-citation outputs.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> <li>• He/she is able to design experiments for data collection and to analyse their results using mathematical and IT means.</li> </ul> <b>Competence:</b>	

<ul style="list-style-type: none"> <li>• He/she self-containedly presents research results in professional and public community in Slovakia as well as abroad.</li> <li>• He/she publishes own research results in an appropriate form.</li> <li>• Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.</li> <li>• He/she performs his/her mathematical work with the highest ethic standards and high quality.</li> </ul>	
<p><b>Brief syllabus:</b>  Completion of courses in the scientific part of the PhD student's study programme consists in the preparation of outputs of publishing and scientific research activities.  A doctoral student may also receive credit for a course repeatedly for each recognised output of a given type.</p>	
<p><b>Literature:</b>  According to the focus of the research area.</p>	
<p><b>Language, knowledge of which is necessary to complete a course:</b>  Slovak and Hungarian language</p>	
<p><b>Notes:</b></p>	
<p><b>Evaluation of subjects</b>  Total number of evaluated students: 0</p>	
a	n
0.0	0.0
<p><b>Teacher:</b> tutor</p>	
<p><b>Date of last update:</b> 03.03.2023</p>	
<p><b>Approved by:</b> prof. RNDr. János Tóth, PhD.</p>	

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ COVK/22	<b>Name:</b> Membership in the conference organizing committee
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 2	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Doctoral students are obliged to confirm their publishing and scientific research activities with photocopies of publication outputs or citations, confirmations from the organizers of the scientific event about the presentation at the scientific event or membership in the organizing committee of conferences, confirmations from the project leader about the scope and form of participation in the project, etc. The outputs of the doctoral student's publishing activity and citations must be registered in the information system of the UJS University Library. Credits can be awarded for the course only if: - the publication or citation output is registered and approved in the indicated category in the university library information system, - the relevant confirmation with a written statement of acceptance by the supervisor is placed in the doctoral student's personal file for non-publication and non-citation outputs.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> <li>• He/she is able to design experiments for data collection and to analyse their results using mathematical and IT means.</li> </ul> <b>Competence:</b>	

<ul style="list-style-type: none"> <li>• He/she self-containedly presents research results in professional and public community in Slovakia as well as abroad.</li> <li>• He/she publishes own research results in an appropriate form.</li> <li>• Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.</li> <li>• He/she performs his/her mathematical work with the highest ethic standards and high quality.</li> </ul>	
<b>Brief syllabus:</b>	
<b>Literature:</b> According to the focus of the research area.	
<b>Language, knowledge of which is necessary to complete a course:</b> Slovak and Hungarian language	
<b>Notes:</b>	
<b>Evaluation of subjects</b> Total number of evaluated students: 0	
a	n
0.0	0.0
<b>Teacher:</b> tutor	
<b>Date of last update:</b> 03.03.2023	
<b>Approved by:</b> prof. RNDr. János Tóth, PhD.	

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ CRD/22	<b>Name:</b> Citation registered in the database Web of Science or Scopus
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 8	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Doctoral students are obliged to confirm their publishing and scientific research activities with photocopies of publication outputs or citations, confirmations from the organizers of the scientific event about the presentation at the scientific event or membership in the organizing committee of conferences, confirmations from the project leader about the scope and form of participation in the project, etc. The outputs of the doctoral student's publishing activity and citations must be registered in the information system of the UJS University Library. Credits can be awarded for the course only if: - the publication or citation output is registered and approved in the indicated category in the university library information system, - the relevant confirmation with a written statement of acceptance by the supervisor is placed in the doctoral student's personal file for non-publication and non-citation outputs.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> <li>• He/she is able to design experiments for data collection and to analyse their results using mathematical and IT means.</li> </ul> <b>Competence:</b>	

<ul style="list-style-type: none"> <li>• He/she self-containedly presents research results in professional and public community in Slovakia as well as abroad.</li> <li>• He/she publishes own research results in an appropriate form.</li> <li>• Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.</li> <li>• He/she performs his/her mathematical work with the highest ethic standards and high quality.</li> </ul>				
<p><b>Brief syllabus:</b>  Completion of courses in the scientific part of the PhD student's study programme consists in the preparation of outputs of publishing and scientific research activities.  A PhD student may also receive course credits repeatedly for each recognised output of a given type.</p>				
<p><b>Literature:</b>  According to the focus of the research area.</p>				
<p><b>Language, knowledge of which is necessary to complete a course:</b>  Slovak and Hungarian language</p>				
<p><b>Notes:</b></p>				
<p><b>Evaluation of subjects</b>  Total number of evaluated students: 0</p> <table border="1"> <thead> <tr> <th>a</th> <th>n</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>0.0</td> </tr> </tbody> </table>	a	n	0.0	0.0
a	n			
0.0	0.0			
<p><b>Teacher:</b> tutor</p>				
<p><b>Date of last update:</b> 03.03.2023</p>				
<p><b>Approved by:</b> prof. RNDr. János Tóth, PhD.</p>				

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ CRDS/22	<b>Name:</b> Citation registered in the database Web of Science or Scopus (co-authorship)
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 6	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Doctoral students are obliged to confirm their publishing and scientific research activities with photocopies of publication outputs or citations, confirmations from the organizers of the scientific event about the presentation at the scientific event or membership in the organizing committee of conferences, confirmations from the project leader about the scope and form of participation in the project, etc. The outputs of the doctoral student's publishing activity and citations must be registered in the information system of the UJS University Library. Credits can be awarded for the course only if: - the publication or citation output is registered and approved in the indicated category in the university library information system, - the relevant confirmation with a written statement of acceptance by the supervisor is placed in the doctoral student's personal file for non-publication and non-citation outputs.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> <li>• He/she is able to design experiments for data collection and to analyse their results using mathematical and IT means.</li> </ul> <b>Competence:</b>	

- He/she self-containedly presents research results in professional and public community in Slovakia as well as abroad.
- He/she publishes own research results in an appropriate form.
- Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.
- He/she performs his/her mathematical work with the highest ethic standards and high quality.

**Brief syllabus:**

Completion of courses in the scientific part of the PhD student's study programme consists in the preparation of outputs of publishing and scientific research activities.

A doctoral student may also receive credit for a course repeatedly for each recognised output of a given type.

**Literature:**

According to the orientation of the research area.

**Language, knowledge of which is necessary to complete a course:**

Slovak and Hungarian language

**Notes:**

**Evaluation of subjects**

Total number of evaluated students: 0

a	n
0.0	0.0

**Teacher:** tutor

**Date of last update:** 03.03.2023

**Approved by:** prof. RNDr. János Tóth, PhD.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ DIS/22	<b>Name:</b> Preparing a Dissertation Project and Dissertation Examination
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 20	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> The condition for applying for the dissertation examination is the completion of compulsory courses, obtaining at least 30 credits from the block of compulsory elective courses, i.e. completing the study part of the doctoral study (at least 60 credits from the study part block), as well as obtaining at least 20 credits from the block of the scientific part.	
<b>Results of education:</b> The result of the training is a prepared dissertation project, which, after incorporating the comments of the opponent and the supervisor, the doctoral student is obliged to submit as a basis for the dissertation examination. The dissertation examination is a state examination that verifies the theoretical knowledge of the doctoral candidate and his/her prerequisites for the implementation of scientific research activities as well as the elaboration of the dissertation. The course of the dissertation examination is precisely defined in the internal principles of the Faculty of Economics of UJS. The result is a written dissertation project and the opinion of the opponent and the supervisor of the dissertation.	
<b>Brief syllabus:</b> The dissertation examination is part of the scientific part of the doctoral studies and the basis for the preparation of the dissertation. The dissertation project includes the definition of the theoretical foundations of the research topics of the future dissertation, i.e. the analysis of the current state of the problem addressed, as well as the presentation of the objectives and methods of investigation. The dissertation examination is divided into a debate on the dissertation project and answering questions according to the focus of the dissertation research area.	
<b>Literature:</b> Following the headings of the state examination, which includes the recommended literature listed in the information sheets of the courses of the study programme and condition the doctoral student's dissertation research.	
<b>Language, knowledge of which is necessary to complete a course:</b> Szlovák és magyar nyelv	
<b>Notes:</b>	

<b>Evaluation of subjects</b>					
Total number of evaluated students: 5					
A	B	C	D	E	FX
20.0	20.0	60.0	0.0	0.0	0.0
<b>Teacher:</b> tutor					
<b>Date of last update:</b> 03.03.2023					
<b>Approved by:</b> prof. RNDr. János Tóth, PhD.					

