Transcript of Coursework

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This file contains information about the important courseworks and the self-study subjects I had over in my career. The structure of the document is self-explanatory, The letter(s) in the left of the course code shows the final grade, if exists. If you have any questions regarding myself or want to see the official documents, be free to e-mail me!

Contents:

University of Glasgow

? **MATHS1021**, *Foundation of Mathematics*, Fall 2025, Anna Puskas (main head)
Course Link
Foundations of Mathematics aims to transition students to university level mathematics through development of abstract structures and reasoning skills, the interplay between algebra and geometry, and to ensure students have a strong command of the basics of mathematics that is crucial to our degree programmes. A strong focus throughout the course will be placed on developing mathematical communication skills.
Textbook: M. Liebeck, A Concise Introduction to Pure Mathematics, Routledge, 4th ed. (2015); J. Poole, Linear Algebra: A Modern Introduction, Brooks Cole, 4th ed. (2014); J. Stewart, Calculus, Brooks Cole, 9th ed., International Metric Version (2020).

A3 **MATHS2001**, *Multivariable Calculus*, Fall 2025, Ana G. Lecuona
Course Link
This course on multivariate calculus gives a practical introduction to differentiating and integrating in multiple dimensions, and to fundamental concepts found in diverse fields such as geometry and physics. It is an essential course for intending honours students. The emphasis is on methods and applications.
Textbook: Multivariable Calculus, Metric Edition (9th Edition) by James Stewart; ISBN: 9780357113509.

A2 **MATHS2004**, *Linear Algebra*, Fall 2025, Christian Korff
Course Link
This course covers the fundamentals of linear algebra that are applicable throughout science and engineering, and in particular in the physical, chemical and biological sciences, statistics and other parts of mathematics. It is an essential course for intending honours students. The emphasis is on methods and applications.
Textbook: Lecture notes mainly used, suplementary book is Nicholson, Linear Algebra with Applications (2023 A-D edition).

A2 **MATHS2032**, *Introduction to Real Analysis*, Fall 2025, Mark Powell
Course Link
This course is a first introduction to real analysis. The common thread running through the course is the notion of limit. The precise definition of this notion will be given for both sequences and series. It is an essential course for intending honours students. The emphasis is on developing and applying standard techniques of proof to give rigorous arguments from basic definitions.
Textbook: Lecture Notes.

? **MATHS2033**, *Mathematical Methods and Modelling*, Spring 2026, Stephen J. Watson
Course Link
This course aims to introduce aspects of the theory and methods used in mathematical modelling. Topics covered in the course include: dynamical systems and integral transforms. It is an essential course for intending honours students. The emphasis is on methods and applications.
Textbook: Lecture Notes.

? **MATHS2034**, *Mechanics*, Spring 2026, Misha Feigin
Course Link
This course provides an introduction to the mathematical modelling of mechanical phenomena, for example, the motion of a golf ball moving under the influence of gravity. The main mathematical tools used in this course are vector algebra and the analysis of solutions of differential equations. It is an essential course for intending honours students.
Textbook: Lecture Notes.

? **MATHS2035**, *Groups, Transformations and Symmetries* , Spring 2026, Brendan Owens
Course Link
This course covers fundamental concepts in pure mathematics. Building on the definition of group given in level 1, deeper properties of these objects will be studied. Student's intuition for groups will developed through examples. The abstract concept of vector spaces, and linear transformations between these spaces will be introduced. By considering basis for vector spaces, the concept of linear transformation will be related to that of matrices. In the final part the course, groups and linear transformations come together. This is done by considering the symmetries of spaces and shapes.
Textbook: Lecture Notes.

A2 **STATS2002**, *Probability 1*, Fall 2025, Alexey Lindo
Course Link
This course introduces students to fundamental concepts in univariate probability theory.
Textbook: None, Lecture Notes.

A1 **STATS2003**, *Statistical Methods, Models and Computing 1*, Fall 2025, Iain Bell and Mitchum Bock
Course Link
This course introduces students to key concepts in the statistical sciences including data visualisation, parameter estimation, statistical inference and analysis using statistical software.
Textbook: Probability and Statistics with R by Ugarte, Militino and Arnholt.

? **STATS 2005** , *Probability 2*, Spring 2026, Iain Bell and Eilidh McMurdo
Course Link
This course introduces students to multivariate probability distributions and basic concepts in large sample theory;
Textbook: Lecture notes.

? **STATS2006**, *Statistical Methods, Models and Computing 2*, Spring 2026, Xiaochen Yang
Course Link
This course further develops key concepts in the statistical sciences including hypothesis testing, linear modelling and the analysis of data using statistical software.
Textbook: Lecture Notes.

