Course descriptions

TABLE OF CONTENTS

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAI/2-AIN-127/15	**Course title:** Advanced Computer Graphics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 2.

Educational level: II.

Prerequisites:

Antirequisites: FMFI.KAG/2-MPG-101/00 and FMFI.KAG/2-MPG-102/00

Course requirements:
Attend lessons. One missed +0 points. 2 missed 0 points, 3 missed 0 points, 4 and more is Fx.
Project and exercise (mandatory).
Solve all homework problems (mandatory each one >=30%)
Pass final term (mandatory) You will need to solve several problems discussed during lessons.
Pass oral/written exam: (mandatory)
Scale of assessment (preliminary/final): 60/40

Learning outcomes:
After completing the course students will know techniques of photorealistic computer graphics. Will be able to solve color calculation, shadow computation and render views of a scene from the input images. Students learn the basics of graphical programming in C #.

Class syllabus:
LECTURE01 "INTRODUCTION TO COMPUTER GRAPHICS"
LECTURE02 "RAY TRACING 1."
TayTracong Pipeline
LECTURE03 "RAY TRACING 2."
Ray Intersections
LECTURE04 "RAY TRACING 3."
Ray Tracing Acceleration, Data structure: grids, BVH, Kd-tree, Directional Partitioning, Dynamic Scenes, Beam and Cone Tracing, Packet Tracing
LECTURE05 "LIGHT TRASPORT."
Physics behind ray tracing, Physical light quantities, Visual perception of light, Light sources, Light transport simulation: Rendering Equation
LECTURE06 "RADIOSITY."
Diffuse reflectance function, Radiative equilibrium between emission and absorption, escape, System of linear equations, Iterative solution Neuman series
LECTURE07 "BRDF."
Bidirectional Reflectance Distribution Function (BRDF), Reflection models, Projection onto spherical basis functions, Shading Phong model, Blin-Phong model

Physical BRDF, Ward Reflection Model, Cook-Torrance model
LECTURE08 "SHADOWS."
LECTURE09 "TEXTURING 1, 2."
Texture parameterization, Procedural methods, Procedural textures, Fractal landscapes, Surface reality techniques
LECTURE10 "IMAGE BASED RENDERING 1."
Plenopticfunction, Panoramas, Concentric Mosaics, Light Field Rendering, The Lumigraph
LECTURE11 "IMAGE BASED RENDERING 2."
Layered Depth Images, View-dependent Texture Mapping, Surface Light Fields, View Morphing
LECTURE12 "ASK ME ANYTHING."
Test problem introduction

Recommended literature:

Moderní počítačová grafika / Jiří Žára ... [et al.]. Brno : Computer Press, 2010
Realistic image synthesis using photon mapping / Henrik Wann Jensen ; Foreword by Pat Hanrahan. Natick : A K Peters, 2001
http://www.sccg.sk/~durikovic/classes/CG2/cg2_syllabus.html

Languages necessary to complete the course:
slovak, english

Notes:

Past grade distribution
Total number of evaluated students: 14

A	B	C	D	E	FX
21,43	21,43	35,71	0,0	7,14	14,29

Lecturers: prof. RNDr. Roman Ďurikovič, PhD.

Last change: 22.09.2017

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-AIN-112/15	Advanced Image Processing

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:
homeworks, projects, written exam
A 91%, B 82%, C 73%, D 64%, E 55%
Scale of assessment (preliminary/final): 50/50

Learning outcomes:
Graduates will know the advanced image processing techniques, such as image transformation, filtering, image improvement, advanced segmentation techniques (using active contours - snakes, flood segmentation) etc.

Class syllabus:
Image capture.
Features digital image.
Picture transformation
Methods of image preprocessing, Hough transform
Fourier Transform - DFT, FFT, filters detail
noise Reduction
Mathematical Morphology BW and grayscale
Segmentation. Snake watershed, clustering
improving the image
processing textures

Recommended literature:
Image processing, analysis, and machine vision / Milan Sonka, Vaclav Hlavac, Roger Boyle. [Stamford] : Cengage Learning, 2008
Digital image processing / Rafael C. Gonzalez, Richard E. Woods. Beijing : Pearson education Asia : Publishing House of Electronics Industry, 2010
Image processing : The fundamentals / Maria Petrou, Costas Petrou. Chichester : John Wiley, 2010

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 66

A	B	C	D	E	FX
12,12	22,73	31,82	13,64	6,06	13,64

Lecturers: RNDr. Zuzana Černeková, PhD.

