Aims: The course is aiming at introducing basic concepts and principles of geometry, from axiomatic structures to transformation groups

Competences to develop: spatial abilities, deeper understanding of analytical and synthetic approaches

Course content and schedule:

1. Axiomatism
2. Basic groups of axioms and their consequences
3. Metrical aspects in Euclidean geometry: distance and angle
4. Metrical aspects in Euclidean geometry: area and volume
5. Basic notions of transformations
6. Basic transformation groups: isometries
7. Basic transformation groups: similarities, homotheties
8. Basic transformation groups: affine transformations
9. Algebraic representations of transformations
10. Algebraic curves
11. Algebraic surfaces
12. Conics and quadrics
13. Bézout theorems

Education management: 2 hours a week in case of a larger group of students, or individual tutorial approach

Assessment:

- method of assessment: oral exam
- mid-term requirement:-
- oral exam topics (if any): see above, identical to the topics discussed

Compulsory reading:
Optional reading:

Supporting (compulsory/optional) digital materials:

<table>
<thead>
<tr>
<th>Person in charge of program:</th>
<th>Miklós Hoffmann</th>
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<td>email (<a href="mailto:hofi@ektf.hu">hofi@ektf.hu</a>)</td>
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### Course title: Dynamic web programing

<table>
<thead>
<tr>
<th>Code:</th>
<th>NBT_PI115G2</th>
<th>Credits: 2</th>
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**Type (lecture/seminar/practice/consultation) and number of contact hours:** 2 seminars /week

**Evaluation method (end-term exam mark/ term mark / other):** term mark

**Suggested semester:** winter semester

**Frequency of availability:** in every autumn semester

**Language:** English

**Prerequisites (if any):** -

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### Description


**Competences to develop:**
Students will learn the fundamentals of dynamic web programming and how to create database-driven Web programs and how to update databases using stored procedures.

**Course content and schedule:**
- Basic terms, network knowledge for web programming
- HTML, PHP embedding
- PHP core
- Connecting to a database
- Module structure of PHP programs
- Creating data applications
- Generating lists from databases
- Handling files in web applications.
- Administration of web pages
- Registration and session
- Filter and search
- Code reuse
- OOP fundamentals
- Creating web portals from modules

**Education management:**
Lessons are held in computers rooms 2/week.

**Assessment:**
- **method of assessment:** taking one exam paper and creating a web application at home
- **mid-term requirement:** Students are needed to take an exam paper that contains questions and exercises about the way of representing data of a database using PHP code and saving data to the database. In addition, students are needed to develop a
web application for assessing their knowledge.

- oral exam topics (if any): -

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<th>Optional reading:</th>
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Supporting (compulsory/optional) digital materials:
http://www.w3schools.com/php/

| Person in charge of program: Dr. Tibor Radványi |
| Person in charge of the course: Dr. Roland Király |
| Instructor: Dr. Sándor Király, Tamás Balla |
| Instructor’s office hours: it changes in every semester |
| Preferred contact details: kiraly.roland@ektf.hu |
| Online communication method: Skype, Facebook |
Course title: Geometric modeling  
Code: NBT_PI122K2  
Credits: 2

Type (lecture/seminar/practice/consultation) and number of contact hours: practice

Evaluation method (end-term exam mark/ term mark / other): 5 programing tasks, regularly checked

Suggested semester: spring

Frequency of availability: every year

Language: English

Prerequisites (if any): -

Description

Aims: The course is aiming at introducing basic concepts and principles of computer aided geometric modeling of curves and surfaces

Competences to develop: spatial abilities, deeper understanding of analytical and synthetic approaches, programming techniques

Course content and schedule:

1. Basic notions of CAGD
2. Principles of curve modeling, curve representation forms
3. Programming techniques of parametric curves
4. Hermite arcs
5. Bézier curves
6. B-spline curves
7. Non-uniform spline curves
8. Rational curves, NURBS
9. Spline surfaces
10. Programming techniques of parametric surfaces
11. Principles of subdivision curves and surfaces
12. Basic subdivision schemes
13. Programming and data structure of subdivision surfaces

Education management: 2 hours a week in case of a larger group of students, or individual tutorial approach

Assessment:

- method of assessment: 5 programming tasks
- mid-term requirement: -
- oral exam topics (if any): -

Compulsory reading:
Hoffmann, M., Juhász, I.: Curves in Computer Aided Geometric Design, course notes (available on-line)
Mathematics and Informatics

Optional reading:


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<tr>
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Aims: The course is aiming at introducing basic concepts and principles of curves and surface shapes with the help of topology and differential geometry

Competences to develop: spatial abilities, deeper understanding of analytical and synthetic approaches

Course content and schedule:

1. Basic notions of elementary topology
2. Dimension, curves, surfaces
3. Topological invariants of curves
4. Topological invariants of surfaces
5. Basic notions of differential geometry
6. Curves, tangent, osculating plane and circle
7. Curvature and torsion
8. Surfaces, curves on surfaces
9. Metrics on surfaces, the first fundamental forms
10. The osculating paraboloids, second fundamental forms
11. The Gaussian curvature
12. Theorema egregium and its consequences
13. Gauss-Bonnet theorems

Education management: 2 hours a week in case of a larger group of students, or individual tutorial approach

Assessment:

- method of assessment: oral exam
- mid-term requirement:-
- oral exam topics (if any): see above, identical to the topics discussed

Compulsory reading:
Hoffmann, M. – Papp, I.: Topology and differential geometry, course notes (available on-line)
**Optional reading:**

- Gray, M: Modern Differential Geometry of Curves and Surfaces with Mathematica, ISBN 9780849371646

**Supporting (compulsory/optional) digital materials:**

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