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KINF/ IKTDT/22	<b>Name:</b> ICT and E-learning in Teaching Mathematics and Informatics
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> Lecture / Seminar <b>Recommended extent of course ( in hours ):</b> <b>Per week:</b> 1 / 2 <b>For the study period:</b> 13 / 26 <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b> 2.	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Examination: oral. A minimum of 90% marks for grade A, a minimum of 80% marks for grade B, a minimum of 70% marks for grade C, a minimum of 60% marks for grade D and a minimum of 50% marks for grade E.	
<b>Results of education:</b> The student will gain theoretical and practical experience of e-learning support resources, be familiar with and work with a variety of mathematical software and be able to prepare lessons integrating ICT elements. The student will become familiar with the most widely used systems for symbolic calculations and geometric constructions. The student will acquire the knowledge and skills necessary for the preparation of typographically correct mathematical text, learn to work in the LMS system Moodle, gain practical experience in the creation of e-learning courses.	
<b>Brief syllabus:</b> Information and communication technologies in mathematics education, digital literacy and dominant ICT competences in the subject of mathematics and computer science. Computer algebra systems. Dynamical geometric systems. Standard application programs, educational programs and didactic computer games. Mathematical websites. Searching for available didactic materials on the Internet, their assessment and possibilities for inclusion in the educational process. Searching for scientific publications in professional databases. Electronic and distance learning in mathematics and computer science in the LMS Moodle environment.	
<b>Literature:</b> 1. ADÁMEK, R. a kol.: Digitálna gramotnosť učiteľa. Bratislava: UIPŠ v súčinnosti s elfa, s.r.o., 2009. 80 s. ISBN 978-80-8086-119-3 2. ADÁMEK, R. a kol.: Moderná didaktická technika v práci učiteľa. Bratislava: UIPŠ v súčinnosti s elfa, s.r.o., 2010. 200 s. ISBN 978-80-8086-135-3 3. Černochová, M. A kol.: Využití počítače při vyučování, Portál, Praha, 1998, ISBN 80-7178-272- 6. 4. ŽILKOVÁ, K.: Školská matematika v prostředí IKT (informačné a komunikačné technológie. Bratislava: Univerzita Komenského, 2009. ISBN 978-80-223-2555-4 5. BENEDEK A. (szerk.):Digitális pedagógia - Tanulás IKT környezetben, Typotex Kiadó, 2008	

5. WETTTL, F. – MAYER, GY. – SZABÓ, P.: Latex kézikönyv. Budapest : Panem könyvkiadó, 2004. ISBN 963 545 398 1.  
 6. RYBIČKA, J.: Latex pro začátečníky. Brno : Konvoj, 2003, s. 239. ISBN 80 7302 049 1.  
 7. GeoGebra v praxi [elektronický zdroj] / zost. Peter Csiba. - Komárno : Univerzita J. Selyeho v Komárne, 2012. - 1 elektronický optický disk (CD-ROM). - Elektronický zborník. - ISBN 978-80-8122-067-8.

**Language, knowledge of which is necessary to complete a course:**

Slovak and Hungarian languages

**Notes:**

**Evaluation of subjects**

Total number of evaluated students: 2

A	B	C	D	E	FX
50.0	50.0	0.0	0.0	0.0	0.0

**Teacher:** prof. Dr. Annamária Várkonyiné Kóczy, DSc., doc. RNDr. Ferdinánd Filip, PhD.

**Date of last update:** 03.03.2023

**Approved by:** prof. RNDr. Tibor Kmet', CSc.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ ISVL/22	<b>Name:</b> Individual Study of Scientific and Specialised Literature
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> Seminar <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> 50s <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b> 3.	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Interim assessment: independent work Weighting of intermediate/final assessment: 100/0	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she knows principles and basic methods of mathematical proofs.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• He/she is able to formulate new hypotheses and strategies for further research and development of the scientific field.</li> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to recognize routine professional problems, use accessible literature for their theoretical and practical solutions and apply appropriate research methods.</li> </ul> <b>Competence:</b> <ul style="list-style-type: none"> <li>• He/she is able to apply mathematical knowledge in wide extent.</li> <li>• Applying his/her mathematical knowledge is able well understand observable phenomena, describe and explain their natural relations.</li> <li>• He/she works effectively as an individual as well as a member or a leader of a small team.</li> </ul>	
<b>Brief syllabus:</b> Study of literature selected according to the supervisor's recommendation. Determination of a supervised reading plan by the doctoral student's supervisor Selection of literature Supervised reading, reporting on the knowledge gained to the supervisor Research activity	

<b>Literature:</b> According to the focus of the research area.					
<b>Language, knowledge of which is necessary to complete a course:</b> Slovak, Hungarian and English					
<b>Notes:</b>					
<b>Evaluation of subjects</b> Total number of evaluated students: 1					
A	B	C	D	E	FX
0.0	100.0	0.0	0.0	0.0	0.0
<b>Teacher:</b> prof. RNDr. János Tóth, PhD., prof. László Szalay, DSc., Dr. habil. RNDr. Peter Csiba, PhD., doc. RNDr. Ferdinánd Filip, PhD., doc. RNDr. Ladislav Mišík, CSc.					
<b>Date of last update:</b> 03.03.2023					
<b>Approved by:</b> prof. RNDr. János Tóth, PhD.					

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University					
<b>Name of the faculty:</b> Faculty of Economics and Informatics					
<b>Code:</b> KMAT/ ODP/22		<b>Name:</b> Dissertation Defense			
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present					
<b>Number of credits:</b> 40					
<b>Recommended semester/trimester of study:</b>					
<b>Level of study:</b> III.					
<b>Prerequisites:</b>					
<b>Conditions for passing the subject:</b> The condition of applying for the dissertation examination is the completion of compulsory courses, obtaining at least 30 credits from the block of compulsory elective courses, i.e. completing the study part of the doctoral studies (at least 60 credits from the study part block), as well as obtaining at least 120 credits from the block of the scientific part, registering for the state examination through the Academic Information System of the UJS and successful completion of the Dissertation Examination (20 credits).					
<b>Results of education:</b>					
<b>Brief syllabus:</b> The dissertation must be prepared on the basis of the requirements of the Rector's Directive No.7/2011 on the editing, registration, access and archiving of theses at J. Selye University. The dissertation supervisor shall propose dissertation opponents after the dissertation review. One of the opponents must be a member of the thesis committee. The doctoral student has the right to get acquainted with the questions and possible comments of the supervisor and the opponents of the dissertation. No later than on the day of the defence, the result of the originality check from the CRZP must be drawn up. The dissertation defence is a state examination. The course of the doctoral thesis defence is determined by the regulation of UJS: 'General principles of doctoral studies of J. Selye University'.					
<b>Literature:</b> By research topic and dissertation					
<b>Language, knowledge of which is necessary to complete a course:</b> Slovak and Hungarian language					
<b>Notes:</b>					
<b>Evaluation of subjects</b> Total number of evaluated students: 4					
A	B	C	D	E	FX
50.0	50.0	0.0	0.0	0.0	0.0

<b>Teacher:</b> tutor
<b>Date of last update:</b> 03.03.2023
<b>Approved by:</b> prof. RNDr. János Tóth, PhD.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ PCRD/22	<b>Name:</b> Publication in a journal registered in the databases Web of Science or SCOPUS – ADC, ADD, ADM, ADN, BDC, BDD, BDM, BDN
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 40	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Doctoral students are obliged to confirm their publishing and scientific research activities with photocopies of publication outputs or citations, confirmations from the organizers of the scientific event about the presentation at the scientific event or membership in the organizing committee of conferences, confirmations from the project leader about the scope and form of participation in the project, etc. Outputs of publishing activity and citations of the doctoral student must be registered in the information system of the UJS University Library. Credits can be awarded for a course only if: - the publication or citation output is registered and approved in the indicated category in the university library information system, - the relevant confirmation with a written statement of acceptance by the supervisor is placed in the doctoral student's personal file for non-publication and non-citation outputs	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> <li>• He/she is able to design experiments for data collection and to analyse their results using mathematical and IT means.</li> </ul> <b>Competence:</b>	

He/she self-containedly presents research results in professional and public community in Slovakia as well as abroad.  
 He/she publishes own research results in an appropriate form.  
 Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.  
 He/she performs his/her mathematical work with the highest ethic standards and high quality.

