UNIVERSITY PATHWAY FINLAND

Science – Technology – Economics

Course Guide

Curriculum 2023-2024

Aalto University

Tampere University

UNIVERSITY OF OULU

Table of contents

Welcome Message

A Heartfelt Welcome to the University Pathway Finland (Science & Technology and Economics) Programme!

Here at Aalto University, we take great pride in hosting the inaugural Finnish university Pathway programme in collaboration with Tampere University and the University of Oulu. This distinctive programme presents international students with an exceptional opportunity to prepare and secure admission for degree studies in Finland while continuing their studies from the comfort of their homes.

We aspire to provide you with a enlightening international learning experience and a platform for engaging with fellow international students who will soon be your peers in our Bachelor programs here in Finland. I encourage you to make the most of the instruction delivered by our university educators. Additionally, remember that sharing your unique experiences and ideas with other students from diverse backgrounds is an enriching way to learn. I trust you will derive pleasure from our supplementary social and informative agenda, thoughtfully crafted to complement the course curriculum.

This guide encompasses the Pathway programme's course descriptions, encompassing learning objectives, workloads, instructional schedules, as well as criteria for completion and evaluation of each course. Upon embarking on your educational journey, we will extend an invitation for you to join our digital learning hub on Microsoft Teams. Within this space, you will find comprehensive course descriptions, details about the social program, and additional information aimed at ensuring your academic journey is both seamless and gratifying.

May your time within the University Pathway Finland programme be profoundly inspiring and rewarding!

MATHEMATICS AND PROGRAMMING:

Vectors and Matrices, 5 ECTS

Teaching period and exams: 28.8.2023 – 20.10.2023
Teaching times: Mondays and Wednesdays 10.15–11:45

Course Content

- Core content:
  - Systems of linear equations: solving using Gaussian elimination.
  - Linear independence of Euclidian space, subspaces, basis, rank, and dimension of Euclidian space.
  - Lines and planes.
  - Matrices: matrix algebra, matrix product, the transpose, the inverse, the determinant, Eigenvalues and eigenvectors. The cross product, the dot product and the vector triple product of vectors.
- Complementary knowledge:
  - Basic competence in using Matlab to solve mathematical problems

Learning Outcomes

Within this course, students will grasp the essential theories and techniques of linear algebra and matrix analysis. They will gain proficiency in theorem proofing, problem-solving through mathematical methodologies, and adeptly articulating solutions verbally as well as in written formats.

Completion and Grading

- Attending online classes (80 % attendance): Active participation in the online classes accounts for 10% of the final grade. Active participation means presenting one's own solutions for the assignments, commenting other students' presented solutions and answering other students' questions on the course content during the classes.

- Completing assignments: The assignments account for 15% of the final grade. Each week 8 problems are given. It is mandatory to solve the first 6 problems. Problems 7 and 8 are bonus and can be used to compensate for points lost from problems 1 to 6.

- Written and oral exam: The exams account for 75% of the final grade. In the written exam students can earn 30 points and in the oral exam 6 points. The written exam covers mostly practical questions while the oral exam focuses on theory.

- Grading on scale 1-5. Grade 5 if at least 90% of all points acquired; grade 4 if at least 80% but less than 90% of all points acquired; etc. If less than 50% of all points are acquired than the course is failed.

- The exam can be re-taken once.

Course Workload

- Online video lectures 14 hrs (study time including study material approximately 42 hrs)
- Synchronous online classes 14 hrs (study time including preparation for classes 42 hrs)
- Math clinic 14 hrs
- Self-study assignments 21 hrs
- Practice, repetition and exam 16 hrs

MATHEMATICS AND PROGRAMMING:

Analysis A: Limit and Continuity, 5 ECTS

Teaching period and exams: 23.10.2023 – 22.12.2023
Teaching times: Mondays and Wednesdays 10.15–11.45

Course Content

Real numbers, the least upper bound and the greatest lower bound, the limit of a sequence, Bolzano-Weierstrass Theorem, the limit of a function and the epsilon-delta proofs, continuity of a function, Bolzano's Intermediate Value Theorem.

