Table of Contents

- Course objectives
- Prerequisites
- Curriculum
- Course schedule
- Trainer
- Lecture format
- Final exam
- Some learning resources

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
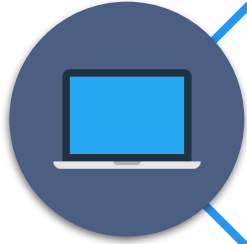
Programming Basics

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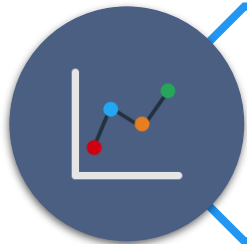- Software development experience is a plus but not required

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)

- Each week
  - 1 "lecture" on Tuesday (18:00 – 22:00)
    - Covers new material, builds foundations and understanding of new concepts
    - Brings examples of how math concepts are applied in software
      - Scientific programming
      - Math in day-to-day programming / software engineering
  - 1 "exercise" on Thursday (18:00 – 22:00)
    - "Case studies"
    - Continues to build intuition
    - We'll solve problems together
      - See how the concepts we just learned apply by implementing them
- Time allocation
  - Course: 2 Apr 2019 – 23 May 2019
  - **Exam: 26 May 2019, 09:00 – 18:00**

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.
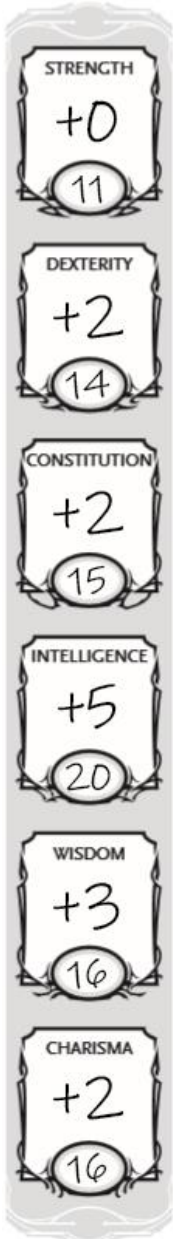
Grading Scheme

- Labs: up to 20%
  - Due date: at the end of the course
  - Graded on a "submitted" / "not submitted" basis
- Final exam: up to 80%
  - Develop at your own pace
  - Upload deadline: 23 May 2019, 12:00:00
  - Project defense
    - On-site: 26 May 2019, 09:00:00
    - Online: 24-26 May 2019, as scheduled
- Forum activity: bonus up to 10%

Grading and Course Certificate

- 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) on the course will get a certificate from SoftUni
  - 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

COURSE CERTIFICATE

Teodor Ivanov Kurtev

QA Fundamentals

Who Am I?

STRENGTH
+0
11

DEXTERITY
+2
14

CONSTITUTION
+2
15

INTELLIGENCE
+5
20

WISDOM
+3
16

CHARISMA
+2
16

YORDAN DARAKCHIEV
CHARACTER NAME

HUMAN, 25
CLASS & LEVEL

RESEARCHER
BACKGROUND

- 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 (July 2016), MSc (February 2018) in Astrophysics
  - Currently pursuing a PhD

Learning Resources

**Learn more
and share your knowledge**

SoftUni Course Pages

- AI module
  - https://softuni.bg/modules/65/artificial-intelligence-april-2019
- Official Web page of this course
  - https://softuni.bg/trainings/2313/math-concepts-for-developers-april-2019
- Forum category
  - https://softuni.bg/forum/categories/117/math-concepts-for-developers
  - 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
  - FunFunFunction, Daniel Shiffman, Siraj Raval, AsapSCIENCE, Veritasium, Vsauce, TedEd, CrashCourse, Mind Your Decisions, Infinite Series, Numberphile, Computerphile, Vi Hart, blackpenredpen, Mathologer

Questions?