Course Introduction

What (and how) are we going to learn?

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Technical Trainer

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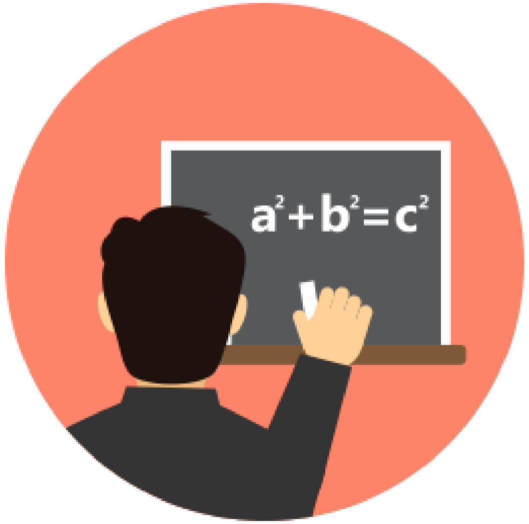

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Course Objectives

Mathematical concepts
for software developers

Course Objectives

- Learn how math and science can be used in software development
- Develop an intuition about math concepts
- Learn how to implement math concepts in code
- Learn how to solve problems using numerical methods
- Learn how to apply the scientific method to solve everyday (and special) development tasks
- 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

Course Format Details

Curriculum, schedule, trainer, lecture format, exam

Curriculum

- Course introduction
- High-school math review
- Basic algebra
- Linear algebra
- Calculus
- Probability and combinatorics
- Statistics
- Hypothesis testing
- Final exam

Course Schedule

- Lessons
  - 7 lectures + 7 exercises x 4 hours each
- **"Lectures"** – mostly intuition building, some theoretical stuff, examples
- **"Exercises"** – implementing the concepts we learned
  - Most courses have one but not the other
  - We'll try to combine them while still looking over a broad range of math and applications
- Exercises at home
  - 10 hours+ / week – the more, the better
- Practical exam
  - 5-20+ hours

Course Schedule (2)

- 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
- Time allocation
  - Course: 10 Mar 2022 – 9 June 2022
  - **Exam: 12 June 2022 / 19 June 2022**
  - **Retake: 26 June 2022**

Final Exam

- Practical project
  - Work on your own, present your results (documentation, code, etc.) 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
- Notes
  - 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 / etc.

Grading Scheme

- Labs: up to 20%
  - Due date: at the end of the course
  - Graded on a "submitted" / "not submitted" basis
- 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: Sunday, according to schedule
- Forum / Facebook / Discord activity: bonus up to 10%
- Other bonuses: up to 10%

Grading and 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

COURSE CERTIFICATE

Teodor Ivanov Kurtev

QA Fundamentals

РЕПУБЛИКА БЪЛГАРИЯ

УДОСТОВЕРЕНИЕ

за професионално обучение

ropass certificate supplement

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 $\geq 5{,}00$ knows what they're doing :)

DUNGEONS & DRAGONS®

Yordan Darakchiev
CHARACTER NAME

Trainer
CLASS

Researcher
BACKGROUND

Human
RACE

Lawful Good
ALIGNMENT

STRENGTH	+0	11
DEXTERITY	+2	14
CONSTITUTION	+2	15
INTELLIGENCE	+6	22
WISDOM	+4	18
CHARISMA	+3	16

FEATURES & TRAITS

- 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

Learning Resources

Learn more
and share your knowledge

SoftUni Resources

- AI module page
- Course page
- Facebook group
- Discord server
- Guidelines
  - Ask and answer questions
    - I will try to answer your questions as well
  - Post what you've learned
    - Links to resources, code snippets, ideas, tips and tricks
  - Share your problems (homework or not) and help solve them
  - Create and maintain a community

Online Resources

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

Questions?