Last change: 22.09.2017

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI+KI/2-AIN-205/15	Algorithmics for Hard Problems

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 2.

Educational level: II.

Prerequisites:

Recommended prerequisites:
1-AIN-105 Efektívne algoritmy a zložitosť OR 1-INF-310 Tvorba efektívnych algoritmov

Course requirements:
homeworks, quizzes, written exams
Scale: A 90%, B 80%, C 70%, D 60%, E 50
Scale of assessment (preliminary/final): 50/50

Learning outcomes:
After completing this subject students will be able to use the methods to solve difficult algorithmic task, particularly approximation algorithms, probability algorithms and integer linear programming. Students will be able to work with extended methods of analysis algorithms and complexity classes.

Class syllabus:
Introduction to approximation algorithms. Neaproximovateľnosti term. Probabilistic analysis of algorithms and their complexity. Las Vegas and Monte Carlo. Integer linear programming. Overview of a hierarchy of complexity classes. Demonstrations on examples.

Recommended literature:
Introduction to algorithms / Thomas H. Cormen ... [et al.]. Cambridge, Mass. : MIT Press, 2001
Approximation algorithms / Vijay V. Vazirani. Berlin : Springer, 2001
Randomized algorithms / Rajeev Motwani, Prabhakar Raghavan. New York : Cambridge University Press, 1995

Languages necessary to complete the course:
slovensky, anglicky

Notes:

Past grade distribution
Total number of evaluated students: 25

A	B	C	D	E	FX
36,0	12,0	4,0	24,0	12,0	12,0

Lecturers: doc. RNDr. Dana Pardubská, CSc., doc. Mgr. Tomáš Vinař, PhD., RNDr. Jozef Šiška, PhD.
Last change: 22.09.2017
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-AIN-137/15	Artificial Intelligence

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 2.

Educational level: II.

Prerequisites:

Antirequisites: FMFI.KAI/2-AINa-137/20

Course requirements:
projects, written exam
Scale: A 95%, B 88%, C 79%, D 68%, E 55%
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
After completing the course, students should have a good overview of the theoretical methods used in artificial intelligence. They should be able to use these methods in practice in programming intelligent systems, they should be able to enrich and creatively exploit.

Class syllabus:
1. Agents, types of agents, agent properties. Browse - informed strategies. 2. Search - informed strategies. Games. 3. Logical agents, propositional and predicate database knowledge. 4. Inference of the predicate in the knowledge base. 5. Planning. 6. likelihood naive Bayesian classifier, Bayesian network. 7. Bayesian network, exact and approximate inference in Bayesian network. 8. Using Bayesian networks in artificial intelligence. Introduction to the use of probability theory in games. 9. Monte Carlo method in games.
10. The classic theory of time series, time series models. 11. Use of Bayesian networks inference in time series with uncertainty. 12. Markov priocesy, Kalman filter, the use of artificial intelligence. 13. Decision Theory: simple and complex decision-making, decision trees.

Recommended literature:
Artificial intelligence : A modern approach / Stuart J. Russell, Peter Norvig. Englewood Cliffs : Prentice-Hall, 1995
Artificial intelligence a new synthesis / Nils J. Nilsson. San Francisco : Morgan Kaufmann, 1998

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 81

A	B	C	D	E	FX
30,86	14,81	16,05	18,52	18,52	1,23

Lecturers: doc. RNDr. Mária Markošová, PhD.

Last change: 22.09.2017

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-AIN-147/19	Computer Vision

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 2.

Educational level: II.

Prerequisites:

Antirequisites: FMFI.KAI+KAG/2-MPG-125/15

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 19

A	B	C	D	E	FX
26,32	15,79	5,26	10,53	15,79	26,32

Lecturers: RNDr. Zuzana Berger Haladová, PhD.

Last change:

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAI/2-AIN-233/00	**Course title:** Computer Vision Applications
Educational activities: **Type of activities:** seminar **Number of hours:** **per week:** 2 **per level/semester:** 28 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Recommended prerequisites: 2-AIN-112/15 or 2-MPG-125/15	
Course requirements: Presentations A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100/0	
Learning outcomes: After completing the course students will be able to discover, develop and analyze the latest practices of successful projects in the field of computer vision and apply new trends in computer vision to create their own applications.	
Class syllabus: 1. Case studies of successful applications. 2. Industrial applications. 3. Medical applications. 3. Other applications. 4. Results of departmental research projects. 5. New trends in application of computer vision methods and techniques.	
Recommended literature: Boyle – Šonka – Hlaváč: Image processing, analysis and machine vision, 1999 Research reports ECCV proceedings Internet	
Languages necessary to complete the course:	
Notes:	

Past grade distribution
Total number of evaluated students: 234

A	B	C	D	E	FX
49,15	23,5	11,54	1,71	4,7	9,4

Lecturers: RNDr. Zuzana Černeková, PhD.

