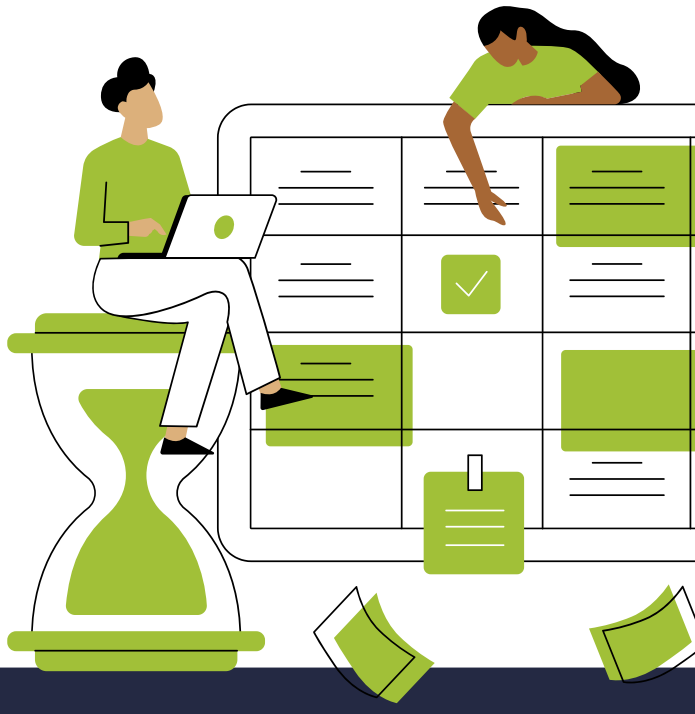
SZÉCHENYI EGYETEM
UNIVERSITY OF GYŐR

HOW TO SUCCEED IN YOUR STUDIES?

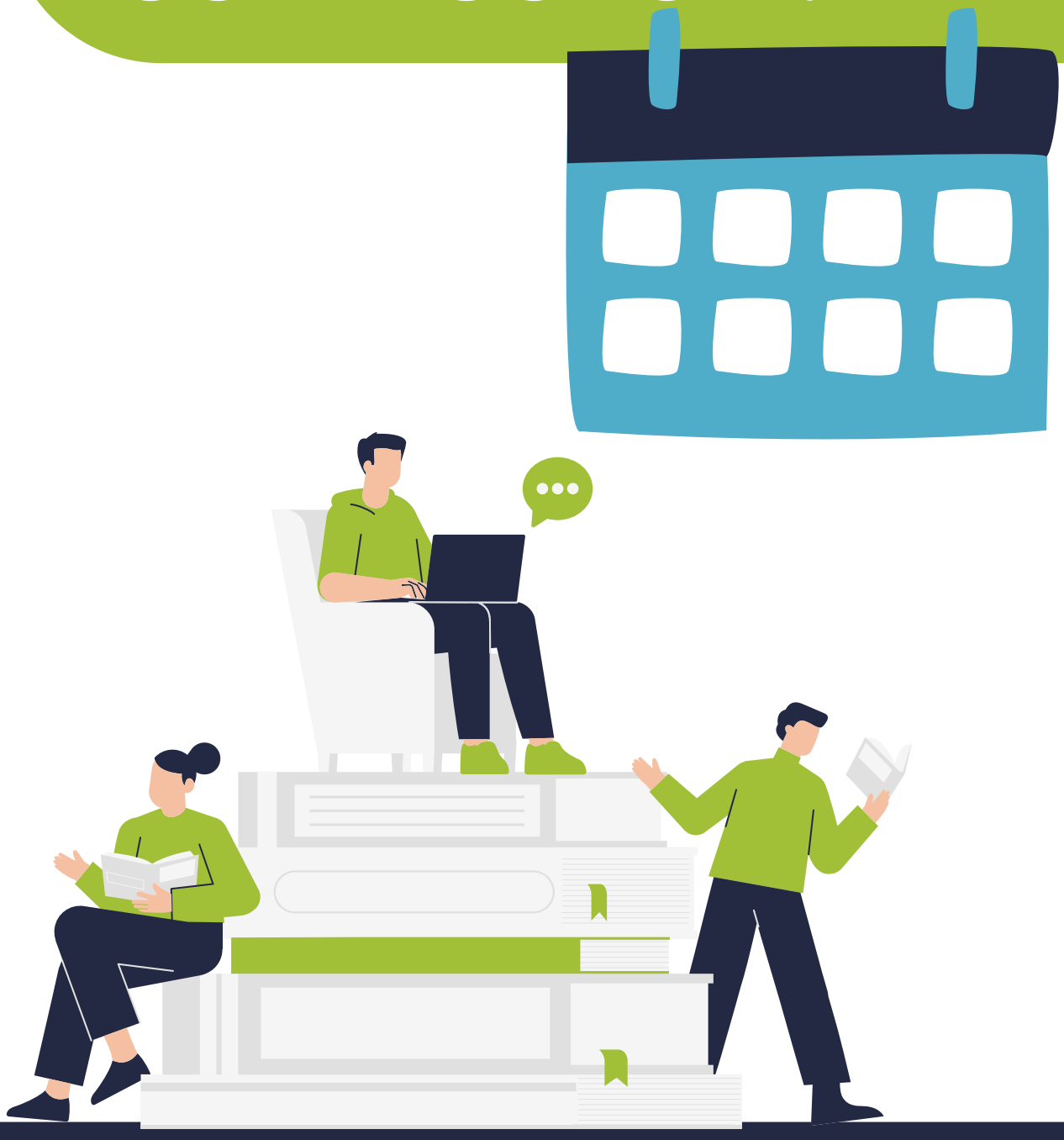
Welcome guide for
Computer Science MSc Students

2023



SZÉCHENYI EGYETEM
UNIVERSITY OF GYŐR

1. PLAN YOUR CURRICULUM!



GOOD TO KNOW

- You need to complete subjects in three category:
  - **compulsory** - 85 credit points
  - **elective** - you need to choose 5 subjects = 25 credit points
  - **optional** - you need to choose 2-3 subjects = 10 credit points

- It is recommended to have an **average workload**. Take 25-35 credit points per semester.