**Brief syllabus:**

**Literature:**

According to the focus of the research area.

**Language, knowledge of which is necessary to complete a course:**

Slovak and Hungarian language

**Notes:**

**Evaluation of subjects**

Total number of evaluated students: 0

a	n
0.0	0.0

**Teacher:** tutor

**Date of last update:** 03.03.2023

**Approved by:** prof. RNDr. János Tóth, PhD.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ PCRDS/22	<b>Name:</b> Publication in a journal registered in the databases Web of Science or SCOPUS – co-authorship – ADC, ADD, ADM, ADN, BDC, BDD, BDM, BDN
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 30	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Doctoral students are obliged to confirm their publishing and scientific research activities with photocopies of publication outputs or citations, confirmations from the organizers of the scientific event about the presentation at the scientific event or membership in the organizing committee of conferences, confirmations from the project leader about the scope and form of participation in the project, etc. The outputs of the doctoral student's publishing activity and citations must be registered in the information system of the UJS University Library. Credits can be awarded for the course only if: - the publication or citation output is registered and approved in the indicated category in the university library information system, - the relevant confirmation with a written statement of acceptance by the supervisor is placed in the doctoral student's personal file for non-publication and non-citation outputs.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> <li>• He/she is able to design experiments for data collection and to analyse their results using mathematical and IT means.</li> </ul> <b>Competence:</b>	

He/she self-containedly presents research results in professional and public community in Slovakia as well as abroad.  
He/she publishes own research results in an appropriate form.  
Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.  
He/she performs his/her mathematical work with the highest ethic standards and high quality.

**Brief syllabus:**

Completion of courses in the scientific part of the PhD student's study programme consists in the preparation of outputs of publishing and scientific research activities. A doctoral student may also receive credit for a course repeatedly for each recognised output of a given type.

**Literature:**

According to the focus of the research area.

**Language, knowledge of which is necessary to complete a course:**

Slovak and Hungarian language

**Notes:**

**Evaluation of subjects**

Total number of evaluated students: 1

a	n
100.0	0.0

**Teacher:** tutor

**Date of last update:** 03.03.2023

**Approved by:** prof. RNDr. János Tóth, PhD.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KINF/ POVI/22	<b>Name:</b> Computer vision
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> Lecture <b>Recommended extent of course ( in hours ):</b> <b>Per week:</b> 3 <b>For the study period:</b> 39 <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b> 4.	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> During the semester, the student works on a semester-long project in which he/she is required to develop and implement a suitable solution (algorithm), write a project report, and create a web page. At the end of the semester, each student must successfully complete a final presentation of their project. A minimum of 90 points is required for a grade of A, a minimum of 80 points for a grade of B, a minimum of 70 points for a grade of C, a minimum of 60 points for a grade of D, and a minimum of 50 points for a grade of E. Credit will not be awarded to a student who scores less than 50 points	
<b>Results of education:</b> Upon completion of the course, the student will be proficient in the fundamentals of computer vision. The goal of the course is for the student to be familiar with models of perception, models of motion, camera geometry, and the basics of epipolar geometry. The student will be able to apply the acquired knowledge in solving practical problems and will be proficient in the use of computer vision methods such as detection and recognition of objects in images and video, segmentation, motion tracking, 3D reconstruction, etc.	
<b>Brief syllabus:</b> 1. Bevezetés - a számítógépes látás és az emberi látás közötti kapcsolat 2. Az észlelés modelljei (Marr modellje, Gestalt-szabályok) 3. Kamerageometria, 3D -> 2D megjelenítési paraméterek 4. Felületrekonstrukció egyetlen képből 1. 5. Felületrekonstrukció egyetlen képből 2.: textúraalapú módszerek 6. Mozgásmérés, optikai áramlásszámítás 7. Mozgás, mint transzformáció: parametrikus mozgásmodellek 8. Mozgáskövetés 9. Video mozaikok 10. Sztereo látás, epipoláris geometria, esszenciális mátrix, fundamentális mátrix 11. 3D rekonstrukció egyetlen képből 12. 3D rekonstrukció több képből 13. Fotometrikus sztereo, mozgásalapú rekonstrukció	

#### 14. 3D rekonstrukció és tárgynézetek generálása

**Literature:**

1. HARTLEY, R. I. – ZISSERMAN, A.: Multiple View Geometry in Computer Vision. Cambridge : Cambridge University Press, 2015. 655 s. ISBN 978-0-521-54051-3.
2. KATÓ, Z. – CZÚNI, L.: Számítógépes látás. Budapest : Typotex, 2011, 88 s. ISBN 978-963-279-512-6. EIZ.
3. MORRIS, T.: Computer Vision and Image Processing. New York : Palgrave Macmillan, 2004, 300 s. ISBN 978-0-333-99451-5.
4. ŠIKUDO VÁ, E. - ČERNEKOVÁ, Y. - BENEŠOVÁ, W. - HALADOKOVÁ, Y. - KUČEROVÁ, J.: Počítačové Videnie Detekcia a rozpoznávanie objektov, Wikina Praha, 2014

**Language, knowledge of which is necessary to complete a course:**

Slovak and Hungarian languages

**Notes:****Evaluation of subjects**

Total number of evaluated students: 0

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

**Teacher:** prof. József Zoltán Kató, DSc.

**Date of last update:** 03.03.2023

**Approved by:** prof. RNDr. Tibor Kmet', CSc.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ PRC/22	<b>Name:</b> Publication in a peer-reviewed journal - ADE, ADF, BDE, BDF
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 20	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Doctoral students are obliged to confirm their publishing and scientific research activities with photocopies of publication outputs or citations, confirmations from the organizers of the scientific event about the presentation at the scientific event or membership in the organizing committee of conferences, confirmations from the project leader about the scope and form of participation in the project, etc. The outputs of the doctoral student's publishing activity and citations must be registered in the information system of the UJS University Library. Credits can be awarded for the course only if: - the publication or citation output is registered and approved in the indicated category in the university library information system, - the relevant confirmation with a written statement of acceptance by the supervisor is placed in the doctoral student's personal file for non-publication and non-citation outputs.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> <li>• He/she is able to design experiments for data collection and to analyse their results using mathematical and IT means.</li> </ul> <b>Competence:</b>	

<ul style="list-style-type: none"> <li>• He/she self-containedly presents research results in professional and public community in Slovakia as well as abroad.</li> <li>• He/she publishes own research results in an appropriate form.</li> <li>• Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.</li> <li>• He/she performs his/her mathematical work with the highest ethic standards and high quality.</li> </ul>				
<p><b>Brief syllabus:</b>  Completion of courses in the scientific part of the PhD student's study programme consists in the preparation of outputs of publishing and scientific research activities. A doctoral student may also receive credit for a course repeatedly for each recognised output of a given type.</p>				
<p><b>Literature:</b>  According to the focus of the research area.</p>				
<p><b>Language, knowledge of which is necessary to complete a course:</b>  Slovak and Hungarian language</p>				
<p><b>Notes:</b></p>				
<p><b>Evaluation of subjects</b>  Total number of evaluated students: 1</p> <table border="1"> <thead> <tr> <th>a</th> <th>n</th> </tr> </thead> <tbody> <tr> <td>100.0</td> <td>0.0</td> </tr> </tbody> </table>	a	n	100.0	0.0
a	n			
100.0	0.0			
<p><b>Teacher:</b> tutor</p>				
<p><b>Date of last update:</b> 03.03.2023</p>				
<p><b>Approved by:</b> prof. RNDr. János Tóth, PhD.</p>				