Learning Outcomes

Upon completing this course, a student will have the ability to:

- Determine the greatest lower bound and the least upper bound in simple cases,
- Study the convergence and the properties of sequences,
- Find limits and study continuity of functions,
- Use precise definitions to produce rigorous proofs of results that arise in this course using direct and indirect proof, induction and epsilon-delta technique,
- Deliver both oral and written presentations of her/his solutions.

Completion and Grading

- Attending online classes (80 % attendance)
- Completing assignments
- Written and oral exam
- Grading on scale 1-5
- The exam can be re-taken once

Course Workload

- Online video lectures 14 hrs (study time including study material approximately 42 hrs)
- Synchronous online classes 14 hrs (study time including preparation for classes 42 hrs)
- Math clinic 14 hrs
- Self-study assignments 21 hrs
- Practice, repetition and exam 16 hrs

MATHEMATICS AND PROGRAMMING:

Differential and Integral Calculus, 5 ECTS

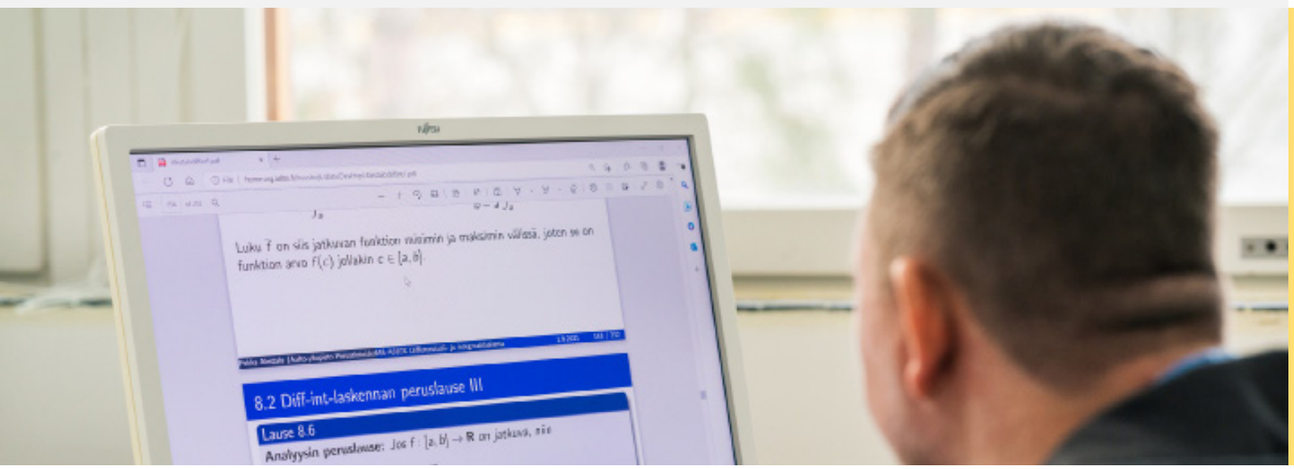
Teaching period and exams: 8.1.2024 – 1.3.2024
Teaching times: Mondays and Wednesdays 10.15–11.45

Course Content

- Sequences
- Series and Power series
- Derivatives and integrals
- Basic types of differential equations

Completion and Grading

- Attending online classes (80 % attendance)
- Completing assignments
- Written and oral exam
- Grading on scale 1-5
- The exam can be re-taken once



Learning Outcomes

Upon completing this course, a student will have the ability to:

- Analyse the convergence of sequences and series
- Be familiar with the series expansions and approximations of elementary functions
- Master the most important properties, calculation methods, and applications of the derivative and the integral
- Solve a first order differential equation in the linear and separable cases
- Solve a linear second order differential equation in the case of constant coefficients

Course Workload

- Online video lectures 10 hrs (study time including study material approximately 36 hours)
- Synchronous online classes 12 hrs (study time including study material approximately 40 hours)
- Math clinic 12 hrs
- Self-study assignments 32 hrs
- Practice, repetition and exam 16 hrs