For Stipendium Hungaricum scholarship holders it is required to obtain at least 36 credits for the last two semesters. (minimum credit requirement - applicable also in case of one semester extension)

- The programme focuses on **5 main topics**, you have opportunity to deepen your knowledge in various fields with compulsory, elective and optional subjects.

For details, see the next pages about the curriculum.

  - **artificial intelligence and data science**
  - **mathematical modelling, simulation and optimization**
  - **programming**
  - **high performance computing**
  - **research and innovation**

- There are some **very important subjects, which are pre-conditions** for other subjects, for example:
  - Python programming --> Machine learning --> Neural networks
  - Digital twins and Numerical linear algebra --> Numerical methods for differential equations
  - Research methodology --> Thesis consultation 1 --> Thesis consultation 2
  - and some other subjects are pre-conditions for electives.

It is highly recommended to focus with special attention on these subjects during the semester and prioritise them in the exam period. You can find them below with **red**.

- For further information on the content and requirements of the subjects please check the **latest datasheet of the subjects** on https://neptun.sze.hu/tantargyi-tematikak.

In the search box on the right, write the name of the subject (Tárgy), than push Enter. You can download the datasheets by clicking on "Letöltés". You can find the subjects of your curriculum below or at the website of the department as well: https://math.sze.hu/en_GB/computer-science-msc

TO DO FOR THE REGISTRATION PERIOD

- **First semester, the Academic Registry Office takes up your subjects, in the following semesters you have to take them up yourself after you register for active semester**. Deadlines are sent in Neptun.

In case of any uncertainty, e.g. if you do not know, which subjects to take up, please contact the administrator of the Department of Mathematics and Computational Sciences.

- **If there is no more free slot** for the subject you would like to take, please make sure to request the extension of capacity in time.

Please contact the administrator of the department responsible for the subject / or the teacher during the registration week, latest until Thursday.

- **If taking up the subject is unsuccessful**, please check the pre-conditions. Most likely you have not completed it yet.
- **If you would like to change something after the week of the registration,** you can send a Neptun request for delayed taking up/dropping subjects (Administratin --> Requests).

Taking up a subject or dropping it after the registration week costs 3500 HUF / subject.

- **If you have taken a subject twice,** further occasions cost 6000 HUF.
- **If you have failed a compulsory subject, but you completed mid-term requirements and got signature, you can take a CV course** ("Csak Vizsga", means Exam Only course) in next semester's registration period. (EER §47)

If you cannot see the CV course, please contact the administrator of the department responsible for the subject / or the teacher during the registration week, latest until Thursday.

- Students from other BSc than Computer Science might need to complete **MP courses (Mesteren Pótlandó, means MSc supplementary course)**. List of courses is received during admission. (EER §47/A)

First two semesters, MP courses are taken up automatically by the Academic Registry Office, later semesters the student must request it in Neptun (Administration --> Requests).

- Those who have already studied at a higher education institution have the opportunity to **accept credits with credit transfer request**.

Credit transfer: Annex 1 of EER, administrative details and online request form: neptun.sze.hu

- **You may take up subjects from other majors as cross-study** to extend your knowledge.

Detailed rules are in EER §53, a Neptun request should be submitted **before** registration period.

COMPULSORY SUBJECTS
Total credit points: 85

1st year

Subject	Weekly lectures	Weekly seminars	Credit points	Semes-ter	Pre-conditions
Data analysis GKNM_MSTA025	4	0	4	1	-
Digital twins GKNM_MSTA035	2	4	7	1	-
Numerical linear algebra GKNM_MSTA036	2	2	5	1	-
Python programming GKNM_MSTA038	2	4	7	1	-
Introduction to HPC GKNM_MSTA088	2	2	5	1	-
Research methodology GKNM_MSTA089	0	2	2	1	-
High performance computing GKNM_MSTA039	2	2	5	2	Introduction to HPC
Machine learning GKNM_MSTA040	2	2	5	2	Python programming
Numerical methods for differential equations GKNM_MSTA044	2	2	5	2	Digital twins and Numerical linear algebra

In the online version, datasheets of the courses can be downloaded via clicking on the subject code, than “Letöltés”

COMPULSORY SUBJECTS

Total credit points: 85

2nd year

Subject	Weekly lectures	Weekly seminars	Credit points	Earliest semes-ter	Pre-conditions
Neural networks GKNM_MSTA049	2	2	5	3	Machine learning
Thesis consultation 1 GKNM_MSTA090	0	0	5	3	Research methodology
Professional practice GKNM_MSTA094	0	0	0	3*	-
Cloud computing GKNM_TATA051	2	2	5	3	-
Thesis consultation 2 GKNM_MSTA091	0	0	25	4	Thesis consultation 1

***Recommended timing of compulsory internship is summer after the 1st year, however it can be completed any time during the curriculum.**