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ PRCS/22	<b>Name:</b> Publication in a peer-reviewed journal - co-authorship - ADE, ADF, BDE, BD
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 12	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Doctoral students are obliged to confirm their publishing and scientific research activities with photocopies of publication outputs or citations, confirmations from the organizers of the scientific event about the presentation at the scientific event or membership in the organizing committee of conferences, confirmations from the project leader about the scope and form of participation in the project, etc. The outputs of the doctoral student's publishing activity and citations must be registered in the information system of the UJS University Library. Credits can be awarded for the course only if: - the publication or citation output is registered and approved in the indicated category in the university library information system, - the relevant confirmation with a written statement of acceptance by the supervisor is placed in the doctoral student's personal file for non-publication and non-citation outputs.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> <li>• He/she is able to design experiments for data collection and to analyse their results using mathematical and IT means.</li> </ul> <b>Competence:</b>	

He/she self-containedly presents research results in professional and public community in Slovakia as well as abroad.  
He/she publishes own research results in an appropriate form.  
Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.  
He/she performs his/her mathematical work with the highest ethic standards and high quality.

**Brief syllabus:**

Completion of courses in the scientific part of the PhD student's study programme consists in the preparation of outputs of publishing and scientific research activities. A doctoral student may also receive credit for a course repeatedly for each recognised output of a given type.

**Literature:**

According to the focus of the research area.

**Language, knowledge of which is necessary to complete a course:**

Slovak and Hungarian language

**Notes:**

**Evaluation of subjects**

Total number of evaluated students: 0

a	n
0.0	0.0

**Teacher:** tutor

**Date of last update:** 03.03.2023

**Approved by:** prof. RNDr. János Tóth, PhD.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ PRZ/22	<b>Name:</b> Publication in peer-reviewed proceedings - AEC, AED, AFC, AFD
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 15	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Doctoral students are obliged to confirm their publishing and scientific research activities with photocopies of publication outputs or citations, confirmations from the organizers of the scientific event about the presentation at the scientific event or membership in the organizing committee of conferences, confirmations from the project leader about the scope and form of participation in the project, etc. The outputs of the doctoral student's publishing activity and citations must be registered in the information system of the UJS University Library. Credits can be awarded for the course only if: - the publication or citation output is registered and approved in the indicated category in the university library information system, - the relevant confirmation with a written statement of acceptance by the supervisor is placed in the doctoral student's personal file for non-publication and non-citation outputs.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> <li>• He/she is able to design experiments for data collection and to analyse their results using mathematical and IT means.</li> </ul> <b>Competence:</b>	

<ul style="list-style-type: none"> <li>• He/she self-containedly presents research results in professional and public community in Slovakia as well as abroad.</li> <li>• He/she publishes own research results in an appropriate form.</li> <li>• Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.</li> <li>• He/she performs his/her mathematical work with the highest ethic standards and high quality.</li> </ul>				
<p><b>Brief syllabus:</b>  Completion of courses in the scientific part of the PhD student's study programme consists in the preparation of outputs of publishing and scientific research activities. A doctoral student may also receive credit for a course repeatedly for each recognised output of a given type.</p>				
<p><b>Literature:</b>  According to the focus of the research area.</p>				
<p><b>Language, knowledge of which is necessary to complete a course:</b>  Slovak and Hungarian language</p>				
<p><b>Notes:</b></p>				
<p><b>Evaluation of subjects</b>  Total number of evaluated students: 3</p> <table border="1"> <thead> <tr> <th>a</th> <th>n</th> </tr> </thead> <tbody> <tr> <td>100.0</td> <td>0.0</td> </tr> </tbody> </table>	a	n	100.0	0.0
a	n			
100.0	0.0			
<p><b>Teacher:</b> tutor</p>				
<p><b>Date of last update:</b> 03.03.2023</p>				
<p><b>Approved by:</b> prof. RNDr. János Tóth, PhD.</p>				

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ PRZS/22	<b>Name:</b> Publication in peer-reviewed proceedings (co-authorship) - AEC, AED, AFC, AFD
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Doctoral students are obliged to confirm their publishing and scientific research activities with photocopies of publication outputs or citations, confirmations from the organizers of the scientific event about the presentation at the scientific event or membership in the organizing committee of conferences, confirmations from the project leader about the scope and form of participation in the project, etc. The outputs of the doctoral student's publishing activity and citations must be registered in the information system of the UJS University Library. Credits can be awarded for the course only if: - the publication or citation output is registered and approved in the indicated category in the university library information system, - the relevant confirmation with a written statement of acceptance by the supervisor is placed in the doctoral student's personal file for non-publication and non-citation outputs.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> <li>• He/she is able to design experiments for data collection and to analyse their results using mathematical and IT means.</li> </ul> <b>Competence:</b>	

<ul style="list-style-type: none"> <li>• He/she self-containedly presents research results in professional and public community in Slovakia as well as abroad.</li> <li>• He/she publishes own research results in an appropriate form.</li> <li>• Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.</li> <li>• He/she performs his/her mathematical work with the highest ethic standards and high quality.</li> </ul>				
<p><b>Brief syllabus:</b>  Completion of courses in the scientific part of the PhD student's study programme consists in the preparation of outputs of publishing and scientific research activities. A doctoral student may also receive credit for a course repeatedly for each recognised output of a given type.</p>				
<p><b>Literature:</b>  According to the focus of the research area.</p>				
<p><b>Language, knowledge of which is necessary to complete a course:</b>  Slovak and Hungarian language</p>				
<p><b>Notes:</b></p>				
<p><b>Evaluation of subjects</b>  Total number of evaluated students: 3</p> <table border="1"> <thead> <tr> <th>a</th> <th>n</th> </tr> </thead> <tbody> <tr> <td>100.0</td> <td>0.0</td> </tr> </tbody> </table>	a	n	100.0	0.0
a	n			
100.0	0.0			
<p><b>Teacher:</b> tutor</p>				
<p><b>Date of last update:</b> 03.03.2023</p>				
<p><b>Approved by:</b> prof. RNDr. János Tóth, PhD.</p>				

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ REP/22	<b>Name:</b> Editorial work
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 5	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Doctoral students are obliged to confirm their publishing and scientific research activities with photocopies of publication outputs or citations, confirmations from the organizers of the scientific event about the presentation at the scientific event or membership in the organizing committee of conferences, confirmations from the project leader about the scope and form of participation in the project, etc. The outputs of the doctoral student's publishing activity and citations must be registered in the information system of the UJS University Library. Credits can be awarded for the course only if: - the publication or citation output is registered and approved in the indicated category in the university library information system, - the relevant confirmation with a written statement of acceptance by the supervisor is placed in the doctoral student's personal file for non-publication and non-citation outputs.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> <li>• He/she is able to design experiments for data collection and to analyse their results using mathematical and IT means.</li> </ul> <b>Competence:</b>	

- He/she self-containedly presents research results in professional and public community in Slovakia as well as abroad.
- He/she publishes own research results in an appropriate form.
- Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.
- He/she performs his/her mathematical work with the highest ethic standards and high quality.

**Brief syllabus:**

Completion of courses in the scientific part of the PhD student's study programme consists in the preparation of outputs of publishing and scientific research activities.  
A doctoral student may also receive credit for a course repeatedly for each recognised output of a given type.

**Literature:**

According to the focus of the research area.