Last change: 23.09.2017

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-AIN-272/15	Digital Signal Processing

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:
homeworks,
practical exam, written exam, oral exam
Scale: A 88%, B 81%, C 74%, D 67%, E 60%

Learning outcomes:
Students acquire theoretical and practical knowledge with the processing of discrete (sampling analog) one dimensional signals using a computer. The acquired knowledge can be used in real-world applications such as audio processing, measurement sensors, signal transmission ... In the exercises students gain the appropriate skills to work in an environment Octave (freely distributable compatible alternative to Matlab).

Class syllabus:
discrete-time signal
Discrete random signal
Discrete Fourier Transform (DFT)
Okienkový functions and their influence on the properties of the DFT
Z-transformation
Discrete linear time-invariant (LTI) systems
Digital IIR filters
Digital FIR filters
Detection and estimation
Power Spectral Density (PSD)
parametric PSD

Recommended literature:
Springer handbook of speech processing / Jacob Benesty, M. Mohan Sondhi, Yiteng Huang (Eds.). Berlin : Springer, 2008
Číslicová filtrace, analýza a restaurace signálů / Jiří Jan. Brno : Vysoké české učení : VUTIUM, 2002

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 114

A	B	C	D	E	FX
31,58	16,67	14,91	10,53	17,54	8,77

Lecturers: RNDr. Marek Nagy, PhD.

Last change: 23.09.2017

Approved by:

STATE EXAM DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAI/2-AIN-991/15	**Course title:** Diploma Thesis
Number of credits: 16	
Educational level: II.	
Prerequisites: FMFI.KAI/2-AIN-923/15 - Project Seminar (1),FMFI.KAI/2-AIN-924/15 - Project Seminar (2)	
State exam syllabus:	
Last change: 29.05.2020	
Approved by:	

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-AIN-138/16	Discrete Structures in Informatics and Computer Graphics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 29

A	B	C	D	E	FX
37,93	13,79	13,79	10,34	13,79	10,34

Lecturers: doc. RNDr. Tatiana Jajcayová, PhD.

Last change: 22.09.2017

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-233/13	English Conversation Course (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1., 3.

Educational level: I., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:

Class syllabus:
The content of the course is general English.
The language level is B2/C1 (Upper-Intermediate/Lower Advanced).

Recommended literature:
Selection of materials from Inside Out Upper-Intermediate, Cutting Edge Upper-Intermediate, New English File Upper-Intermediate, British and American newspapers and journals
Recordings: authentic and semi-authentic (source: BBC, CNN, coursebook recordings)

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 193

A	B	C	D	E	FX
65,28	13,99	7,25	2,07	1,55	9,84

Lecturers: PhDr. Elena Klátiková, Mgr. Aneta Barnes

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-234/13	English Conversation Course (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2., 4.

Educational level: I., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:

Class syllabus:
The course is a follow-up to the Conversation Course in English (1). The content of the course is general English.
The language level is B2/C1 (Upper-Intermediate/Lower Advanced).

Recommended literature:
Selection of materials from Inside Out Upper-Intermediate, Cutting Edge Upper-Intermediate, New English File Upper-Intermediate, British and American newspapers and journals
Recordings: authentic and semi-authentic (source: BBC, CNN, coursebook recordings)

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 118

A	B	C	D	E	FX
73,73	15,25	4,24	0,85	0,0	5,93

Lecturers: PhDr. Elena Klátiková, Mgr. Aneta Barnes

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-141/00	French Language (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
French language is taught at two levels: beginner and intermediate. Students opt for one of them depending on whether they wish to obtain the fundamentals of the language or wish to maintain and/or improve previous knowledge of French.

Recommended literature:
Pravda, Pravdová: Učebnica francúzštiny pre samoukov a kurzy, SPN Bratislava 1999, ISBN 80-08-00431-2

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 421

A	B	C	D	E	FX
45,13	20,43	19,48	9,03	1,9	4,04

Lecturers: Mgr. Ľubomíra Kožehubová

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-142/00	French Language (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The subject continues the program of French language (1) and provides courses of essential and intermediate French language.