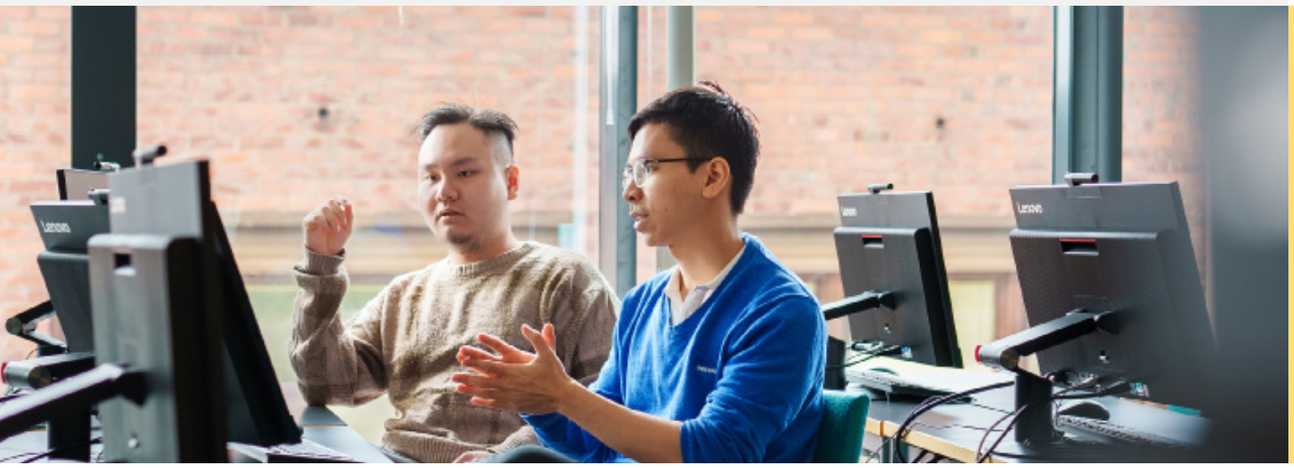
MATHEMATICS AND PROGRAMMING:

Programming I, 5 ECTS

Teaching period and exams: 4.3.2024 – 3.5.2024
Teaching times: Mondays and Wednesdays 10.15–11.45

Course Content

- Core content:
  - Software design methods
  - Control structures
  - Data types and operators
  - Modular programming
  - Handling user input and output
  - Arrays
  - Pointers
  - Character strings
  - Data Structures
  - Storing data
  - Recursion



Completion and Grading

- Attending online classes and practice hours (80 % attendance)
- Completing programming assignments
- Quizzes and exams
- Grading on a scale 1-5
- The exam can be re-taken once

Learning Outcomes

Upon completing this course, a student will have the ability to:

- Solve a computational problem by using abstraction and stepwise refinement
- Create simple working programs using C programming language
- Identify and use the basic control structures of a program
- Find and fix errors in the program
- Use files to store and retrieve data
- Document the program

Course Workload

- Live lectures on Zoom 14 hrs
- Guided practice hours 14 hrs
- Independent programming practice and assignments 85h
- Quizzes and exams 22 hrs

FINNISH LANGUAGE AND STUDY SKILLS FOR FINNISH UNIVERSITIES:

Survival Finnish, 3 ECTS

Teaching period and exams: 5.4.2023 – 23.5.2024
Teaching times: Mondays, Wednesdays and Fridays 10.15–11:45

Course Content

In this course, you will practice all four modalities of the Finnish language: speaking, understanding, reading, and writing. The course will also expose you to the Finnish people and culture. The language module consists of asynchronous independent online studies and synchronous online group work with a teacher, discussions, and other online activities.

