załącznik do Regulaminu programu „visiting profesor”

Code of the course	4606-VP-ES-00023	Name of the course	Polish	**Zaawansowana geometria w informatyce**
			English	**Advanced Geometry for Computer Science**
Type of the course	Specialty subject			
Course coordinator	Przemyslaw Musialski	Course teacher	Przemyslaw Musialski	
Implementing unit	Faculty of Mathematics and Information Science	Scientific discipline / disciplines*		
Level of education	Doctoral studies	Semester	spring	
Language of the course	English			
Type of assessment	Exam	Number of hours in a semester	30	ECTS credits: 2
Minimum number of participants	12	Maximum number of participants	60	Available for students (BSc, MSc): Yes/No; MSc - Yes

Type of classes		Lecture	Auditory classes	Project classes	Laboratory	Seminar
Number of hours	in a week					
	in a semester	30				

* does not apply to the Researcher’s Workshop

1. Prerequisites

Basic knowledge of algebra. Undergraduate course in this topics is prerequisite. Recap will be provided.

2. Course objectives

The course provides basic principles in different areas of geometry, which are important for applications in computer science such as computer graphics, computer vision and image processing, CAD-engineering, computer animation, and geometric design.

3. Course content (separate for each type of classes)

Lecture

Areas that are covered are: 1. Elementary Analytic Geometry 2. Projective Geometry (homogeneous coordinates, projective transformations, quadrics) 3. Differential Geometry (curve theory, geometry on surfaces, curvature theory of surfaces, numerical aspects)

4. Learning outcomes

Type of learning outcomes	Learning outcomes description	Reference to the learning outcomes of the WUT DS	Learning outcomes verification methods*
Knowledge			

K01	The student knows modern methods of advanced geometry used in computer graphics.	SD_W2	exam
K02	The student knows and understands the main development trends in computer graphics.	SD_W3	exam
Skills			
S01	The student is able to critically analyze and evaluate the results of scientific research in the field of geometry and computer graphics, in particular assess the usefulness and possibility of using the results of theoretical work in practice.	SD_U2	exam
S02	The student is able to communicate on specialist topics related to geometry and computer graphics to a degree that allows active participation in the national and international scientific community.	SD_U4	exam
Social competences			
SC01	The student recognizes the importance of knowledge and scientific achievements in solving cognitive and practical problems.	SD_K2	exam

*Allowed learning outcomes verification methods: exam; oral exam; oral test; project evaluation; report evaluation; presentation evaluation; active participation during classes; homework; tests

5. Assessment criteria

At the end of the course there will be an individual written exam (test), based on the lectures and the homework exercises. Grades: >50% - 3.0; >60% – 3.5; >70% – 4.0; >80% - 4.5; >90%– 5.0

6. Literature

Primary references:

[1] Gilbert Strang, Linear Algebra And Its Applications,4Ed Paperback – 17 Nov. 2005

[2] Guide to Computational Geometry Processing: Foundations, Algorithms, and Methods 2012th Edition by J. Andreas Bærentzen (Author), Jens Gravesen (Author), François Anton (Author), Henrik Aanæs, Springer

[3] Polygon Mesh Processing, by Mario Botsch (Author), Leif Kobbelt (Author), Mark Pauly (Author), Pierre Alliez (Author), Bruno Levy

Secondary references:

[1] Curves and Surfaces for CAGD, A Practical Guide, 5th edition, by Gerald Farin, Published by Morgan-Kaufmann, Published 2002, 499 pages, ISBN 1-55860-737-4

[2] Computational Line Geometry 2001st Edition, by Helmut Pottmann (Author), Johannes Wallner (Author)

7. PhD student's workload necessary to achieve the learning outcomes**

No.	Description	Number of hours
1	Hours of scheduled instruction given by the academic teacher in the classroom	30
2	Hours of consultations with the academic teacher, exams, tests, etc.	5
3	Amount of time devoted to the preparation for classes, preparation of presentations, reports, projects, homework	
4	Amount of time devoted to the preparation for exams, test, assessments	25

Total number of hours	**60**
ECTS credits	**2**

** 1 ECTS = 25-30 hours of the PhD students work (2 ECTS = 60 hours; 4 ECTS = 110 hours, etc.)

8. Additional information	
Number of ECTS credits for classes requiring direct participation of academic teachers	1
Number of ECTS credits earned by a student in a practical course	1