Recommended literature:
Pravda, Pravdová: Učebnica francúzštiny pre samoukov a kurzy, SPN Bratislava 1999, ISBN 80-08-00431-2
Blažena Srncová: Učebnica francúzštiny pre študentov Matematicko-fyzikálnej fakulty , UK 1983
Kolektív Lingea, s.r.o.: Slovensko-francúzsky hovorník, Bratislava 2008

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 259

A	B	C	D	E	FX
38,22	25,87	20,08	10,42	2,7	2,7

Lecturers: Mgr. Ľubomíra Kožehubová

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-241/00	French Language (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The subject provides a course of intermediate French language, covering not only general, but also technical language.

Recommended literature:
Pravda, Pravdová: Učebnica francúzštiny pre samoukov a kurzy, SPN Bratislava 1999, ISBN 80-08-00431-2
Blažena Srncová: Učebnica francúzštiny pre študentov Matematicko-fyzikálnej fakulty , UK 1983
Kolektív Lingea, s.r.o.: Slovensko-francúzsky hovorník, Bratislava 2008

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 101

A	B	C	D	E	FX
37,62	28,71	21,78	6,93	0,99	3,96

Lecturers: Mgr. Ľubomíra Kožehubová

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-242/00	French Language (4)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The subject provides a course of intermediate French covering not only general, but also technical French language.

Recommended literature:
Pravda, Pravdová: Učebnica francúzštiny pre samoukov a kurzy, SPN Bratislava 1999, ISBN 80-08-00431-2
Blažena Srncová: Učebnica francúzštiny pre študentov Matematicko-fyzikálnej fakulty , UK 1983
Kolektív Lingea, s.r.o.: Slovensko-francúzsky hovorník, Bratislava 2008
Zarha Lahmidi: Sciences-techniques.com, ISBN 209-0331186-0, CLE international, 2005

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 71

A	B	C	D	E	FX
39,44	33,8	18,31	2,82	1,41	4,23

Lecturers: Mgr. Ľubomíra Kožehubová

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-AIN-134/14	Geometric modelling in graphics

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:
Projects, oral exam
A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 50/50

Learning outcomes:
After completing the course, students will be able to distinguish between the current methods and options for creating, modeling and digital representation of three-dimensional objects. He will be able to implement these structures and procedures to use and modify them under the existing modeling tools.

Class syllabus:
1. Polygonal networks - describes the structure for polygonal representation networks, simplification, smoothing compression and networking, computing over networks (earth, normal, curvature), parameterization and triangularizácia, interactive techniques for modeling networks 2. Parametric curves and surfaces - polynomial and spline representation, design and modeling, tessellation, redistribution curves and surfaces 3. implicit FREP a volumetric representation - classification, modeling, set operations, conversion to the polygonal network 4. point clouds - representation of unorganized set of points, nearest neighbor search set of points, proximity graphs, surface reconstruction, multiview geometry 5. Procedural modeling - L-systems, generating terrain procedurally buildings and cities

Recommended literature:
Curves and Surfaces for computer-Aided geometric design : A practical Guide / Gerald E. Farin. San Diego : Academic Press, 1997

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 23

A	B	C	D	E	FX
34,78	17,39	21,74	8,7	13,04	4,35

Lecturers: prof. RNDr. Roman Ďurikovič, PhD.

Last change: 22.09.2017

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-151/00	German Language (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
German language is taught at three levels: beginner, intermediate and advanced. Students opt for one of them depending on whether they need to learn the fundamentals or maintain and/or improve their previous knowledge.

Recommended literature:
Vilášek, P.: Nemčina pre študentov FMFI, Na webovej stránke autora v elektronickej podobe.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 717

A	B	C	D	E	FX
35,43	27,62	19,8	9,21	2,79	5,16

Lecturers: Mgr. Alexandra Maďarová, Mgr. Marián Mancovič

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-152/00	German Language (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The course continues the program of German language (1). German language is taught at three levels: beginner, intermediate, advanced.

Recommended literature:
Vilášek, P.: Nemčina pre študentov FMFI, Na webovej stránke autora v elektronickej podobe.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 468

A	B	C	D	E	FX
35,47	20,51	20,73	13,46	3,42	6,41

Lecturers: Mgr. Alexandra Maďarová

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-251/00	German Language (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The subject continues the program of German language (2). It provides a course of intermediate and advanced German language.