Additional compulsory courses: Hungarian language

Subject	Weekly lectures	Weekly seminars	Credit points	Semes-ter	Pre-conditions
Hungarian Language and Culture 1. KGNB_NOKA036	0	3	0	1	-
Hungarian Language and Culture 2. KGNB_NOKA037	0	0	5	3	-

ELECTIVE SUBJECTS

Choose 25 credit points

Subject	Weekly lectures	Weekly seminars	Credit points	Semes-ter	Pre-conditions
Selected topics in Machine Learning GKNM_MSTA050	2	2	5	autumn	Machine learning
Nonlinear optimization GKNM_MSTA037	2	2	5	autumn	-
Linear optimization GKNM_MSTA045	2	2	5	spring	-
Model order reduction GKNM_MSTA047	2	2	5	autumn	Numerical methods for differential equations
Data assimilation GKNM_MSTA048	2	2	5	spring	Data analysis
Logic GKNM_INTA056	2	2	5	autumn	-
Theory of algorithms GKNM_MSTA002	2	2	5	autumn	-
Web technologies GKNM_MSTA041	2	2	5	spring	-
Production software development GKNM_MSTA092	2	2	5	autumn/ spring	-
Digitalization for industry GKNM_TATA061	2	2	5	autumn	-

OPTIONAL SUBJECTS

Choose 10 credit points

Subject	Weekly lectures	Weekly seminars	Credit points	Semes-ter	Pre-conditions
Computational fluid dinamics in vehicle engineering AJNM_JFTA005	0	2	5	3	Numerical methods for differential equations
Logistics AJNM_LSTA024	2	2	6	autumn	
CAE Methods GKNM_AMTA011	2	1	5	spring	
Automatic controls GKNM_AUTA011	2	0	5	spring	
Global economics KGNM_NETA028	2	0	4	autumn	
Advanced Macroeconomics KGNM_NETA054	2	0	4	autumn or spring	
Leadership and Organizational Communication KGNM_VKTA003	2	2	5	autumn or spring	
Innovation and Research Communication I. KGNM_VKTA020	0	0	5	autumn or spring	
Innovation and Research Communication II. KGNM_VKTA021	0	0	5	autumn or spring	

SCHEDULE PER SEMESTER

Pre-conditions are marked with red

1.Semester	2. Semester	3. Semester	4. Semester
Compulsory subjects (85 credit points)			
Python programming (7)	Machine learning (5)	Neural networks (5)	Thesis consultation 2 (25)
Introduction to HPC (5)	High performance computing (5)	Professional practice (0)	
Digital twins (7)	Numerical methods for differential equation (5)	Thesis consultation 1 (5)	
Numerical linear algebra (5)		Cloud computing (5)	
Research methodology (2)			
Data analysis (4)			
30 credit points	**15 credit points**	**15 credit points**	**25 credit points**
Elective subjects (choose 25 credit points)			
	• Linear optimization • Web technologies • Data assimilation	• Model order reduction • Selected topics in machine learning • Theory of algorithms • Logic • Digitalization for industry • Nonlinear optimization	• Linear optimization • Web technologies • Data assimilation • Production software development
Optional subjects (choose 10 credit points)			
• Logistics (6) • Global economics (4) • Advanced Macroeconomics (4) • Leadership and Organizational Communications (5)	• CAE methods (5) • Automatic Controls (5) • Advanced Macroeconomics (4) • Leadership and Organizational Communications (5)	• Computational fluid dinamics in vehicle engineering (5) • Logistics (6) • Global economics (4) • Advanced Macroeconomics (4) • Leadership and Organizational Communications (5)	• CAE methods (5) • Automatic Controls (5) • Advanced Macroeconomics (4) • Leadership and Organizational Communications (5)

Artificial intelligence and data science

Data analysis

5 credit points* I *compulsory* I 1. *semester* I *dr. István Harmati

The goal of the course is to provide students basic insight into data analysis and statistics with Python.

Content: Python foundations. Probability and statistics overview. Statistics, classical hypothesis test. Data visualization (Anscombe, Datasaurus). Logistic regression, ROC curve. Analysis of multidimensional mixed data sets. Basics of Bayesian methods. Comparison of Bayesian and Frequentist methods, their application in data analysis.

Machine learning

5 credit points* I *compulsory* I *2. semester* I *dr. Gábor Takács

The goal of the course is to introduce the basic methods of machine learning to the students. In addition, the course teaches how to use a specific data analysis tool to process real-life data sets.

Content: The definition, goal and process of data analysis. Some interesting real-life applications. Fundamental problems of machine learning: classicication, regression, clustering. Linear regression. Multivariate case, bias term. Logistic regression. Cross-validation, evaluation metrics for classification and regression. Overfitting, regularization. Decision trees, random forests, gradient boosting. Unsupervised learning, K-means clustering, t-SNE.

Neural networks

5 credit points* I *elective* I *3. semester* I *Albert Tihamér Kocsis

The goal of the course is to introduce the most important types of artificial neural networks, moreover, to teach modern methods for training these networks.

Content: The history of artificial neural networks, shallow and deep networks. Introduction to the Python modules tensorflow and Keras. Multilayer perceptron. Activation functions. Batch normalization, dropout. Variants of the stochastic gradient method. Convolutional networks. The ResNet architecture. Recurrent networks, LSTM. The Generative Adversarial Network (GAN) architecture.

