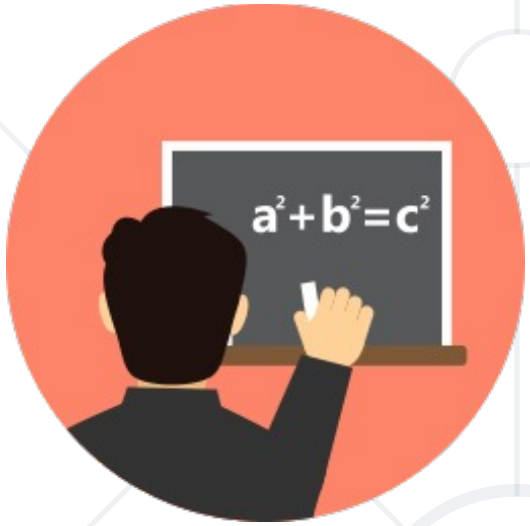
Math Concepts for Developers

Course Introduction



SoftUni Team

Technical Trainers

Software University

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https://softuni.bg/

Have a Question?

Software University

sli.do

#MathForDevs

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Course Objectives

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- Learn how:
  - math and science can be used in **software development**
  - to implement **math concepts in code**
  - to solve problems using **numerical methods**
  - to apply the **scientific method** to solve everyday (and special) development tasks
- Develop an **intuition** about math concepts
- Write your **own research**, **communicate** and **compare** results with the community
- Get excited about mathematics :)

Prerequisites

Programming Basics

- Understand what variables and for-loops are
- Software development experience is a plus but not required

High-School Mathematics

- Have a basic math logic and intuition

Intermediate English

- Understand what is written on the slides

Scientific Mindset

- Be open to (and not afraid of) challenges

Curriculum

- Course Introduction
- High-school Math Review
- Basic Algebra
- Linear Algebra
- Calculus
- Probability and Combinatorics
- Statistics
- Hypothesis Testing
- Final Exam

The Trainer

Yordan Darakchiev

Software University

- **Programmer**
  - .NET / Full-stack Web developer
- **Machine learning engineer**
  - Multiple projects, mainly image processing
- **Trainer**
  - Various programming courses
  - Scientific (and popular) lectures
- **Scientist / Enthusiast**
  - BSc & MSc in Astrophysics
  - Currently pursuing a PhD

PROFICIENCIES & LANGUAGES

- Machine learning
- Research
- Teaching
- Software Engineering
- Python
- C#
- JavaScript

Course Organization

Course Schedule

Math Concepts for Developers

14 weeks * 1 time / week
6 credits

Start: 19 March 2024
End: 18 June 2024

Exam Sessions

Regular Exam: 22 and 23 June 2024
Retake Exam: 6 and 7 July 2024

Course Schedule

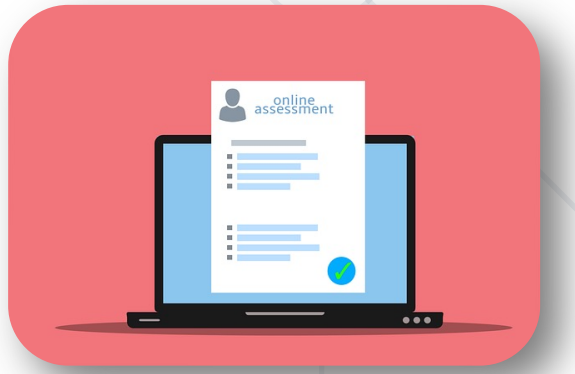
- **Lessons**
  - 7 lectures + 7 exercises = **14 lessons x 4 hours each**
- **Lectures** – mostly intuition building, some **theoretical** stuff, examples
- **Exercises** – **implementing the concepts** we learned
- Exercises at home
  - 10 hours / week – the more, the better
- Practical exam
  - 5 - 20 hours

Lecture Format

- **Lectures**
  - Cover **new material**, build foundations and understanding of **new concepts**
  - Bring **examples** of how math concepts are applied in software
    - Scientific programming
    - Math in day-to-day programming / software engineering
- **Exercises**
  - Case studies, continue to **build intuition**
  - We'll **solve problems** together
    - See how the concepts we just learned apply by implementing them

Exam Information

- Practical project
  - Work on your own, present your results in a **limited** amount of time
- Find a topic which includes a **math-related problem**
  - Perform research (scientific papers, community forums, etc.)
  - Document your own findings
  - Implement your idea

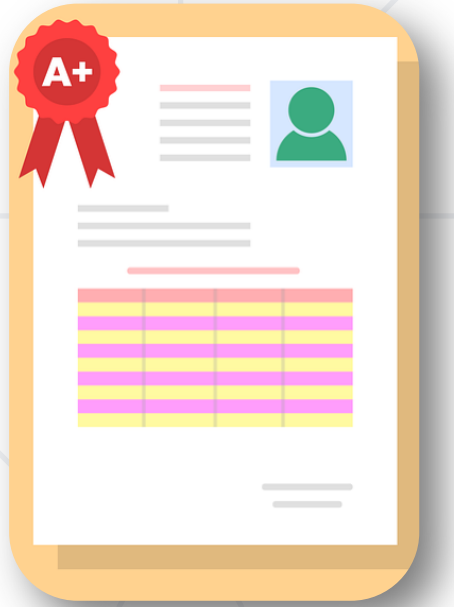


Exam Information

- You **DO NOT** need to create something from scratch; understanding other people's work and implementing it is fine
- You **DO NOT** need to have a positive research result
  - "My hypothesis was wrong" is perfectly valid and can give you full score
- It's better if you connect your project to your work / interests

Course Scoring

- **Exercises (Labs): up to 20%**
  - Due date: at the end of the course
  - Graded on a "passing" / "failing" basis
    - To pass a lab, solve at least two problems correctly
- **Final exam: up to 80%**
  - Theoretical exam (quiz): 30% (24% of total grade)
  - Practical exam (project): 70% (56% of total grade)
  - Develop at your own pace
  - **Upload deadline:** Friday before the exam date, 12:00 PM
  - Project defense: **online, according to schedule**



Course Certificates

- All students will be graded on a **scale from 2.00 to 6.00**
  - The same way the standard grading in Bulgaria works
- Everyone who **scores ≥ 5.00** (total) will get a **certificate from SoftUni**
- Everyone who **scores ≥ 3.00** (on both theory and practice) can get a **MoES certificate** as well
  - You need to apply explicitly within a **limited time**

Why Bother?