Recommended literature:
Vilášek, P.: Nemčina pre študentov FMFI, Na webovej stránke autora v elektronickej podobe.
Aus moderner Technik und Naturwissenschaft, 1999, Max Hueber Verlag, D-85737, ISBN 3-19-001629-1

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 158

A	B	C	D	E	FX
39,24	26,58	21,52	6,96	2,53	3,16

Lecturers: Mgr. Alexandra Maďarová

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-252/00	German Language (4)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The subject continues the program of German language (3). It provides a course of intermediate and advanced German language.

Recommended literature:
Vilášek, P.: Nemčina pre študentov FMFI, Na webovej stránke autora v elektronickej podobe.
Vilma Václavíková: Nemčina pre študentov MFF UK, Vysokoškolský učebný text pre potrebu študentov KJP, č. 9793/1982 C VIII/2, 1983

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 85

A	B	C	D	E	FX
40,0	25,88	12,94	11,76	3,53	5,88

Lecturers: Mgr. Alexandra Maďarová

Last change: 02.06.2015

Approved by:

STATE EXAM DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAI/2-AIN-953/15	**Course title:** Methods of Applied Informatics
Number of credits: 4	
Educational level: II.	
State exam syllabus:	
Last change: 29.05.2020	
Approved by:	

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-AIN-132/15	Neural Networks

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 2.

Educational level: II.

Prerequisites:

Antirequisites: FMFI.KAI/1-AIN-480/00

Course requirements:
individual projects during the semester.
Final written-oral exam
Scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 70/30

Learning outcomes:
After completing the course will student understands the basic principles of connectionism (neural networks) know the basic models of neural networks and know their usefulness when solving various tasks (eg. Pattern recognition, classification, time series prediction, memorizing patterns and others). Lectures are combined with computer simulations exercises in Python.

Class syllabus:
Introduction, inspiration from biology, brief history, NS with logical neurons.
Binary / continuous perceptron: the concept of learning with the teacher, classification of patterns.
Single-layer NS: linear self-association, classification, error functions.
Multilayer perceptron: error backpropagation method, training and test set, generalization, model selection, validation.
Modifications of gradient methods, second order optimization, regularization. Optimization problems.
Unsupervised learning, feature extraction, principal component analysis, self-organizing map, data visualization.
Sequence data modeling: forward NS, relation to n-grams, partially and completely recurrent models, SRN model, BPTT algorithms, RTRL.
Expansion of hidden representation: NS with radial basis functions (RBF), echo state network (ESN).
Deep learning, convolutional neural networks: introduction.
Modern recurrent NS: autoencoders, GRU, LSTM.
Hopfield model: deterministic dynamics, attractors, autoassociative memory.
Stochastic recurrent NS models: basics of probability theory and statistical mechanics, Boltzmann machine, RBM model, Deep Belief Network.

The recent trends in NS.

Recommended literature:

Neural networks and learning machines / Simon Haykin. Upper Saddle River : Pearson education, 2009
Úvod do teórie neurónových sietí / Vladimír Kvasnička ... [et al.]. Bratislava : Iris, 1997
Neural networks (slajdy k prednáškam), Igor Farkaš, Knižničné a edičné centrum FMFI UK v Bratislave, 2011.
Goodfellow I., Bengio Y., Courville A. (2016). Deep Learning. MIT Press.
Zhang A. et al. (2020). Dive into Deep Learning. An interactive deep learning book with code, math, and discussions, based on the NumPy interface.

Languages necessary to complete the course:

Notes:

Past grade distribution

Total number of evaluated students: 128

A	B	C	D	E	FX
29,69	15,63	14,06	11,72	10,94	17,97

Lecturers: prof. Ing. Igor Farkaš, Dr.

Last change: 12.02.2021

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-AIN-204/10	Pattern Recognition

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:
tests, projects, oral exam
Scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
Graduates will acquire basic methods of classification.

Class syllabus:
The role of classification, feature articles and Syntax Notation.
Selection and pretreatment symptoms.
Classifiers, basic concepts.
Bayesian decision theory, discriminatory and divisive functions hypersurface, the criterion of the minimum error.
Decision trees.
Discriminant analysis, linear classifier.
Mechanisms of support vectors (SVM).
Neural networks.
Uncontrolled classifiers.
Hidden Markov models.
Quality rating classification.
Syntactic recognition, inference grammar. Special types of grammar.

Recommended literature:
Pattern classification / Richard O. Duda, Peter E. Hart, David G. Stork. New York : Wiley Interscience, 2001
Classification pattern recognition and reduction of dimensionality / edited by P. R. Krishnaiah, L. N. Kanal. Amsterdam : North-Holland, 1982
Modern multivariate statistical techniques : Regression, classification, and manifold learning / Alan Julian Izenman. New York : Springer, 2008

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 174

A	B	C	D	E	FX
13,22	17,24	26,44	20,69	12,64	9,77

Lecturers: doc. RNDr. Milan Ftáčnik, CSc.