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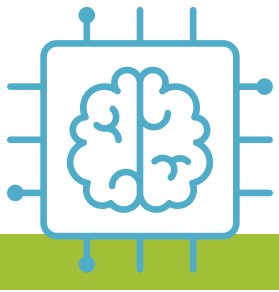
5 credit points* I *elective* I *3. semester* I *dr. András Benczúr

Selected topics in machine learning

The course covers additional topics beyond the Machine Learning course, as a continuation of that course. The topics include machine learning over networks, recommendation systems, and reinforcement learning.



Mathematical modelling, simulation and optimization

Digital twins

7 credit points* I *compulsory* I *1. semester* I *dr. Zoltán Horváth, dr. László Környei

The main goal of the course is to introduce, practice and deepen the necessary mathematical tools for the curriculum and provide the students with a detailed overview of all components of the model based digital twins and construct one actual digital twin at the end of the course.

Topics: The concept of digital twins with examples from industry and global challenges. Vector spaces, norms, scalar product, Hilbert spaces. Function spaces. Ordinary differential equations, initial and boundary value problems, linearization. Linear ordinary differential equations, exact and numerical solutions in the state space. Linear input-output systems, control systems. Model order reduction with balanced truncation and proper orthogonal decomposition for linear input-output systems. Parameter dependent problems and their methods. Introduction to non-intrusive model order reduction. Introduction to data assimilation to linear dynamical systems. Construction of a model based digital twin: thermal predictive maintenance of a simplified motor.

Model order reduction

5 credit points* I *elective* I *3. semester* I *dr. Abdelhakim Lotfi

The main goal of the course is to introduce and get learned the most recent and effective methods of the model order reduction technology, including their numerical implementation.

Topics: The model order reduction concept and terminology. Model order reduction for linear input-output systems: modal truncation, balanced truncation and comparision with the substructuring method. Simplification of parametric systems and application for optimization. The proper orthogonal decomposition (POD). Methods improving efficiency of POD (balanced POD, EIM, DEIM). Combination of POD and clustering. The reduced basis method for the finite element methods. Applications using computational software FEniCS and Feel++.

Numerical linear algebra

5 credit points* I *compulsory* I *1. semester* I *dr. Csaba Gáspár

The main goal of the course is to outline the solution techniques for linear systems of equations, eigenvalue problems and matrix decompositions with special focus on the linear algebra needed for data science and numerical methods for differential equations.

Topics. Challenges to be solved with linear algebra (e.g. image compression). Linear systems of equations, direct and iterative solution methods, the Krylov subspace methods. The effect of ill-conditioning, pre-conditioning. Matrix decompositions (LU, Cholesky, QR, SVD). Partial SVD. Computation of eigenvalues. The method of least squares. Efficient implementations and software libraries (BLAS, LAPACK). The SciPy Linear Algebra toolbox. Large scale problems.

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5 credit points* I *compulsory* I *2. semester* I *dr. Csaba Gáspár, dr. Abdelhakim Lotfi

Numerical methods for differential equations

The main goal of the course is to introduce numerical methods for partial differential equations and provide students a practice with FEniCS for problem solution with the finite element methods.

Topics: Some vector analysis. Physical problems resulting PDEs. Weak forms of PDEs. Elliptic partial differential equations. Finite element method for 1D and 2D Poisson problems. Techniques based on the Fourier, finite difference, finite element method, finite volume and some other methods.
Problem solving with FEniCS: Introduction; A simple finite element program; Applications: academic examples; Time discretization: transient heat equation; Nonlinear problems: Newton method; Navier-Stokes equations.

Linear optimization

5 credit points* I *elective* I *2. semester* I *dr. Tamás Hajba

Topics: Motivation: vehicle routing problem and production line optimization of large enterprises. Linear programming problems. Solution methods of linear programming problems: graphical method, symplex method. Duality, connection between the primal and dual problems. Multiple objective optimization. Integer linear programming models. The knapsack problem. Transportation problem, assignment problem and their solution methods. Network flows. Algorithms for finding the maximum flow, and the minimal cost flow. Modeling and solving integer programming problems with GAMS. Solution of a vehicle routing problem. Solution of a production line optimization problem.

Nonlinear optimization

5 credit points* I *elective* I *3. semester* I *dr. Mihály Csaba Markót

Basic concepts and methods of nonlinear optimization. Optimality conditions for unconstrained optimization. Gradient methods. Newton and quasi-Newton methods, the conjugate gradient method. Nonlinear least squares problems. The Gauss-Newton method. Derivative–free search. Black-box optimization. Directional and symplectic direct search methods. Basics of convex optimization. Lagrange multiplicators. Necessary and sufficient optimality conditions for equality and inequality constrained optimization. NLP duality. Lagrange multiplicator algorithms. Interior point methods for NLPs. Sequential quadratic programming. Basics of multidisciplinary optimization, a priori and a posteriori search methods. PDE-constrained optimization, the adjoint method. Overview of heuristics methods.

Data assimilation

5 credit points* I *elective* I *3. semester* I *dr. István Harmati

The course introduces the basic methods of data assimilation and their mathematical background with emphasis on applications.

Topics covered:
Basics of probability, random variables, conditional and marginal distributions. Basics of statistics and estimation theory. Bayesian estimation.
Dynamical systems, iterations, differential equations, long-term behaviour. Controlled dynamical systems. Probabilistic view of dynamical systems, ergodicity.
Basic notions, properties and categories of stochastic processes. Correlation measures. Smoothing problems, filtering problems. Linear Gaussian problems. Kalman smoother. Particle filter. Kalman filter, extended Kalman filter. Ensemble Kalman filter. Markov Chain Monte Carlo methodology: deterministic and stochastic dynamics. Linear smoothers. Variational methods. 3D Var, 4D Var, adjoint method. Large-time behaviour of filters.

