

Kyaw Shin Thant

Transcript of Mathematics Coursework

Last updated December 25, 2023.

Year 3 Term 1

MATH5051, *Abstract Algebra I*, Prof. Jiu-Kang YU.

Graduate course on Galois theory of algebras. Categories and functors, Yoneda lemma, tensor products of algebras and base change, separable extensions, étale algebras, Galois theory of étale algebras, Galois algebras, Hilbert's Theorem 90, Galois descent and twists, simple/semisimple modules, central simple algebras, Brauer group.

Textbook: None.

MATH4030, *Differential Geometry*, Prof. Man Chun LEE.

An introductory course on the differential geometry of curves and surfaces. curvature and torsion of curves, Frenet formulas, regular surfaces, shape operator, 1st and 2nd fundamental form, Gaussian curvature and mean curvature, Christoffel symbols, Gauss' theorema egregium, covariant derivative, geodesics, Gauss-Bonnet theorem.

Textbook: Do Carmo, *Differential Geometry of Curves and Surfaces*.

MATH3060, *Mathematical Analysis III*, Prof. Kai Seng CHOU.

Introductory Fourier analysis, metric spaces and their topology, Banach fixed point theorem and applications: inverse function theorem, Picard-Lindelöf theorem, Arzelà-Ascoli theorem, Baire category theorem.

Textbook: None.

MATH3030, *Abstract Algebra*, Prof. Kwok Wai CHAN.

Normal subgroups, quotient groups, free groups, presentations of groups, isomorphism theorems, subgroup series, group actions, Sylow theorems and their applications, prime and maximal ideals, factorization in rings, PIDs and UFDs.

Textbook: Dummit and Foote, *Abstract Algebra*.

MATH2048, *Honours Linear Algebra II*, Prof. Ronald Lok Min LUI.

Direct sums, products and quotient spaces, Zorn's lemma, linear transformations, dual spaces, diagonalizability, inner product spaces, adjoint, normal and self-adjoint operators, spectral theorem and Jordan canonical form.

Textbook: Friedberg, Insel and Spence, *Linear Algebra*.

Year 2 Term 2

A **MATH3040**, *Fields and Galois Theory*, Prof. Michael MCBREEN.

Finite and algebraic extensions, algebraic closures, straightedge and compass constructions, finite fields, automorphism groups, splitting fields, separable and normal extensions, Galois correspondence, cyclotomic extensions, solvability by radicals.

Textbook: Fraleigh, *A First Course in Abstract Algebra*.

A **MATH2060**, *Mathematical Analysis II*, Prof. Leung Fu CHEUNG.

Derivatives, Taylor's theorem, Riemann integration and Darboux integration, pointwise and uniform convergence of functions, absolute convergence, series of functions.

Textbook: Bartle and Sherbert, *Introduction to Real Analysis*, Chapter 6-9.

- A **MATH2020**, *Advanced Calculus II*, Prof. Kai Seng CHOU.

Double and triple integrals, change of coordinates, line integrals, vector fields, Green's theorem, surface integrals, Stokes' theorem.

Textbook: Thomas' *Calculus*, Chapter 15-16.

■ Year 2 Term 1

- A **MATH2050**, *Mathematical Analysis I*, Prof. Man Chun LEE.

A first course on real analysis. Construction of real numbers, least upper bound property, sequences and limits, Cauchy sequences, infinite series, limits of functions, continuity and uniform continuity.

Textbook: Bartle and Sherbert, *Introduction to Real Analysis*, Chapter 1-5.

- A **ESTR2004**, *Discrete Mathematics for Engineers*, Prof. Hoi To WAI.

Mathematical induction, summation, recurrences and generating functions, asymptotics, counting, introductory graph theory and probability.

Textbook: None.

■ Year 1 Term 2

- A **MATH1050**, *Foundations of Modern Mathematics*, Dr. Wing Chun FONG.

A course on introduction to proof writing through various topics, and basic set theory and logic.

Textbook: None.

■ Year 1 Term 1

- A **MATH1510**, *Calculus for Engineers*, Dr. Kelvin Chun Lung LIU.

Standard first course on calculus. Functions, limits, continuity, differentiation and applications, integration, Taylor series.

Textbook: None.