- Starting point for a **new career** or **continuing education** in your current field
- **Career assistance**
  - The SoftUni career center will help you find work
- Official and recognizable
  - Employers value certificates
- Proof of hard work :)
  - Shareable and verifiable
- We make sure that everyone who scores more than 5.00 knows what they're doing :)

Course, Facebook Group and Discord Group

Software University

- Module Page:

https://softuni.bg/modules/111/artificial-intelligence-march-2024/1462

- Course Page:

https://softuni.bg/trainings/4486/math-concepts-for-developers-march-2024

- Official Facebook group:

https://www.facebook.com/groups/mathconceptsfordevelopersmarch2024softuni

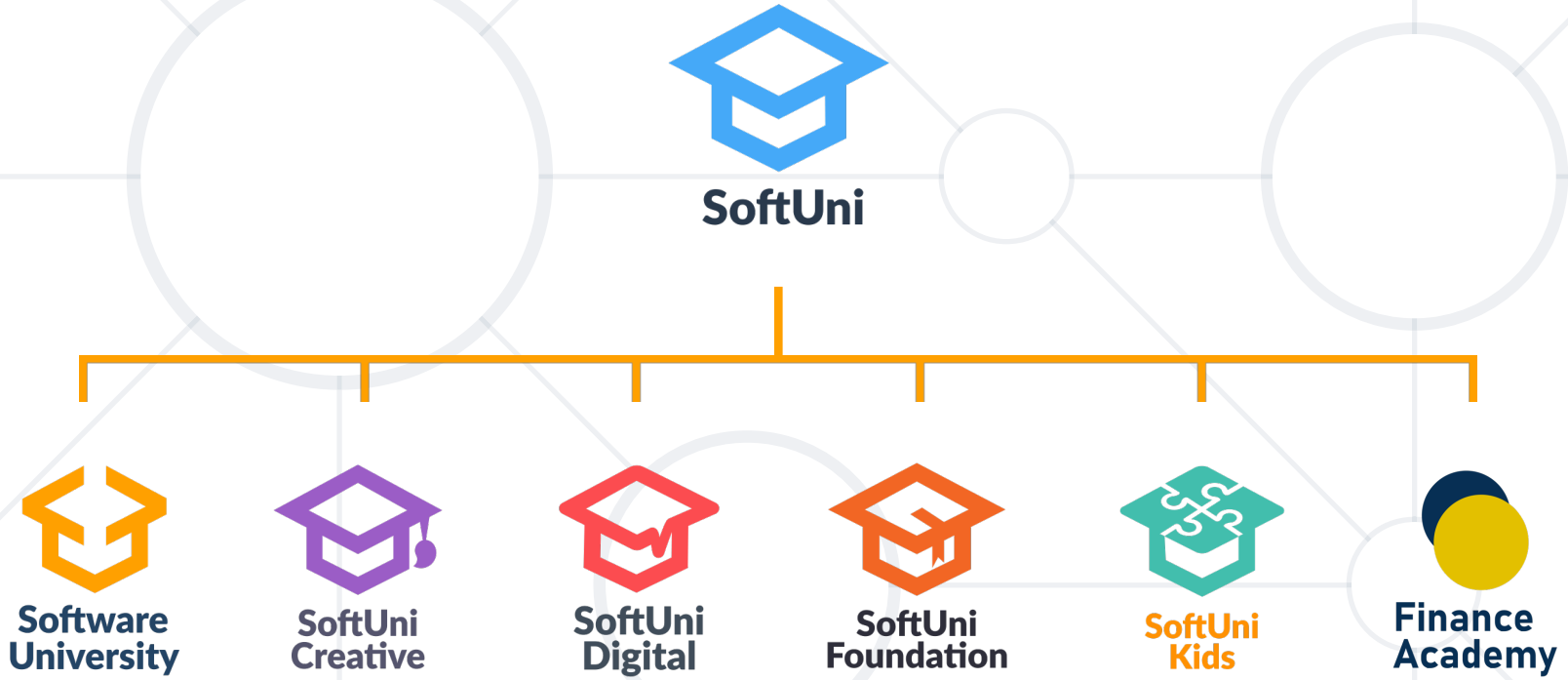
- Discord Channel:

https://discord.com/invite/UDfVDF7dx5

Learning Resources

- **Books**
  - "How Not to Be Wrong" – Jordan Ellenberg
  - "Numerical Recipes in C" – Cambridge University (free download)
- **Websites**
  - Khan Academy, Coding the Matrix
  - Communities: Kaggle, Quora, Stack Exchange
  - Online courses: Coursera, edX, MIT OCW, Stanford
- **YouTube**
  - 3Blue1Brown
  - Daniel Shiffman, AsapSCIENCE, Veritasium, Vsauce, Stand-Up Maths, CrashCourse, Numberphile, Computerphile, Vi Hart, blackpenredpen, Mathologer, Tom Rocks Maths

Questions?



Trainings @ Software University (SoftUni)

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