**Language, knowledge of which is necessary to complete a course:**

Slovak and Hungarian language

**Notes:**

**Evaluation of subjects**

Total number of evaluated students: 0

a	n
0.0	0.0

**Teacher:** tutor

**Date of last update:** 03.03.2023

**Approved by:** prof. RNDr. János Tóth, PhD.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ SMSVM/22	<b>Name:</b> School Mathematics in the Light of Higher Mathematics
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> Lecture / Seminar <b>Recommended extent of course ( in hours ):</b> <b>Per week:</b> 1 / 2 <b>For the study period:</b> 13 / 26 <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b> 3.	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> The student's assessment is continuous according to the requirements and tasks set by the teacher. Independent study of the prescribed thematic units. For an A grade, at least 90% of the points must be obtained, for a B grade at least 80% of the points, for a C grade at least 70% of the points, for a D grade at least 60% of the points, and for an E grade at least 50% of the points.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she understands abstract notions in curriculum and knows the relations among them. He/she recognizes general patterns and concepts in applied problems.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• He/she is able to formulate new hypotheses and strategies for further research and development of the scientific field.</li> <li>• He/she is able to formulate logical and true mathematical statements with exact specification of their conditions and main consequences.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> </ul> <b>Competence:</b> <ul style="list-style-type: none"> <li>• He/she is able self-containedly earn new mathematical knowledge and extend it.</li> <li>• Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.</li> <li>• He/she is able to suggest self-containedly possible solutions of mathematical tasks.</li> </ul>	
<b>Brief syllabus:</b>	

Heuristic methods of problem solving, mathematical induction, method of invariants, method of colouring, extremal principle, Dirichlet principle, summation of number series, inequalities, complex numbers in geometry and number theory.

**Literature:**

1. Larson Loren C.: Metódy riešenia matematických problémov, Bratislava, Alfa, 1990
2. Arthur Engel: Problem-Solving Strategies, Springer, Berlin, 1999
3. Martin Aigner – Günter M. Ziegler: Bizonyítások a könyvből, Typotex, Budapest, 2009
4. A. M. Jaglom – I. M. Jaglom: Nem elemi feladatok elemi tárgyalásban, Typotex, Budapest, 2015

**Language, knowledge of which is necessary to complete a course:**

Slovak and Hungarian language

**Notes:**

**Evaluation of subjects**

Total number of evaluated students: 3

A	B	C	D	E	FX
33.33	66.67	0.0	0.0	0.0	0.0

**Teacher:** prof. RNDr. János Tóth, PhD., doc. RNDr. József Bukor, PhD.

**Date of last update:** 03.03.2023

**Approved by:** prof. RNDr. János Tóth, PhD.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ SVGP/22	<b>Name:</b> Co-worker of a scientific grant project
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 5	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Doctoral students are obliged to confirm their publishing and scientific research activities with photocopies of publication outputs or citations, confirmations from the organizers of the scientific event about the presentation at the scientific event or membership in the organizing committee of conferences, confirmations from the project leader about the scope and form of participation in the project, etc. The outputs of the doctoral student's publishing activity and citations must be registered in the information system of the UJS University Library. Credits can be awarded for the course only if: - the publication or citation output is registered and approved in the indicated category in the university library information system, - the relevant confirmation with a written statement of acceptance by the supervisor is placed in the doctoral student's personal file for non-publication and non-citation outputs.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> <li>• He/she is able to design experiments for data collection and to analyse their results using mathematical and IT means.</li> </ul> <b>Competence:</b>	

<ul style="list-style-type: none"> <li>• He/she self-containedly presents research results in professional and public community in Slovakia as well as abroad.</li> <li>• He/she publishes own research results in an appropriate form.</li> <li>• Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.</li> <li>• He/she performs his/her mathematical work with the highest ethic standards and high quality.</li> </ul>	
<p><b>Brief syllabus:</b>  Completion of courses in the scientific part of the PhD student's study programme consists in the preparation of outputs of publishing and scientific research activities.  A doctoral student may also receive credit for a course repeatedly for each recognised output of a given type.</p>	
<p><b>Literature:</b>  According to the focus of the research area.</p>	
<p><b>Language, knowledge of which is necessary to complete a course:</b>  Slovak and Hungarian language</p>	
<p><b>Notes:</b></p>	
<p><b>Evaluation of subjects</b>  Total number of evaluated students: 1</p>	
a	n
100.0	0.0
<p><b>Teacher:</b> tutor</p>	
<p><b>Date of last update:</b> 03.03.2023</p>	
<p><b>Approved by:</b> prof. RNDr. János Tóth, PhD.</p>	

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KINF/ TNMS/22	<b>Name:</b> Theory and tools of modeling and simulation
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> Lecture / Practical <b>Recommended extent of course ( in hours ):</b> <b>Per week:</b> 2 / 2 <b>For the study period:</b> 26 / 26 <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b> 3.	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> At least 50% pass rate in the written examination during the semester, submission of the project.	
<b>Results of education:</b> The student will gain knowledge of basic models, understand the basic properties of the models mentioned. The student will analyze the acquired knowledge about the different types of models. The student applies the knowledge learned to the field of modelling and simulation.	
<b>Brief syllabus:</b> 1. Modeling and simulation theory, DEVS (Discrete Event System Specification) formalism 2. HLA (High Level Architecture) 3. Modeling and Simulation of Continuous Systems (DESS) 4. Modeling and Simulation of Discrete Event Systems (DTSS) 5. Modeling and Simulation of Hybrid Systems (DEV&DESS) 6. Introduction to neural networks (NN): inspiration from neurobiology, basic understanding of neuronal activity, overview of NN models, history of the field 7. Binary perceptron: notion of learning with teacher (pattern), learning rule perceptron, pattern classification, linear separable problems, linear neural networks. 8. Backpropagation: multilayer feedforward networks, learning rule derivation - Backpropagation method of Error Sulfation. 9. Recurrently NN: temporal structure in data, time delay feed forward neural networks (TDNN), example of training recurrent neural network. 10. Self-organizing maps, Kohonen model, LVQ, Max net, Ojo and Sanger's Learning Rule, extraction of principal components in data, dimension reduction in data, clustering. 11. Hopfield's discrete and continuous model. 12. Application of NN to prediction, classification and generative tasks in data sequence processing.	
<b>Literature:</b> 1. V. Kvasnička, L. Beňušková, J. Pospíchal, I. Farkaš, P. Tiňo, and A. Král' – Úvod do teórieneurónových sietí . IRIS, Bratislava, 1997. 2. S. N. Sivanandam, S. Sumathi, S.N. Deepa – Introduction to Neural Networks Using Matlab6.0. Tata McGraw-Hill New Delhi 2006 3. S. Haykin - Neural Networks: A Comprehensive Foundation (2nd ed.). Prentice Hall, NJ 1999.	

4. Zeigler, B., P., Praehofer, H. and Kim, T.,G.: Theory of modeling and simulation. AcademicPress, 2000.
5. Knuhl, F., Weathery, R. and Dahmann, J.: Creating Computer Simulation Systems: AnIntroduction to the High Level Architecture. Prentice Hall, 1999.
6. Law, A., Kelton, D.: Simulation Modelling and Analysis, McGraw-Hill, 2000.
7. Hinrichsen, D., Pritchard, A.J.: Mathematical Systems Theory I, Springer Berlin HeidelbergNew York 2005.
8. Ross, S.: Simulation. Academic Press, 2002.
9. Dabney, J. B.: Mastering Simulink, Prentice Hall, 2004.
10. Fishwick, P.: Simulation Model Design and Execution. Prentice Hall, 1995