ADA University

A **MATH 1111**, *Calculus I*, Spring 2025, Javanshir Azizov
Standard Calculus Course. Limits, Convergence and Divergence of Limits, Differentiation of the functions, Anti-Derivatives, Integration, Fundamental Theorem of Calculus, Area Between Curves, Volumes by Rotation, Initial Value Problems, Introductory Differential Equations.
Textbook: Thomas' Calculus Early Transcendentals.

A **MATH 1201**, *Abstract Algebra*, Spring 2025, Rafael Alizade
Group Theory, Permutations, Cosets and Theorem of Lagrange, Rings, Fields, Integral Domains, Rings of Polynomials, Vector Spaces, Euler's and Fermat's Theorems.
Textbook: John Fralelgh's A First Course in Abstract Algebra.

A **CSCI 1101**, *Programming Principles I*, Spring 2025, Rashad Aliyev
Standard Introductory Programming course for C and C++. Logic, Variables, Loops, Arrays, Strings, Functions, Pointers, Dynamic Memory Allocation, Bitwise Operation, Elementary Algorithms.
Textbook: None.

A **MATH 3501**, *Linear Algebra*, Fall 2025, Elchin Hasanilzade
Computation focused Linear Algebra course. Vectors, Hyperplanes, System of Linear Equations, Matrices, Echalon and Row Canonical Forms, Span and Basis, Permutations, Determinants, Inverse of Matrices, Linear mappings and transformations, Change of Basis, Similarity, Orthogonal Basis, Gram-Schmit Algorithm, Diagonalization, Eigenvalues, Eigenvectors, Linear Functional and Dual Spaces.
Textbook: Schaum's Outline of Linear Algebra.

A **MATH 1100**, *Pre-Calculus*, Fall 2025, Javanshir Azizov
Standard (compulsory!) Pre-Calculus course. Definition of Functions, Injective and Surjective Functions, Trigonometric Functions etc.
Textbook: Stewart's Precalculus.

A **SITE 1101**, *Principles of Information Systems*, Fall 2025, Rashad Aliyev, Araz Yusubov
A course that introduces concepts of general Information Systems. Introduction to Programming, Computer Networks, Principles of Designing Software, Development Pipeline etc.
Textbook: None.

P **PDEV 2302**, *Data And Computing Skills*, Fall 2025, Khalil Israfilzada.
Introductory course focused on Excel and Data Analysis.
Textbook: None.

Self-Study

Theorical Machine Learning
Textbook: Kevin P. Murphy - Probabilistic Machine Learning
Status: Skimmed through important parts of the book. Planning to re-read and write projects in the side to showcase I guess.

Stochiastic Process
Textbook: Michael Steele - Stochastic Calculus and Financial Applications Stochastic Modelling and Applied Probability
Status: Just have started at the time of the writing.

Probability and Statistics
Discrete and Continous Random Variables, Expectation, Variance, Distribution of Random Variables, Cumultative Distribution Function, Probability Density Function, Convergence in Distribution and Probability, Law of Large Numbers, Central Limit Theorem, Statistical Models, Parametric and non-Parametric Inference, Point Estimator, Bias, Method of Moments, Maximum Likelihood, Bootsrap, Hypothesis Testing and p-values, Risk and Loss Functions etc.
Textbook: Wasserman's All of Statistics A Concise Course in Statistical Inference
Technologies Practiced: Python Libraries such as Pandas, Numpy, Scipy, Matplotlib, Seaborn.
Status: Have studied Part I and Part II of the book.

Real Analysis
Axiom of Completeness, Supremum and Infimums, Converence of Sequences, Monotone Convergence Theorem, Subsequences and Bolzano-Weierstrass Theorem, Cauchy Sequences, Topolofy of $\mathbb{R}$: Open, Closed, Perfect, Compact Sets, Functional Limits, Continous and Uniformly Continous Functions, Intermediate Value Theorem, Derivatives, Mean Value Theorem
Textbook: Stephen Abbot's Understand Analysis
Status: Have Studied all the chapters except for Integrals and Series chapters

(Analytical) Classical Mechanics, Physics
Textbook: Herbert Goldstein's Classical Mechanics
Status:Read Chapter I and II, skimmed through other chapters to get the overall idea of the analytical mechanics.

Numerical Analysis
Textbook: Numerical Recipes: The Art of Scientific Computing
Status: Reading and writing a project in parallel

Topology
Textbook: Topology, James Munkres
Status: I have skimmed through important parts of the books like definitions, terminologies, important theorems. Basically enough to understand the topic whenever I come across it.

Geometry, Number Theory, Algebra, Combinatorics
During high-school, I was preparing for math olympiads and consequently read a couple of books and solved lots of problems about these four subjects.