Last change: 21.09.2018

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/2-MXX-110/00	Physical Education and Sport (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Practicing of the students´ game skills in collective sports: basketball, volleyball, football, floorball and hockey. Mastering of the basic technique of a particular sport discipline in other sports. In paddling, basic training on still and slightly flowing water. Development of coordination skills, improvement of articular mobility and cardiovascular system.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 1594

A	B	C	D	E	FX
98,56	0,56	0,06	0,0	0,0	0,82

Lecturers: PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Ondrej Podkonický, Mgr. Jana Leginusová, Mgr. Tomáš Kuchár, PhD., PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/2-MXX-120/00	Physical Education and Sport (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Practicing of offensive and defensive game combinations and playing with modified rules in collective sports such as basketball, volleyball, football, floorball, hockey. Command of elements of higher difficulty in locomotion skills (swimming - crawl stroke, breast stroke, butterfly stroke, trampoline jumping and aerobics – practicing of areobics compositions, bodybuilding – development of the main muscle groups, paddling on running water. Testing of the level of physical fitness and coordination skills.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 1458

A	B	C	D	E	FX
98,97	0,41	0,07	0,07	0,0	0,48

Lecturers: Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Branislav Nedbálek, PaedDr. Mikuláš Ortutay, Mgr. Ondrej Podkonický, Mgr. Júlia Raábová, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/2-MXX-210/00	Physical Education and Sport (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
To improve offensive and defensive game combinations in collective sports. Practicing of tactical and technical elements in individual sports. Compensatory exercises to correct wrong body posture. Stretching. Competition rules in sport disciplines.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 1219

A	B	C	D	E	FX
99,02	0,41	0,0	0,0	0,0	0,57

Lecturers: PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Ondrej Podkonický, Mgr. Jana Leginusová, Mgr. Tomáš Kuchár, PhD., PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/2-MXX-220/00	Physical Education and Sport (4)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
Sport training for Faculty Championships in a selected sport with modified rules. Selection of sport-talented students into teams of the Faculty Sport League, University League of Bratislava Faculties, and participation in sport events of the Faculty and University.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 1056

A	B	C	D	E	FX
99,05	0,38	0,09	0,0	0,09	0,38

Lecturers: PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Ondrej Podkonický, Mgr. Jana Leginusová, Mgr. Tomáš Kuchár, PhD., PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Branislav Nedbálek, Mgr. Júlia Raábová, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-AIN-206/15	Physical-based Animations and Mathematical Modeling

Educational activities:
Type of activities: lecture / independent work
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:
Evaluation: assignments, homeworks, written exams, computer animation project or programming project from physically based animation of natural phenomena
Exam: final exam, project presentation, oral exam
Evaluation scale: A 92%, B 84%, C 76%, D 68%, E 60%
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
Students will learn the basic techniques of simulation particle systems, solving systems of ordinary differential equations numerically, the object collision detection. Understand the principles of dynamics of rigid bodies and the principle of the creation of computer animation and camera movement. Understand how to construct physics engine for games or video animation.

Class syllabus:
Particle systems, motion equations of first order integration methods to calculate the speed and position, state vector system, external forces, restrictive conditions - constraints, response forces, particle collisions - plane.
Numerical solution of differential equations, Euler method, Runge-Kuta method, stability criteria to select the time step.
Lagrange method without networks, modeling and animation point cloud, SPH, deformation
Animation mobility, spline interpolation to animate movement, reparametrisation spline curves by length, and orientation quaternion interpolation of two or more quaternion.
Collision detection, Z buffer algorithm, necessary and sufficient conditions when there are two bodies in a collision, parting line, hierarchy envelopes force response (Response Forces). Three phase detection wide, medium and narrow.
Dynamics of rigid bodies, equations of motion, velocity, acceleration, angular velocity and angular acceleration, inertia matrix.
Procedurárne animation, systems and methods for creating computer animation liquids, fire, smoke.
Computer animation in games and in the film industry. Other applications of computer animation with further developments in the field of computer animation using physical effects.