RECOMMENDED MATERIALS

about the application of MSO-DE methodologies in industry:

EU MATHS IN

eu-maths-in.eu

[EU-MATHS-IN Strategic Research Agenda]

preparation coordinated by Prof. Zoltán Horváth,
president of EU-MATHS-IN,
supervisor of the Computer Science MSc programme

[EU-MATHS-IN Success Stories]
[HU-MATHS-IN Success Stories]

HU–MATHS–IN

hu-maths-in.hu

Programming

Python programming

7 credit points* I *compulsory* I *1. semester* I *dr. Gábor Takács

The goal of the course is to introduce a modern, dynamically typed programming language (Python), and to teach the programming approach and techniques needed to use the language efficiently.

Content: Simple data types, collections. Operators, expressions, conversion. Standard I/O. Control structures: if, while, for. Comprehensions. Searching and sorting. File handling, text file processing schemes. Advanced elements of the language (unpacking, slicing, advanced iteration). Functions. Elements of functional programming. Object oriented programming in Python. Exception handling. Overview of the standard library. Some useful external packages (numpy, pandas, matplotlib).

Web technologies

5 credit points* I *elective* I *2. semester* I *dr. Dávid Fülep

The goal of the course is to introduce how the web works, and to teach the basics of web programming and web services.

Content: History of the internet and the web. Some important protocols (IP, TCP, UDP, DNS, HTTP, HTTPS). Web standards. The fundamentals of HTML(5). Document Object Model (DOM). Dynamic web pages, the basics of Javascript. CSS in nutshell. Template engines. Python based web frameworks: Bottle and Flask. The JSON format. RESTful web services.

Cloud computing

5 credit points* I *compulsory* I *3. semester* I *dr. Ákos Kovács

During the semester, students will learn about leading virtualization solutions, will learn how to allocate and manage resources, and design enterprise virtualisation systems.

Content: Introduction to virtualization. Hardware requirements for virtualization. Host based virtualization. Hypervisor based virtualization. VMware vSphere. Central management. Container technologies. HPC solutions. Cloud computing, SDN. Resource management, disaster recovery.

Digitalization for industry

5 credit points* I elective I *3. semester* I dr. *Ákos Kovács

The goal of the course is to introduce tha basic concecpt of Computer Networks to understand IoT and Industry 4.0 concept. The participant will get familiar with basic Linux command, shell scripts, filesystems, kernels, and usage of an HPC system, or cloud resource.

Topics: IoT network concepts. Data Protocols and data processing (e.g. MQTT, CoAP, AMQP, LoraWan, LPWAN). Computer networks basics, Transport protocols, network services, IPv4 and IPv6. IP and not IP based Interconnects. Linux basic structure, kernels/modules, basic commands, compiling tools, permissions. Shell scritps, regular expressions, basic text editing tools. Virtualizaton basics, concepts. CPU, Memory, Disk, Network virtualization. HPC Computer architecture, X86, Cray, differences. HPC architecture, key applications, module system. HPC and Cloud computing. Using HPC from WEB interface, TOSCA files, HPC and Cloud orchestrators.

Logic

5 credit points **I elective I** ***3. semester*** **I dr. Róbert Fullér**

We study the basic chapters of mathematical logic emphasizing on the wider application of logical tools in computing.

Topics: A short history of mathematical logic. The subject and goal of logic. Propositional logic. Logic valueas and operations. Logical expressions, tautologies and truth tables. Set-theoretical approach to logic. Relations between set-theoretical and logical operations. Multi-valued logics. Fuzzy logic. Boolean logic versus fuzzy logic. The linguistic variable "Truth". Evaluating the truth value of quantified propositions. Anding the propositions. Oring the propositions. Orlike and andlike OWA operators. Orness and andness degrees. Linguistic quantifiers. Fuzzy implications. The theory of approximate reasoning. Fuzzy rule-based systems. Fuzzy reasoning schemes. Knowledge-based expert systems. Reasoning methods in knowledge-based systems. Introduction to logic programming.

Theory of algorithms

5 credit points **I elective I** ***3. semester*** **I Pusztai Pál**

The goal of the course is to give an overview of algorithms. The necessary data structure and the efficiency of the algorithms will be described and analysed too.

Topics: Efficiency of algorithms. Asymptotic notation. Sorting methods: insertion sort, merge sort, quicksort, heapsort. Sorting in linear time: counting sort, radix sort, bucket sort. Priority queues with heaps. Medians and order statistics. Selection in expected linear time.
Dynamic sets. Stacks and queues with arrays. Linked lists. Implementing pointers and objects with arrays. Representing rooted trees. Hash tables: direct-address tables, hash functions, open addressing.
Binary search trees. Searching and querying minimum, maximum, successor, predecessor. Insertion and deletion. Red-black trees: properties, rotations, insertion. Interval trees. B-trees and its basic operations.
Dynamic programming. Matrix-chain multiplication. Longest common subsequence. Greedy algorithms. An activity-selection problem. Huffman codes. Approximation algorithms. The set-covering problem.
String matching. A naive string-matching algorithm. The Rabin-Karp algorithm. String matching with finite automata. The Knuth-Morris-Pratt algorithm.
The Rivest-Shamir-Adleman (RSA) public-key cryptosystem and its mathematical background: greatest common divisor, modular arithmetic, solving modular linear equations, powers of an element.