**Language, knowledge of which is necessary to complete a course:**  
Slovak and Hungarian languages

**Notes:**

**Evaluation of subjects**

Total number of evaluated students: 3

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

**Teacher:** prof. RNDr. Tibor Kmet', CSc.

**Date of last update:** 03.03.2023

**Approved by:** prof. RNDr. Tibor Kmet', CSc.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ TPDV/22	<b>Name:</b> Theory and Practice of Didactic Research
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> Lecture <b>Recommended extent of course ( in hours ):</b> <b>Per week:</b> 3 <b>For the study period:</b> 39 <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b> 2.	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Interim assessment: model statistical data processing based on the assignment, model evaluation of qualitative research based on the assignment. Final assessment: oral examination Midterm/final assessment: 50 points/50 points. A grade A requires a sum of at least 90 points from the midterm and final assessments, a grade B requires at least 80 points, a grade C requires at least 70 points, a grade D requires at least 60 points, and a grade E requires at least 50 points.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in</li> <li>• He/she understands and knows concrete scientific methods of basic or applied research in the fields of mathematics and theory of teaching of mathematics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• He/she is able to formulate new hypotheses and strategies for further research and development of the scientific field.</li> <li>• He/she practically handles research methods and its use in research and working procedures.</li> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> </ul> <b>Competence:</b> <ul style="list-style-type: none"> <li>• He/she has independent, critical and analytic thinking.</li> <li>• He/she is able to understand problems specific for other subjects, to cooperate with experts working in these areas and to reformulate their problems into mathematical language.</li> <li>• He/she understands value of mathematical statements, their applicability and limits of their use.</li> </ul>	
<b>Brief syllabus:</b> Research methodology in educational sciences. Stages of pedagogical research. Research topics, problems, research hypotheses. Validity, objectivity, reliability of research. Research sample, research sample selection options. Empirical research methods - observation, questionnaire,	

survey, interview. Use of mathematical and statistical methods in research. Descriptive statistics; quantitative trait - processing of measured data, tests of location and variability of measured values, tracking of two or more traits, linear regression, multivariate statistical analyses; qualitative trait - description and characteristics of a set with one or more observed traits, testing for independence and agreement, time series processing. Qualitative data processing methods, digital support.

**Literature:**

HENDL, J.: Přehled statistických metod. Praha : Portál, 2009. 695 s. ISBN 978-80-7367-482-3.  
CHRÁSKA, M.: Metody pedagogického výzkumu. Praha : Grada, 2011.  
KRÖPFL, B. - PESCHEK, W. - SCHNEIDER, E. – SCHÖNLIEB, A.: Alkalmazott statisztika. Budapest : Műszaki Könyvkiadó, 2002. - 335 s. - ISBN 963 16 2657 1.  
PUNCH, K. F.: Úspěšný návrh výzkumu. Praha : Portál, 2008. 230s. ISBN 978-80-7367-468-7.  
ŠVARÍČEK, R., ŠEĐOVÁ, K.: Kvalitativní výzkum v pedagogických vědách. Praha : Portál, 2007. 377s. ISBN 978-80-7367-313-0.  
COX, D. R. -DONNELLY, CHRISTL A.É Principles of Applied Statistics, Cambridge University Press, 2011  
KARLOVITZ, J. T. – TORGYIK, J. Vzdelávanie, výskum a metodológia (Oktatás, kutatás és módszertan). 1. vyd. Komárno : International Research Institute s.r.o., 2013. 684 s. ISBN 978-80-971251-1-0.  
SILVERMAN, D. Ako robiť kvalitatívny výskum. Bratislava : Ikar a.s., 2005. 328 s. ISBN 80-551-0904-4.

**Language, knowledge of which is necessary to complete a course:**

Slovak and Hungarian language

**Notes:**

**Evaluation of subjects**

Total number of evaluated students: 11

A	B	C	D	E	FX
45.45	27.27	9.09	18.18	0.0	0.0

**Teacher:** prof. Dr. Péter Tóth, PhD.

**Date of last update:** 03.03.2023

**Approved by:** prof. RNDr. János Tóth, PhD.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KINF/TVI/22	<b>Name:</b> Theory of Teaching Informatics
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> Lecture <b>Recommended extent of course ( in hours ):</b> <b>Per week:</b> 3 <b>For the study period:</b> 39 <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b> 1.	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Continuous assessment: reports, presentations, discussions, didactic outputs based on the solution of assigned tasks, preparation of a term paper. Final assessment: oral examination Midterm/final assessment ratio: 50 points/50 points. To obtain a grade of A, the sum of at least 90 points from the midterm and final assessments must be obtained, to obtain a grade of B at least 80 points, to obtain a grade of C at least 70 points, to obtain a grade of D at least 60 points, to obtain a grade of E at least 50 points.	
<b>Results of education:</b> The student will be able to identify the general objectives of teaching computer science, at different levels of school education. The student is familiar with modern approaches to teaching computer science and is familiar with current theories of cognition in the context of digital technologies. Can design learning situations, design different types of learning activities, develop methodologies. Can design appropriate learning content, formulate specific learning objectives as well as analyse and evaluate learning activities in terms of the achievement of learning objectives, the appropriateness of the methods and forms used. The student is able to interpret the results of pedagogical research and subsequently use them in his/her own research. He/she has a general overview of current issues in the field of theory of teaching informatics and is able to analyze and compare different concepts of teaching informatics (internationally).	
<b>Brief syllabus:</b> Analysis of the general objectives of teaching computer science. Formulation of specific teaching objectives and evaluation of the achieved results. Preparation and implementation of learning activities and development of methodology. Teaching methods and forms of education in the teaching of computer science. Fundamental concepts of informatics and their projection into school informatics at primary and secondary schools. Development of digital literacy and computational thinking. Issues related to the didactics of programming in primary and secondary schools. Constructive and instructive approach in teaching computer science. Developing skills for the 21st century in the teaching of computer science. Current problems of teaching computer science in Slovakia and in the world. Current issues in the didactics of computer science teaching.	

Pedagogical research in the field of theory of teaching informatics.  
Defining the research problem, methods of data collection and processing.

**Literature:**

1. BRESTENSKÁ, B. Premena školy s využitím informačných a komunikačných technológií : Využitie IKT v danom predmete : spoločná časť . 1. vyd. Košice : elfa, s.r.o. 162 s. ISBN 978-80-8086-143-8.
2. CHRÁSKA, M. Metody pedagogického výzkumu : Základy kvantitatívneho výzkumu . 2., akt. vyd. Praha : Grada, 2016. 254 s. ISBN 978-80-247-5326-3.
3. KALAŠ, K. Informatika pre stredné školy. 1. vyd. Bratislava : SPN, 2001. 112 s. ISBN 80-08-01518-7.
4. KALAŠ, I. Premeny školy v digitálnom veku. 1. vyd. Bratislava : SPN - Mladé letá, s.r.o., 2013. 256 s. ISBN 978-80-10-02409-4.
5. KARLOVITZ, J. T. – TORGYIK, J. Vzdelávanie, výskum a metodológia (Oktatás, kutatás és módszertan). 1. vyd. Komárno : International Research Institute s.r.o., 2013. 684 s. ISBN 978-80-971251-1-0.
- MARCHIȘ, J. Az informatika tanításának módszertana/. 1. kiad. Cluj-Napoca : Presa Universitară Clujeană, 2008. 154 s. ISBN 978-973-610-736-8.
6. POKORNÝ, M. Nápadník do informatiky. 1. vyd. Kralice na Hané : Computer Media, 2008. 80 s. ISBN 978-80-7402-010-0.
7. SILVERMAN, D. Ako robiť kvalitatívny výskum. Bratislava : Ikar a.s., 2005. 328 s. ISBN 80-551-0904-4.

**Language, knowledge of which is necessary to complete a course:**

**Notes:**

**Evaluation of subjects**

Total number of evaluated students: 5

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0

**Teacher:** prof. RNDr. Tibor Kmeť, CSc.

**Date of last update:** 03.03.2023

**Approved by:** prof. RNDr. Tibor Kmeť, CSc.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ TVM/22	<b>Name:</b> Theories of Mathematics Education
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> Lecture <b>Recommended extent of course ( in hours ):</b> <b>Per week:</b> 3 <b>For the study period:</b> 39 <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b> 1.	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Continuous evaluation: reports, presentations, discussions, didactic outputs based on the solution of assigned tasks, preparation of term papers. Final evaluation: oral examination Midterm/final assessment ratio: 50 points/50 points. To obtain a grade of A, the sum of at least 90 points from the midterm and final assessments must be obtained, to obtain a grade of B at least 80 points, to obtain a grade of C at least 70 points, to obtain a grade of D at least 60 points, to obtain a grade of E at least 50 points.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in</li> <li>• He/she understands and knows concrete scientific methods of basic or applied research in the fields of mathematics and theory of teaching of mathematics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• He/she applies knowledge of own theoretical analysis and complex research in solving problems in this area.</li> <li>• He/she applies knowledge of own theoretical analysis and complex research in solving problems in this area.</li> <li>• He/she is able to recognize routine professional problems, use accessible literature for their theoretical and practical solutions and apply appropriate research methods.</li> </ul> <b>Competence:</b> <ul style="list-style-type: none"> <li>• He/she has independent, critical and analytic thinking.</li> <li>• He/she is able self-containedly earn new mathematical knowledge and extend it.</li> <li>• Applying his/her mathematical knowledge is able well understand observable phenomena, describe and explain their natural relations.</li> </ul>	
<b>Brief syllabus:</b>	

Languages of mathematics, their historical development and didactic significance. Cognitive process in mathematics. The conceptual process in mathematics and in mathematics teaching. Structure, diagnosis and development of key mathematical competences. Didactical analysis of the thematic areas according to the State Educational Programme - equations and inequalities, functions, graphs of functions and functional thinking, infinitesimal calculus, combinatorics, probability and statistics, geometry, number theory. Assessment in mathematics teaching, development of standards and didactic tests. Pedagogical research in didactics of mathematics, comparison of quantitative and qualitative research.