Recommended literature:

Visual Quantum mechanics : Selected Topics with Computer/Generated animations of Quantum-Mechanical phenomena / Bernd Thaller. New York : Springer, 2000
Computer facial animation / Frederic I. Parke, Keith Waters. Wellesley : A. K. Peters , 1996
SIGGRAPH tutorialy dostupné na http://dl.acm.org/dl.cfm?CFID=412417535&CFTOKEN=50913605
Dostupné texty k prednáške. https://dai.fmph.uniba.sk/w/Physical-based_Animations_and_Mathematical_Modeling_Material

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 310

A	B	C	D	E	FX
37,42	17,74	12,58	12,26	8,06	11,94

Lecturers: prof. RNDr. Roman Ďurikovič, PhD.

Last change: 22.09.2017

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAI/2-AIN-109/15	**Course title:** Programming of Parallel and Distributed Systems

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 3 / 1 **per level/semester:** 42 / 14
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:
excercises, exam
A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
Graduates of the course will be familiar with the issues of parallel and distributed programming. At the beginning they learn the means of writing parallel and distributed programs as necessary logic to evidence and formulate their properties. Later they learn the solution of selected problems in parallel and distributed programming (eg. The shortest path problem Reader-Writers, Večerajúci philosophers, coordination meetings, drinkers philosophers, sorting, Faulty channels, Global snapshots, detected a stable qualities, Byzantine Agreement).

Class syllabus:
Initially, the students met a simple language for writing parallel programs and dostribuovaných. UNITY (syntax and semantics) Fundamental parallel and distributed architectures as a way for them to map UNITY programs. The list is the logic of allowing express safetty and progress vlastnostio programs and formally prove the correctness of programs. Subsequently they learn the solution of selected problems in parallel and distributed programming (eg. The shortest way, reader-writers problem dinning philosophers, coordination meetings, drinkers philosophers, sorting, Faulty channels, Global snapshots, detected a stable qualities, Byzantine Agreement). Their zones can optionally be spread in závoslosti the development in this area.

Recommended literature:
Parallel program design : A Foundation / K. Mani Chandy , Jayadev Misra. Reading : Addison-Wesley, 1988
An introduction to parallel algorithms / Joseph Jájá. Boston : Addison-Wesley, 1992
C. Stirling: Modal and Temporal Properties of Processes, Springer 2001
Elektronické poznámky k prednáške, http://ii.fmph.uniba.sk/~gruska/udpp/Beziacaudppprednaska2014.pdf

Languages necessary to complete the course:
slovak, english

Notes:

Past grade distribution
Total number of evaluated students: 231

A	B	C	D	E	FX
25,11	17,32	22,51	23,38	6,06	5,63

Lecturers: doc. RNDr. Damas Gruska, PhD.

Last change: 13.01.2016

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-AIN-923/15	Project Seminar (1)

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:
Evaluation of the diploma thesis progress
1. Presentation, 2. First prototype implemented, 3. Research papers studied and the detail knowledge of the the problem is required. 4. Framework for development of the thesis should be already set.
A 92%, B 84%, C 76%, D 68%, E 60%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Learning to quickly extract the basic idea of scientific articles.

Class syllabus:
The first phase of the project master thesis. Conventions for writing professional texts informatics. Work on the project and implementation so that results in the diploma thesis.

Recommended literature:
LATEX : Podrobný průvodce / Helmut Kopka, Patrick W. Daly ; překlad Jan Gregor. Brno : Computer Press, 2004
LATEX : A Document preparation system / Leslie Lamport. Reading : Addison-Wesley, 1986

Languages necessary to complete the course:
slovak, english

Notes:

Past grade distribution
Total number of evaluated students: 229

A	B	C	D	E	FX
58,95	14,41	12,23	2,18	3,93	8,3

Lecturers: prof. RNDr. Roman Ďurikovič, PhD.

Last change: 23.09.2017

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAI/2-AIN-924/15	Project Seminar (2)

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 3.

Educational level: II.

Prerequisites: FMFI.KAI/2-AIN-923/15 - Project Seminar (1)

Recommended prerequisites:
2-AIN-924 Projektový seminár (1)

Course requirements:
Evaluation of the diploma thesis progress
1. Presentation, 2. First prototype implemented, 3. Research papers studied and the detail knowledge of the the problem is required. 4. Framework for development of the thesis should be already set. 5. Ano chapter of the thesis should be in its final stage.
All requirements must be satisfactory completed.
A 92%, B 84%, C 76%, D 68%, E 60%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Theoretical background of the thesis will be known and the implementation flips to its final stage of evaluation.