The course will cover the following topics:

- Greetings and introducing yourself
- Telling about your background and current situation
- Asking and answering typical questions in social situations and services on and off campus
- Knowledge of the city regions of Helsinki, Espoo, and Tampere
- The essential characteristics of the Finnish way of life and culture

Learning Outcomes

After the course, the student is familiar with the basics of Finnish language and culture. The student will be able to introduce oneself in Finnish, talk about their general background and current situation using ordinary phares. The student will have tools to manage in common social situations and services on and off campus in Finnish. They will also have tools and strategic skills to learn more Finnish on their own. The student will recognize the main characteristics of Finnish way of life and culture, be able to talk about them, and compare their own culture with that of Finland.

Completion and Grading

- Attending online classes (80 % attendance)
- Completing al the assignments and a final exam
- Grading on scale 1-5

Course orkload

- Synchronous online classes 24 h
- Self-study assignments and homework 42 h
- Course portfolio and self-evaluation 10 h
- Exam and preparation for the exam 5 h

FINNISH LANGUAGE AND STUDY SKILLS FOR FINNISH UNIVERSITIES:

Finland studies, 2 ECTS

Teaching period and exams: 22.8 – 24.8.2023
Teaching times: Once on Monday, Tuesday, Wednesday and Thursday 10.15–11.45

Course Content

- Studying at a Finnish university may differ from studying in another country. This course will familiarize you with the Finnish education system and help you gain the study skills you will need when studying in Finland.

- The course will cover the following topics:
  - The Finnish education system and the Nordic welfare state
  - The key elements of studying at a Finnish university
  - Study strategies
  - Studying in a foreign language
  - Student wellbeing and study support
  - Extracurricular activities and student life in Finnish universities
  - Practical advice for everyday living in Finland

Learning Outcomes

After the course, the student understands what studying at a Finnish university is like and knows the values on which the Finnish education system is based. The student will be able to apply study strategies and time management into their studies and critically reflect upon themselves as learners. The student will have tools to find more information on their future studies in Finland.

Completion and Grading

- Attending online classes (80 % attendance)
- Completing all the assignments
- Grading pass/fail

Course Workload

- Synchronous online classes 8 h
- Asynchronous online lectures 4 h
- Self-study assignments and homework 32 h
- Presentation and preparation for the presentation 8 h
- Peer and self-evaluation 2 h

ENGLISH:

English for Pathway students, 5 ECT

Teaching period and exams: 21.8.2023 – 22.3.2024
Teaching times: Fridays 10:15-11:45

Course Content

In this course, you will practice all four modalities of academic English: speaking, listening, reading, and writing. The course includes two asynchronous self-study online components: reading and writing (1 credit) and speaking and listening (1 credit). Beyond these self-study components, you will have synchronous online lessons with a teacher, biweekly small group discussions with your peers, and other online activities.

The course will cover the following topics:

- Engaging in small talk
- Academic discussion skills (seminar-style)
- Presentation skills
- Giving and receiving feedback on spoken and written texts
- Avoiding plagiarism and academic integrity
- Academic style in word choice and grammar

Learning Outcomes

After the course, the student understands how to use academic written and spoken English in a university setting. For written skills, the student will be able to select appropriate academic vocabulary, produce well-structured, grammatically sound written texts, employ strategies to avoid plagiarism, and utilize various organizational structures when writing essays for different purposes. For spoken skills, students will be able to interact in academic social settings using appropriate conventions (e.g. conversation markers, small talk devices, language for agreeing and disagreeing) and deliver an oral presentation related to a topic in their area of study. The students will also reflect on how academic written and spoken English differs from English use in daily life and engage in constructive practices of giving and receiving feedback.

Completion and Grading

- Attending online classes (80 % attendance)
- Completing assignments and an exam at the end of the course
  - Reading and writing online module 20%
  - Listening and speaking online module 20%
  - Active participation in synchronous sessions and peer meetings 20%
  - Other assignments 20%
  - Final written and spoken exam 20%
- Grading on scale 1-5
- The exam can be re-taken once

Course Workload

- Synchronous online classes 13,5 h
- Synchronous small group teacher meetings (3 x 30 m) 1,5 h
- Synchronous small group peer meetings 15 h
- Asynchronous online modules 54 h
- Other assignments and homework 46 h
- Exam and preparation for the exam 5 h

Contact

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