Math Concepts for Developers

Course Introduction

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SoftUni

Software University

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Have a Question?

Software University

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#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

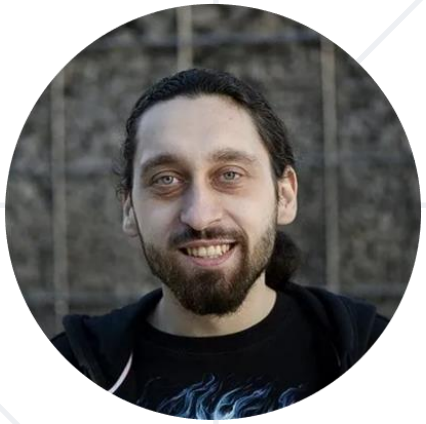
- Be open to (and not afraid of) challenges

Trainer

Yordan Darakchiev

Software University

Who I am?



- Trainer
- Software engineer
- Data Scientist / Machine Learning Engineer
- Scientist / Enthusiast

What I love?

- Teaching (duh!)
- Nature
- Music

Course Organization

Course Schedule

Math Concepts for Developers

14 weeks * 1 time / week
6 credits

Start: 4 March 2025
End: 3 June 2025

Exam Sessions

Regular Exam: 7 and 8 June 2025
Retake Exam: 21 and 22 June 2025

Course Schedule

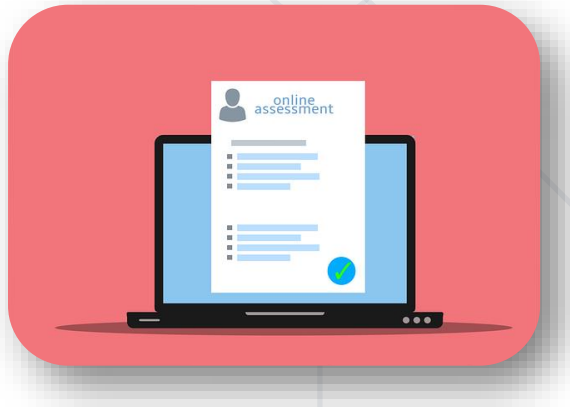
- **Lessons**
  - 7 lectures + 7 exercises = **14 lessons x 4 hours each**
- **Lectures** – mostly intuition building, some **theoretical** stuff, examples
- **Exercises** – **implementing the concepts** we learned
- Exercises at home
  - 10 hours / week – the more, the better
- Practical exam
  - 5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

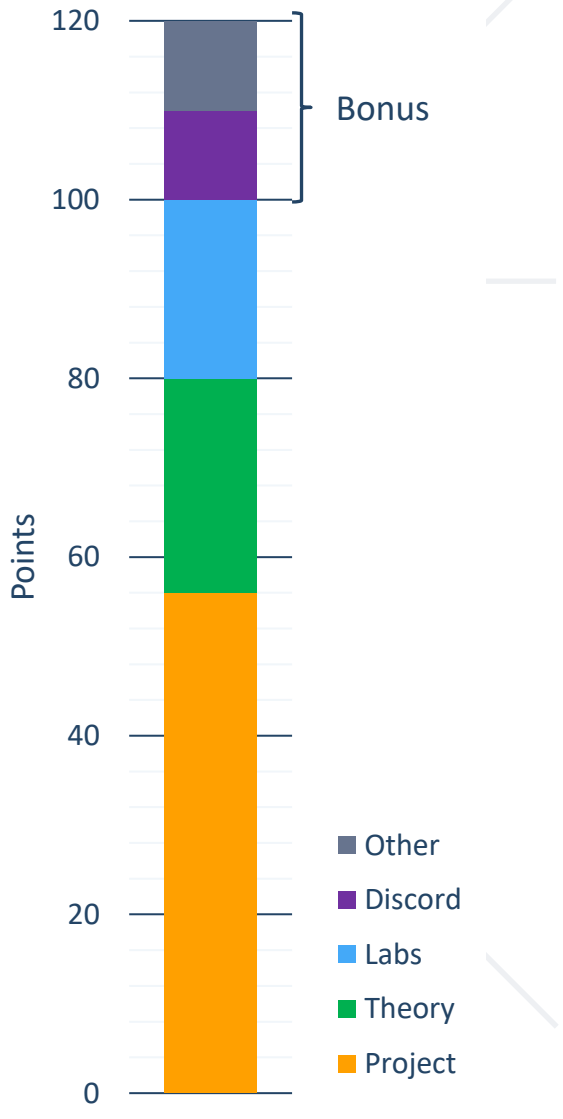


Exam Information

- 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
  - Project defense: **online**, according to schedule
- **Discord server activity:** bonus up to 10%
- **Other bonuses:** up to 10%