**Literature:**

**Language, knowledge of which is necessary to complete a course:**

Slovak and Hungarian language

**Notes:**

**Evaluation of subjects**

Total number of evaluated students: 6

A	B	C	D	E	FX
16.67	66.67	16.67	0.0	0.0	0.0

**Teacher:** Dr. habil. RNDr. Peter Csiba, PhD.

**Date of last update:** 03.03.2023

**Approved by:** prof. RNDr. János Tóth, PhD.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ UVP/22	<b>Name:</b> Participation in a scientific event with the presentation of own results
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 5	
<b>Recommended semester/trimester of study:</b>	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Doctoral students are obliged to confirm their publishing and scientific research activities with photocopies of publication outputs or citations, confirmations from the organizers of the scientific event about the presentation at the scientific event or membership in the organizing committee of conferences, confirmations from the project leader about the scope and form of participation in the project, etc. The outputs of the doctoral student's publishing activity and citations must be registered in the information system of the UJS University Library. Credits can be awarded for the course only if: - the publication or citation output is registered and approved in the indicated category in the university library information system, - the relevant confirmation with a written statement of acceptance by the supervisor is placed in the doctoral student's personal file for non-publication and non-citation outputs.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she is familiar with basic mathematical relations in fields of mathematical analysis, algebra, number theory, geometry, discrete mathematics and probability and statistics.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• Based on his/her learning and results, he/she is able to suggest, verify and implement new research and working procedures.</li> <li>• He/she is able to see and investigate new connections in number theory, analysis, algebra, geometry, finite mathematics, probability and statistics.</li> <li>• He/she is able to design experiments for data collection and to analyse their results using mathematical and IT means.</li> </ul> <b>Competence:</b>	

<ul style="list-style-type: none"> <li>• He/she self-containedly presents research results in professional and public community in Slovakia as well as abroad.</li> <li>• He/she publishes own research results in an appropriate form.</li> <li>• Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.</li> <li>• He/she performs his/her mathematical work with the highest ethic standards and high quality.</li> </ul>	
<p><b>Brief syllabus:</b>  Completion of courses in the scientific part of the PhD student's study programme consists in the preparation of outputs of publishing and scientific research activities.  A doctoral student may also receive credit for a course repeatedly for each recognised output of a given type.</p>	
<p><b>Literature:</b>  According to the focus of the research area.</p>	
<p><b>Language, knowledge of which is necessary to complete a course:</b>  Slovak and Hungarian language</p>	
<p><b>Notes:</b></p>	
<p><b>Evaluation of subjects</b>  Total number of evaluated students: 4</p>	
a	n
100.0	0.0
<p><b>Teacher:</b> tutor</p>	
<p><b>Date of last update:</b> 03.03.2023</p>	
<p><b>Approved by:</b> prof. RNDr. János Tóth, PhD.</p>	

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KINF/ VIZI/22	<b>Name:</b> Information visualizations
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> Lecture <b>Recommended extent of course ( in hours ):</b> <b>Per week:</b> 3 <b>For the study period:</b> 39 <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b> 4.	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Preparation of a seminar paper. Exam: oral. A minimum average of 90% is required for an A grade, a minimum average of 80% for a B grade, a minimum average of 70% for a C grade, a minimum average of 60% for a D grade, and a minimum average of 50% for an E grade.	
<b>Results of education:</b> The student will remember and understand the theoretical principles of visualizing statistical data and other information. The student understands the steps of creating a visual representation from real data, and according to the results of data structure analysis, he/she is able to apply the relevant theoretical knowledge in the creation of a specific visual representation.	
<b>Brief syllabus:</b> 1. Visualization process, scientific visualization and information visualization 2. Criteria, Tufte's principles, methods of visualization of low-dimensional data 3. Principles of perception and their application in the creation of visual representations 4. Analysis of multidimensional data and methods of their visualization. Geometric, icon and pixel techniques. Networks and hierarchically arranged data. 5. Introduction of interactivity and manipulation capabilities into visual representation 6. Perception of space, 3D visualizations, deceptive and risky visualizations 7. Computational support for effective visual learning	
<b>Literature:</b> 1. Ricardo Mazza: Introduction to Information Visualization, Springer, 2009, ISBN978-1-84800-218-0 2. Edward R. Tufte: The Visual Display of Quantitative Information, Graphic Press 2001 3. Edward R. Tufte: Envisioning information, Graphic Press 1990 4. Edward R. Tufte: Visual Explanations, Images and Quantities, Evidence and Narrative, GraphicPress 1997 5. Colin Ware: Information Visualization, Perception for Design, Morgan Kaufmann, Elsevier 20	
<b>Language, knowledge of which is necessary to complete a course:</b> Slovak and Hungarian languages	

<b>Notes:</b>					
<b>Evaluation of subjects</b>					
Total number of evaluated students: 3					
A	B	C	D	E	FX
66.67	33.33	0.0	0.0	0.0	0.0
<b>Teacher:</b> doc. RNDr. Mária Kmeťová, PhD.					
<b>Date of last update:</b> 03.03.2023					
<b>Approved by:</b> prof. RNDr. Tibor Kmeť, CSc.					

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ VKDM/22	<b>Name:</b> Selected Topics in Discrete Mathematics
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> Lecture / Seminar <b>Recommended extent of course ( in hours ):</b> <b>Per week:</b> 2 / 1 <b>For the study period:</b> 26 / 13 <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b> 4.	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Examination: oral. For an A grade, at least 90% of the marks must be obtained, for a B grade at least 80% of the marks, for a C grade at least 70% of the marks, for a D grade at least 60% of the marks and for an E grade at least 50% of the marks.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she understands abstract notions in curriculum and knows the relations among them. He/she recognizes general patterns and concepts in applied problems.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• He/she is able to formulate new hypotheses and strategies for further research and development of the scientific field.</li> <li>• He/she is able to formulate logical and true mathematical statements with exact specification of their conditions and main consequences.</li> <li>• He/she is able to see and investigate new connections in finite mathematics.</li> </ul> <b>Competence:</b> <ul style="list-style-type: none"> <li>• He/she is able self-containedly earn new mathematical knowledge and extend it.</li> <li>• Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.</li> <li>• He/she is able to suggest self-containedly possible solutions of mathematical tasks.</li> </ul>	
<b>Brief syllabus:</b> Solving combinatorial problems using linear recursions. Theory of linear recursion, basic theorem of linear recursions, generating function. Binary recursions, known sequences, associated sequences, identity. Extension of binomial coefficients to $Z \times Z$	

Generalization of Pascal's triangle (Pascal's pyramid, hyperbolic Pascal's triangles). Significant numbers (Catalan, Bernoulli, Stirling numbers).					
<b>Literature:</b>					
<b>Language, knowledge of which is necessary to complete a course:</b> Slovak and Hungarian language					
<b>Notes:</b>					
<b>Evaluation of subjects</b> Total number of evaluated students: 0					
A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0
<b>Teacher:</b> prof. László Szalay, DSc., doc. RNDr. József Bukor, PhD.					
<b>Date of last update:</b> 03.03.2023					
<b>Approved by:</b> prof. RNDr. János Tóth, PhD.					