Class syllabus:

Recommended literature:
LATEX : Podrobný průvodce / Helmut Kopka, Patrick W. Daly ; překlad Jan Gregor. Brno : Computer Press, 2004
LATEX : A Document preparation system / Leslie Lamport. Reading : Addison-Wesley, 1986

Languages necessary to complete the course:
slovensky, anglicky

Notes:

Past grade distribution
Total number of evaluated students: 229

A	B	C	D	E	FX
50,66	14,85	12,66	5,68	8,3	7,86

Lecturers: prof. RNDr. Roman Ďurikovič, PhD.

Last change: 23.09.2017
Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAI/2-AIN-128/15	**Course title:** Real-time Graphics and GPU Computations

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 2.

Educational level: II.

Prerequisites:

Antirequisites: FMFI.KAG/2-MPG-101/00 and FMFI.KAG/2-MPG-102/00

Course requirements:
project, oral exam
Scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 70/30

Learning outcomes:
The course represents the key themes, principles and techniques used in the rendering of virtual scenes in real time. This procedure is most commonly used in making 3D games, but also in various scientific vizualizations, such as visualization of medical data. After the course the students will be able to analyze and implement current procedures, algorithms, programming effects for graphics cards and the create the visualization applications. The subjects students will be able to develop gaming applications on different platforms, applications in virtual and mixed reality and create visualizations of medical data.

Class syllabus:
1. Graphic display channel - description of the graphics hardware architectures, programming of graphics cards, coordinate systems, programmable parts of the display channel, description and formats of virtual scene during the rendering, OpenGL API
2. Animation - a description of the object pose representation (position, rotation, scale), nuts and Quaternions, linear and cubic interpolation for animation
3. Light - description of lighting models and their implementation using shaders, textures in lighting model, direct and defferred lighting, use rendering to texture and shadows, approximation of global illumination methods
4. Post-process Effects - description of algorithms to improve the quality of the final output image, motion blur, depth of field, SSAO, reflections and refractions, HDRI, bloom, toon shading
5. Image-based rendering - use of texture to speed up calculations of lighting, textures for backgrounds to represent complex objects (bilboarding), image processing algorithms on the GPU, volumetric graphics
6. Accelerating algorithms - algorithms and structures to accelerate rendering complex scenes, trimming techniques, level of detail, collision detection

7. GPGPU - description of the graphics card performance for general computing, CUDA and OpenCL language, image and video processing, physical simulation of phenomena on the GPU, ray tracing on the GPU

Recommended literature:
Real-time rendering / Tomas Akenine-Möller, Eric Haines, Naty Hoffman. Wellesley : A. K. Peters, 2008

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 27

A	B	C	D	E	FX
33,33	37,04	7,41	7,41	7,41	7,41

Lecturers: Mgr. Andrej Mihálik, PhD.

Last change: 14.01.2016

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-161/00	Russian Language (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The subject provides a course in Russian language for beginners.

Recommended literature:
The textbook has not been published. It is at students' disposal in an electronic format.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 685

A	B	C	D	E	FX
58,98	16,35	10,51	4,53	1,9	7,74

Lecturers: PhDr. Elena Klátiková

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-162/00	Russian Language (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The subject continues the program of Russian language (1) and provides a course of Russian for beginners.

Recommended literature:
The textbook has not been published. It is at students' disposal in an electronic format.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 414

A	B	C	D	E	FX
65,94	15,22	8,7	3,86	0,97	5,31

Lecturers: PhDr. Elena Klátiková

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-261/00	Russian Language (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The course "Russian for Intermediate Students" is a follow-up to "Russian for Beginners". The subject of the course is general Russian in the range appropriate to the given level.

Recommended literature:
The textbook has not been published. It is at students' disposal in an electronic format.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 197

A	B	C	D	E	FX
70,05	17,77	8,63	2,54	0,0	1,02

Lecturers: PhDr. Elena Klátiková

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-262/00	Russian Language (4)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I., II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:
The course "Russian for Intermediate Students" is a follow-up to "Russian for Beginners". The subject of the course is general Russian in the range appropriate to the given level.

Recommended literature:
The textbook has not been published. It is at students' disposal in an electronic format.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 142

A	B	C	D	E	FX
75,35	13,38	7,04	2,82	0,7	0,7

Lecturers: PhDr. Elena Klátiková

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/2-MXX-115/17	Sports in Natur (1)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 68

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Branislav Nedbálek

Last change:

Approved by:

COURSE DESCRIPTION

University: Comenius University in Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTV/2-MXX-116/18	Sports in Natur (2)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 35

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Branislav Nedbálek

Last change:

Approved by: