Selected Mathematics and Computer Science Courses at Charles University

Winter semester
NMIN105 **Discrete Mathematics** 5 ECTS
https://is.cuni.cz/studium/eng/predmety/index.php?do=predmet&kod=NMIN105
Basic course in discrete mathematics for bachelor's program Mathematics. Elements of set theory (sets, relations), introduction to combinatorics and graph theory.

NDMI011 **Combinatorics and Graph Theory 1** 5 ECTS
https://is.cuni.cz/studium/eng/predmety/index.php?do=predmet&kod=NDMI011
Inclusion-exclusion principle and its applications. Generating functions. Finite projective planes, latin squares. Hall theorem and its applications. Flows in digraphs. k-connectivity of graphs. Ramsey theory.

NDMI098 **Algorithmic Game Theory** 5 ECTS
https://is.cuni.cz/studium/eng/predmety/index.php?do=predmet&kod=NDMI098
An introduction to algorithmic game theory, a relatively new field whose objective is to study formal models of strategic environments and to design effective algorithms for them. This introductory course covers basic concepts and methods that are illustrated with several practical applications. To successfully pass the course, it is recommended to know basics from complexity theory.

NSWI159 **Practical Course on Game Development** 2 ECTS
https://is.cuni.cz/studium/eng/predmety/index.php?do=predmet&kod=NSWI159
Development of small computer game in practice. Student will attend one game jam, during which they create a complete computer game in a limited time (at least 48 hours). Student can enter the jam either as an individual or as part of a team. Some game jams have real-life site organized at MFF UK.

NDMI100 **Introduction to Cryptography** 3 ECTS
https://is.cuni.cz/studium/eng/predmety/index.php?do=predmet&kod=NDMI100
Introductory lecture on basic principles of cryptography, cryptographic protocols and attacks on them.

NPGR003 **Introduction to Computer Graphics** 5 ECTS
https://is.cuni.cz/studium/eng/predmety/index.php?do=predmet&kod=NPGR003
Basic course of 2D and 3D computer graphics - topics: 2D drawing, filling and clipping, introduction to color science, rendering of color images, raster image coding and simple compression methods, raster graphic formats, linear 2D and 3D transformations, projections, 3D scene representation, algorithms for hidden line/surface removal, introduction to OpenGL Labs: programming in C#.

Spring semester
NDMI012 **Combinatorics and Graph Theory 2** 5 ECTS
https://is.cuni.cz/studium/eng/predmety/index.php?do=predmet&kod=NDMI012

Inclusion-exclusion principle and its applications. Generating functions. Finite projective planes, latin squares. Hall theorem and its applications. Flows in digraphs. k-connectivity of graphs. Ramsey theory.

NSWI150 **Virtualization and Cloud Computing**   3 ECTS

https://is.cuni.cz/studium/eng/predmety/index.php?do=predmet&kod=NSWI150

The purpose of this course is to provide an overview of the key concepts behind virtualization and cloud computing systems and their real world applications. The classes will cover a broad range of related topics, including classification of various virtualization and cloud models, data center hardware, high availability and load balancing clusters, scientific computing and security risks of multi-tenancy.

NAIL068 **Human-like Artificial Agents**   6 ECTS

https://is.cuni.cz/studium/eng/predmety/index.php?do=predmet&kod=NAIL068

In this course, we will study human-like artificial agents, that is autonomous intelligent agents situated in a virtual environment similar to real world that act like humans. The course gives an overview of types of such agents and their architectures with the emphasis on the problem of action selection. The course also focuses on solving practical issues related to real-time and partially observable environments.

NSWI115 **Computer Games Development**   6 ECTS

https://is.cuni.cz/studium/eng/predmety/index.php?do=predmet&kod=NSWI115

The course gives a complex overview of computer games development. It will cover programming (middleware for games, scripting languages, etc.), game design, project management and game marketing. This is a joint course for computer science students of Faculty of Mathematics and Physics (CS) and students of Faculty of Arts (FA). In the course, the students will create their own small game in small teams of 2-4 students. The course will also introduce: HTML5, Flash, Android, and Unreal Development Kit. Several talks will be given by invited speakers from the gaming industry.

The complete list of Mathematics courses taught in English in can be found here:
https://is.cuni.cz/studium/eng/predmety/index.php?do=search&nazev=&kod=&match=substring&srch_nazev=0&srch_nazev=1&fak=11320&ustav=&sekce=NM&trida=&klas=&ujmeno=&utyp=3&pvyjazyk=ENG&sem=&pocet=250&b=Search

The complete list of Computer Science courses taught in English can be found here:
https://is.cuni.cz/studium/eng/predmety/index.php?do=search&nazev=&kod=&match=substring&srch_nazev=0&srch_nazev=1&fak=11320&ustav=&sekce=NI&trida=&klas=&ujmeno=&utyp=3&pvyjazyk=ENG&sem=&pocet=250&b=Search

The Study Information System containing all courses is here: https://is.cuni.cz/studium/eng