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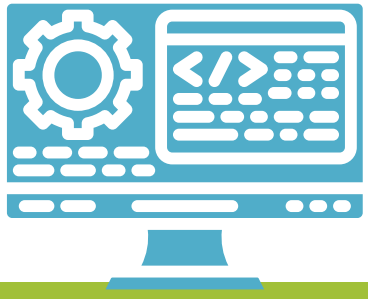
5 credit points **I elective I** ***3. semester*** **I Dr. József Bakosil**

Production software development

The goal of the course is prepare students for software development from smaller to large institutions (e.g., laboratories, industry) with hundreds or thousands of employees.

Topics: Types of software development. Tools for productivity. Version control. Build systems (e.g., CMake). Programming style. Software design. Third-party libraries. Documentation. Testing, continuous integration. Measuring code quality. Software development in teams, communication. Code review. User-friendliness. Learning from history.



High performance computing

Introduction to HPC

5 credit points* I *compulsory* I 1. *semester* I *dr. László Környei

The aim of the course is to acquire the basic skills necessary to develop programs in a high performance computing environment and learn some basic parallelization techniques, including OpenMP.

Topics: Scalable solutions for IT problems. Accessing supercomputing systems at the university. Computer and HPC hardware and architectures. Basic LINUX commands. The LINUX system environment. Programming in BASH. Running script in the LINUX CLI. Programming in C. Numerical linear algebra packages. Installing and configuring external libraries. Using linear algebra tools for solving linear equations. Simulating physical systems. Physical, mathematical and numerical modelling. Implementing numerical models for solving differential equations. Measuring, modelling and estimating runtime. Visualizing results and plotting of simple graphs efficiently. Job and resource management in SLURM. Parallel programming with OpenMP. Running an OpenMP job with SLURM. Parallel programming with OpenMP: data types and controlling number of threads.

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5 credit points* I *compulsory* I 2. *semester* I *dr. László Környei

High performance computing

The aim of the course is to get hands on experience on advanced high performance computing tools, environment and development. The focus is on programming a small cluster system.

Topics: Programming with MPI. Categorizing MPI functions. Collective MPI calls. Calculating speedup and parallel efficiency. Advanced topics in MPI. Visualizing results, MPI-aware numerical linear algebra packages. Advanced topics in OpenMP. Hybrid programming: MPI+OpenMP.

RECOMMENDED MATERIALS

about the application of HPC to tackle global challenged:

HIDALGO2
CENTRE OF EXCELLENCE

The Mathematical Modelling and Simulation Research Group of Széchenyi István University provides the platform for 5 use cases, develops visualization tools, and is use case leader for Urban Air Project.

https://hidalgo2.eu

HPC research infrastructure at Széchenyi István University

contact: Dr. László Környei (laszlo.kornyei@math.sze.hu)

Research and innovation

Research methodology

2 credit points* I *compulsory* I *1. semester

Students will learn how to conduct research effectively, including problem identification, literature review, research design, data collection and analysis, academic writing, and presentation skills.

Topics: Introduction to Research Methodology. Research process and ethical considerations. Literature review. Research design. Data collection. Data analysis. Research ethics and intellectual property. Own research project: proposal, implementation, presenation preparation, presentation and discussion.

Innovation and research communication I-II.

5-5 credit points* I *optional

The aim of the course is to make scientific products prepared by lecturers and students, as well as to make them visible and develop them into publications (conference or journal paper).
The requirement for completing the subject is the preparation / completion of one of the publications below:

- submission and presenation of a scientific student essay at a TDK or OTDK conference
- submission and acceptance of a qualified conference paper
- journal article: the publication is submitted to a Q1-Q4 qualified journal and not rejected

FURTHER INFORMATION ON TDK (Scientific Students' Association):
https://tdk.sze.hu
https://tdk.sze.hu/for-international-students

Requirements for graduation

Compulsory internship

6 weeks internship is compulsory for the students. The internship can be carried out in any government or business organization / enterprise, in research and innovation projects where basic IT technology is used. During the internship, the student must prepare a report detailing the task assigned to him / her, presenting the work done, his / her working method and results, and describing the experience gained. Recommended in summer, after the 2nd semester.

Further information on the process for international students:
https://karrier.sze.hu/international-internship

Further information on the process for Hungarian students:
https://karrier.sze.hu/jelentkezesi-segedlet

Thesis and final exam

https://math.sze.hu/thesis
https://math.sze.hu/final-exam

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2. PREPARE FOR EXAM PERIOD!

USEFUL TIPS

- **Prepare a schedule for the exam period.**

- **Offered marks** registered by the tutors can be found, and accepted or rejected under Tárgyak/ Megajánlott jegyek (Subjects/Offered marks) in the Neptun system during exam period. In this case, you do not have to register for an exam.

- **Do not leave important subjects (pre-conditions) for the last exam date**.

- **Do not leave registration or deregistration for the last minute.** You can register for an exam or deregister from it until 12:00 AM (noon) on the day before the exam.

- If there is a medical reason for **not showing up on the exam**, send a certificate from your doctor to the teacher, otherwise you will be charged 3000 HUF for unverified absence.

- **Always keep some money on your Neptun account.** If you fail an exam twice, you can register for a next exam date only after charging yourself the IV fee in Neptun and paying it through the system. IV fee is 2000 HUF for the 3rd and 4th exam, and 2500 HUF for the 5th and 6th exam. In case of taking the same subject repeatedly, the fails of the previous semesters are added to the exams of the ongoing semester. You may have 3 exams in one exam period.