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 **MoE 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 :)

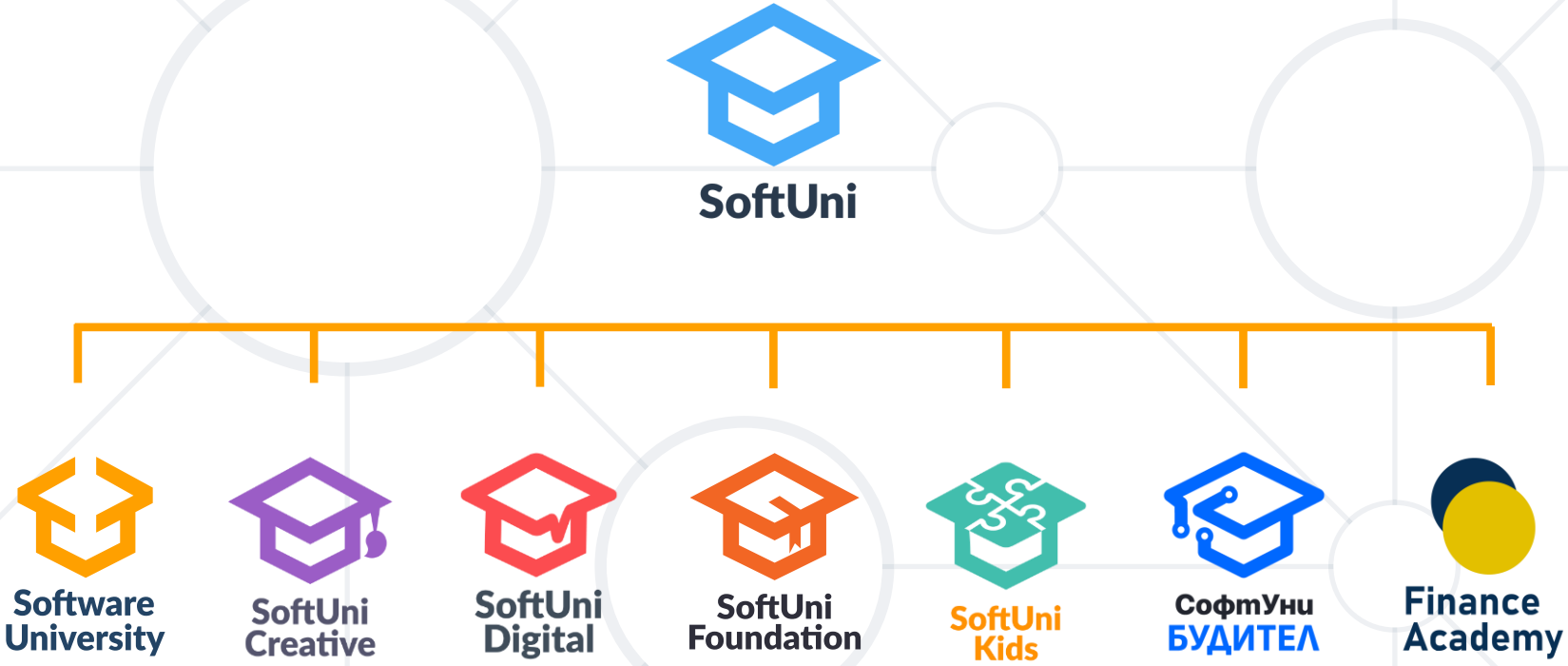
Getting to Know the Others

- AI and Machine Learning Upskill Page
- Course Page
- Official Facebook group
- Discord Server

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
  - Numberphile, Computerphile, Tom Rocks Maths, Daniel Shiffman, Veritasium, Vsauce, AsapSCIENCE, Stand-Up Maths, CrashCourse, Vi Hart, blackpenredpen, Mathologer, etc.

Questions?



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