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ VKMA/22	<b>Name:</b> Selected Topics in Mathematical Analysis
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> Lecture / Seminar <b>Recommended extent of course ( in hours ):</b> <b>Per week:</b> 2 / 1 <b>For the study period:</b> 26 / 13 <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b> 2.	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Examination: oral. For an A grade, at least 90% of the marks must be obtained, for a B grade at least 80% of the marks, for a C grade at least 70% of the marks, for a D grade at least 60% of the marks and for an E grade at least 50% of the marks.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she understands abstract notions in curriculum and knows the relations among them. He/she recognizes general patterns and concepts in applied problems.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• He/she is able to formulate new hypotheses and strategies for further research and development of the scientific field.</li> <li>• He/she is able to formulate logical and true mathematical statements with exact specification of their conditions and main consequences.</li> <li>• He/she is able to see and investigate new connections in analysis.</li> </ul> <b>Competence:</b> <ul style="list-style-type: none"> <li>• He/she is able self-containedly earn new mathematical knowledge and extend it.</li> <li>• Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.</li> <li>• He/she is able to suggest self-containedly possible solutions of mathematical tasks.</li> </ul>	
<b>Brief syllabus:</b> Methodological aspects of the basic concepts of mathematical analysis - representations, sequences, limit, continuity. Concept of metric space. Open and closed sets. Concept of topological space. Relation with metric and topological spaces. Borel sets. Fundamentals of measure theory.	

Set systems, functions defined on set systems. Measure. External measure. Lebesgue measure. Measurable sets. Measurable functions. Lebesgue integral. Relation of the Lebesgue integral to the Riemann integral. Methods of calculating the Lebesgue integral. Applications.					
<b>Literature:</b> ŠALÁT, T: Metrické priestory, ALFA 1981. 291s. RUDIN, W: Analýza v reálném a komplexním oboru, Academia, Praha, 2003 NEUBRUNN, T. - RIEČAN, B.: Miera a integrál, Veda, Bratislava, 1981 RIEČAN, B. - NEUBRUNN, T.: Teória miery, Veda, Bratislava, 1992 JÁRAI, A.: Mérték és integrál, Nemzeti Tankönyvkiadó, 2002, ISBN 963 19 3273 7					
<b>Language, knowledge of which is necessary to complete a course:</b> Slovak and Hungarian language					
<b>Notes:</b>					
<b>Evaluation of subjects</b> Total number of evaluated students: 6					
A	B	C	D	E	FX
33.33	16.67	33.33	16.67	0.0	0.0
<b>Teacher:</b> doc. RNDr. Ladislav Mišík, CSc., doc. RNDr. Ferdinánd Filip, PhD.					
<b>Date of last update:</b> 03.03.2023					
<b>Approved by:</b> prof. RNDr. János Tóth, PhD.					

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ VKTC/22	<b>Name:</b> Selected Topics in Number Theory
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> Lecture / Seminar <b>Recommended extent of course ( in hours ):</b> <b>Per week:</b> 2 / 1 <b>For the study period:</b> 26 / 13 <b>Methods of study:</b> present	
<b>Number of credits:</b> 10	
<b>Recommended semester/trimester of study:</b> 1.	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> Examination: oral. For an A grade, at least 90% of the marks must be obtained, for a B grade at least 80% of the marks, for a C grade at least 70% of the marks, for a D grade at least 60% of the marks and for an E grade at least 50% of the marks.	
<b>Results of education:</b> After completing the course, the student will gain: <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• He/she has extended experience in more areas of the field of study. This experience serves him/her as a base for research activity and creation of new knowledge in mathematics, its applications and in the theory of teaching of mathematics.</li> <li>• He/she understands abstract notions in curriculum and knows the relations among them. He/she recognizes general patterns and concepts in applied problems.</li> <li>• He/she understands specific features of mathematical thinking.</li> </ul> <b>Skills:</b> <ul style="list-style-type: none"> <li>• He/she is able to formulate new hypotheses and strategies for further research and development of the scientific field.</li> <li>• He/she is able to formulate logical and true mathematical statements with exact specification of their conditions and main consequences.</li> <li>• He/she is able to see and investigate new connections in number theory.</li> </ul> <b>Competence:</b> <ul style="list-style-type: none"> <li>• He/she is able self-containedly earn new mathematical knowledge and extend it.</li> <li>• Using basic knowledge obtained in various mathematical fields he/she is able self-containedly formulate and analyze mathematical problems.</li> <li>• He/she is able to suggest self-containedly possible solutions of mathematical tasks.</li> </ul>	
<b>Brief syllabus:</b> 1. Arithmetic functions, multiplicative, additive, summation of function values over argument divisors, inverse formula, convolution, mean value of a function.	

2. Prime numbers and their distributions, estimates of the number of prime numbers, prime number theorem and its applications, Chebyshev's theorems, Bertrand's postulate and additive properties of prime numbers.
3. Ratio sets of subsets of natural numbers, (R)-dense sets and their properties, other densities related to (R)-density. Applications of dense sets in school mathematics.

**Literature:**

1. Kolibiar- Legéň- Šalát- Zám: Algebra a príbuzné disciplíny, Alfa Bratislava, 1991.
2. Freud, R.- Gyarmati, E.: Számelmélet, Nemzeti Tankönyvkiadó, Budapest, 2006.
3. Hardy, G. H.- Wright, E. M.: An Introduction to the Theory of Numbers, Oxford Press, 5th ed., 1980.
4. Tóth J.: Teória (R)-hustých množín a jej aplikácie v školskej matematike, Eruditio- Educatio, Roč. 1, č. 3 (2006), s. 31- 94.

**Language, knowledge of which is necessary to complete a course:**

Slovak and Hungarian language

**Notes:**

**Evaluation of subjects**

Total number of evaluated students: 6

A	B	C	D	E	FX
66.67	16.67	16.67	0.0	0.0	0.0

**Teacher:** prof. RNDr. János Tóth, PhD.

**Date of last update:** 03.03.2023

**Approved by:** prof. RNDr. János Tóth, PhD.

## INFORMATION SHEET

<b>Name of the university:</b> J. Selye University	
<b>Name of the faculty:</b> Faculty of Economics and Informatics	
<b>Code:</b> KMAT/ VZPBS/22	<b>Name:</b> Supervision of the Final Work of Bachelor Studies
<b>Types, range and methods of educational activities:</b> <b>Form of study:</b> <b>Recommended extent of course ( in hours ):</b> <b>Per week: For the study period:</b> <b>Methods of study:</b> present	
<b>Number of credits:</b> 3	
<b>Recommended semester/trimester of study:</b> 3., 4., 5., 6., 7., 8..	
<b>Level of study:</b> III.	
<b>Prerequisites:</b>	
<b>Conditions for passing the subject:</b> A doctoral student will receive credit only for conducting a bachelor's thesis that has been defended before a state examination committee.	
<b>Results of education:</b> As a result of the course, the doctoral student demonstrates the ability to lead and supervise the development of students' basic professional work.	
<b>Brief syllabus:</b> The management of the final thesis of the Bachelor's study consists in the management of the final theses of the students of the 1st university degree of the relevant study programme (in the case of the focus of the topic on mathematics it is the study programme Teaching Mathematics, in the case of the focus of the topic on informatics it is the study programme Teaching Informatics or Applied Informatics). The PhD student must be guided by the doctoral supervisor in such a way that the generally binding legal regulations, the internal regulations of the UJS as well as the principles of authorial ethics are observed.	
<b>Literature:</b> According to the focus of the research area.	
<b>Language, knowledge of which is necessary to complete a course:</b> Slovak and Hungarian language.	
<b>Notes:</b>	
<b>Evaluation of subjects</b> Total number of evaluated students: 2	
a	n
100.0	0.0
<b>Teacher:</b> tutor	
<b>Date of last update:</b> 03.03.2023	

**Approved by:** prof. RNDr. János Tóth, PhD.