- **A last chance: leniency exam.** If you have failed a very important exam (e.g. Python programming, which is pre-condition for three subjects in the second semester), you have the opportunity to apply for a leniency exam. This exam is after the last week of the exam period. Date and place are announced by the department responsible for the subject. Leniency exam can be requested once per curriculum, and costs 4000 HUF.

- Give feedback to your teachers: fill in the **Student's Evaluation of Teacher's Work** (Oktatói Tevékenység Hallgatói Véleményezése - OTHV) questionnaires in Neptun system (Administration --> Questionnaires).

Further information on exam rules: EER §59-§72

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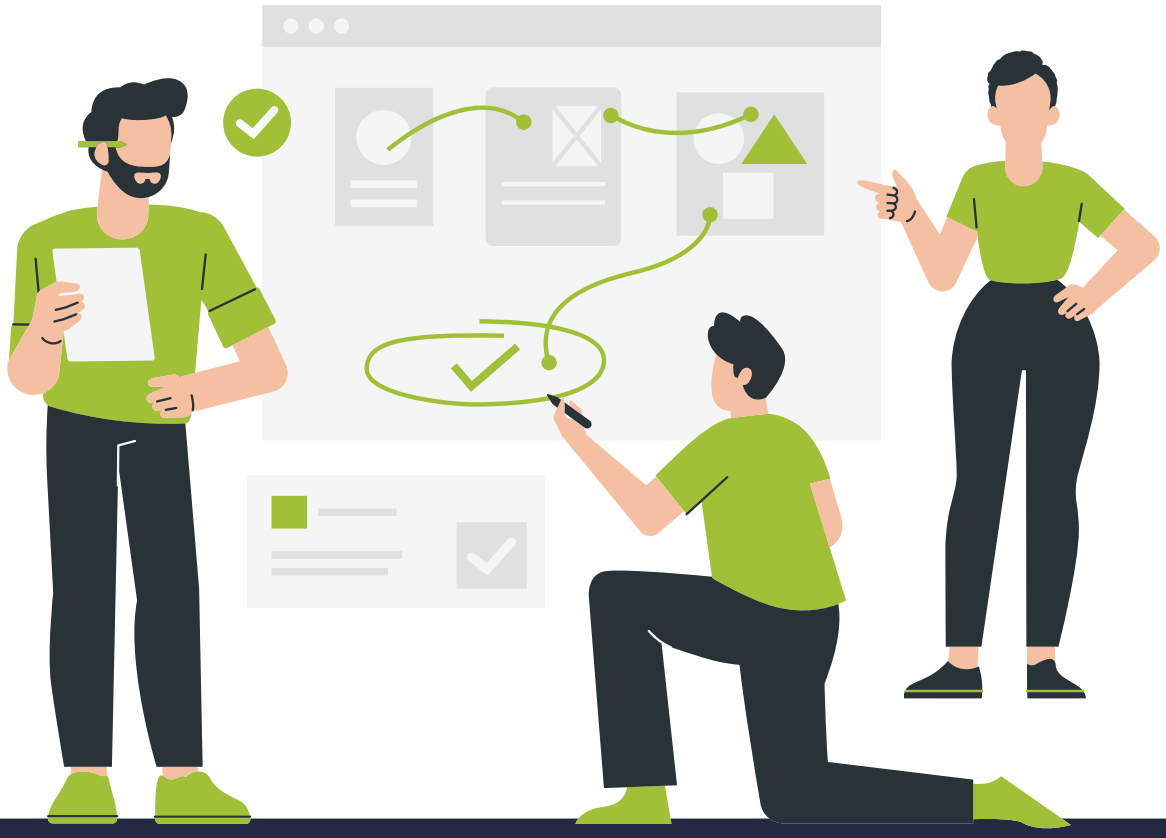
3. PLAN YOUR CAREER!



HOW TO PREPARE FOR YOUR DREAM JOB?

- Always **have an up to date CV** at hand. You may never know, when a good you might need it. If you don't have relevant job experience, specify the subjects and topics you have learnt at university.

- You can **gain valuable experience and build industrial relations during your curriculum**: with compulsory internship and Thesis consulation 1-2. You can complete all of these in one topic, which gives you the **opportunity for specialization**.

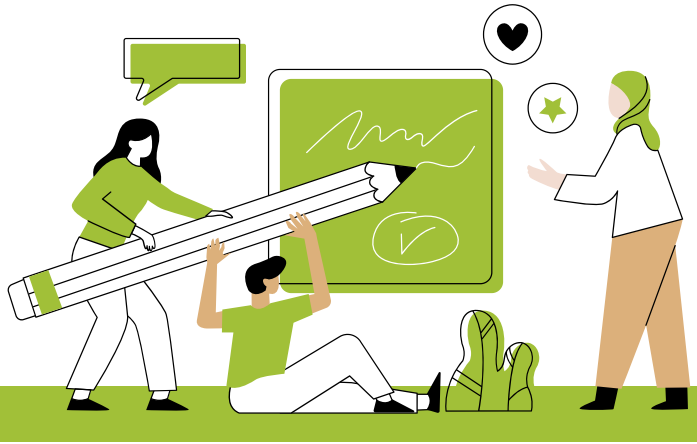
- We also recommend to attend **Scientific Students' Associations Conference** (Tudományos Diákköri Konferencia - **TDK**).

