Essentials of Analytical Geometry and Linear Algebra. Lecture 1.

Vladimir Ivanov

Innopolis University

September 4, 2020

Outline

- Part 1. About the course
- Part 2. Applications of Analytical Geometry and Linear Algebra
- Part 3. Introduction. Vector spaces. Linear independence. Basis

Main questions for today's lecture

- What is this course about?

Main questions for today's lecture

- What is this course about?
- How to get high grade in this course?

Main questions for today's lecture

- What is this course about?
- How to get high grade in this course?
- How to use this course in your projects?

Main questions for today's lecture

What is this course about?

Topics of the course

- Vector spaces, matrices and transformations in 2D and 3D
- Lines and planes
- Conics or quadric curves
- Quadratic surfaces
- Polar and spherical coordinates

Goals of this course

What you will learn in this course?

- to use vectors and matrices to solve applied problems
- to change basis in a vector space
- to calculate determinants
- to recognise different transformations, such as rotation, reflection, shear, etc.
- to work with lines and planes in 2D and 3D
- to operate with quadric curves, such as ellipse, hyperbola and parabola
- many more + examples in Python :)

Main questions for today's lecture

How to get a high grade in this course?

Grading in the course

- Labs 5%
- Test 1 15%
- Midterm 30%
- Test 2 15%
- Final Exam 35%

In total, 100 %

How to get the highest grade?

- Attend classes (either online or offline)
  - Labs
  - Tutorials
  - Lectures
- Solve assignments (also at home) on your own and in groups
- Read books (check the list in moodle)
- Come to office hours (either online or offline)

Repeat :)

What is the exact process you can follow?

- **Friday**
  - attend lecture
  - attend tutorial
  - review materials after classes

What is the exact process you can follow?

- **Friday**
  - attend lecture
  - attend tutorial
  - review materials after classes
- **Saturday** / **Sunday**
  - read books
  - try to solve assignments
  - make a list of questions

What is the exact process you can follow?

- **Friday**
  - attend lecture
  - attend tutorial
  - review materials after classes
- **Saturday / Sunday**
  - read books
  - try to solve assignments
  - make a list of questions
- **Monday**
  - attend labs
  - ask your questions
  - participate in labs

What is the exact process you can follow?

- **Friday**
  - attend lecture
  - attend tutorial
  - review materials after classes
- **Saturday / Sunday**
  - read books
  - try to solve assignments
  - make a list of questions
- **Monday**
  - attend labs
  - ask your questions
  - participate in labs
- **Tuesday - Thursday**
  - come to office hours
  - apply your knowledge by some programming (yay!)

Team of the course and Materials

- Vladimir Ivanov (PhD), Principal Instructor, Lectures
- Mohammedreza Bahrami (PhD), Tutorials
- Anastasia Puzankova, Labs
- Oleg Bulichev, Labs

Resources: Books, Assignments, Useful links, etc.

Please, check Moodle!