- There are always several ongoing **international research projects** at the university, also we have two **competence centers**: Vehicle Industry Research Center (Járműipari Kutatóközpont - JKK) and Digital Development Center (Digitális Fejlesztési Központ - DDC).

- **Student organizations** are the best place to look for friends and experience: e.g. SZEnergy, SZEngine, Arrabona Racing Team, SZESAT and so on.

- Talented students can apply as a **teaching assistant** (demonstrátor) or **reasearch assistant** at the Department of Mathematics and Computational Sciences.

- You can continue your studies even after the MSc programme at **Doctoral School of Multidisciplinary Engineering Sciences** (Műszaki Tudományi Doktori Iskola - MMTDI).



BUILD YOUR CARREER DURING YOUR STUDIES!

Summer internship

Thesis consultation 2

Thesis consulation 1

Possibility for 1 year professional experience
at companies or at international university projects

Further opportunities are offered for you at the university

Vocational colleges and student teams

Scientific Students' Associations Conference

Support of research activities

AFTER GRADUATION

Work as a data scientist, machine learning engineer, cloud engineer, software developer, analyst, research fellow...

Continue your studies at the Doctoral School of Multidisciplinary Engineering Sciences (MMTDI)

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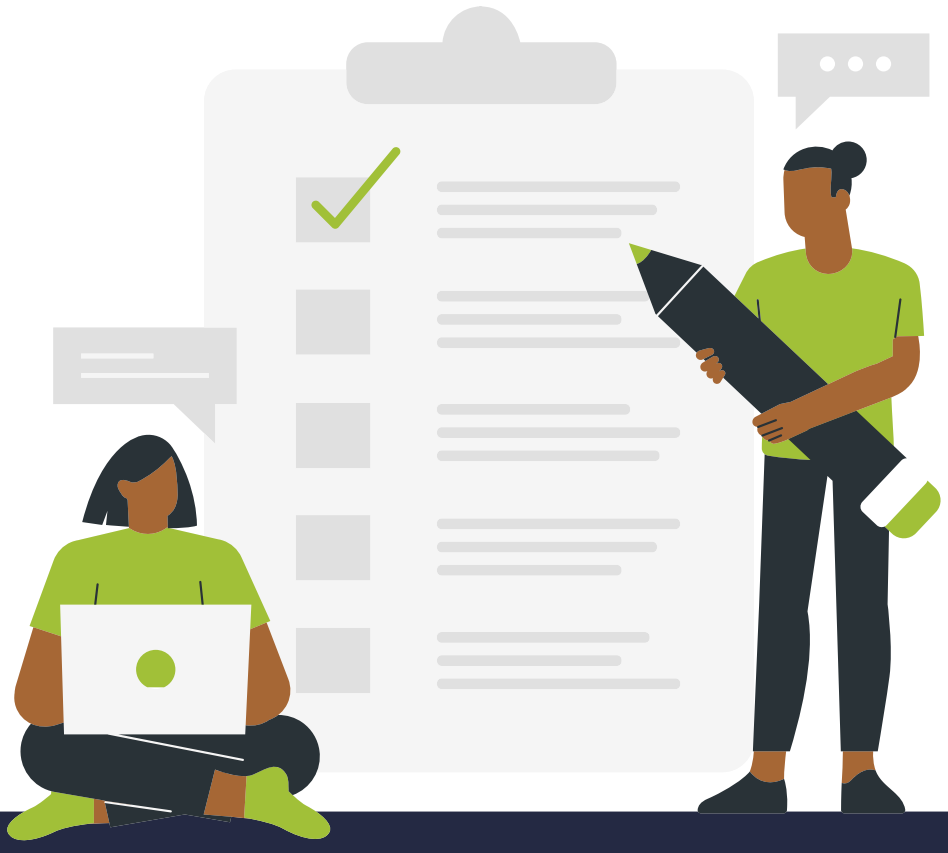
4. BE MASTER OF ADMINISTRATION!



IMPORTANT INFORMATION AND CONTACT DETAILS

- The information in this booklet is based on the **TVSZ** (Tanulmányi és Vizsgaszabályzat - Education and Exam Regulations), **and TJSZ** (Térítési Juttatási Szabályzat - Compensation and Allowance Regulations).

Please always check the latest regulation in these documents, as it contains further details and may change during your studies. You can find them on neptun.sze.hu / neptun.sze.hu/en_GB

- Please check the **messages sent to you in Neptun** regularly - English version is often at the end of the e-mails.

- The most important **websites** for you:
  - admissions.sze.hu - information for international students
  - neptun.sze.hu - latest educational information, deadlines, Neptun guide, link to Neptun, phonebook (contact details for all university employees)
  - karrier.sze.hu - information on internship
  - math.sze.hu - information on thesis and final exam
  - facebook.com/szehkb/ - information on latest events and news for international students
  - facebook.com/sze.givk.hok - Student's Council of the Faculty

- **Contact details:**

Administrator of the Department of Mathematics and Computational Science	Szilvia Hegyi szilvia.hegyi@math.sze.hu, office C605	planning the curriculum, questions about thesis and final exam...
Administrator at the Academic Registry Office (Tanulmányi Osztály, TO)	Enikő Horváth heniko@sze.hu IG ground floor	student requests, student ID card, student status...
Administrator for Stipendium Hungaricum	Márta Mészáros mmzs@sze.hu office IG 103	information on Stipendium Hungaricum
Student Committe of Foreign Affairs (Hallgatói Külügyi Bizottság)	Tamás Sömenek somenek.tamas349@gmail.com	events and help for international students from fellow students

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