

Mathematics

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Course Description

(Unless otherwise specified, all are 3-unit term courses of three hours of lecture and one hour of tutorial per week.)

MAT 0200

Tutorial Seminar

1 U; 1 STOT

This course is designed for those students who have the intention to join the Enrichment Stream in Mathematics. This course consists of small group tutorials and discussions on topics in fundamental analysis and algebra. Prerequisite: permission of the instructor.

MAT 0310

Seminar I

2 U; 2 STOT; 1st term

Small group discussion on topics in analysis, geometry, algebra and applied mathematics. (For Mathematics Majors only.)

MAT 0320

Seminar II

2 U; 2 STOT; 2nd term

Small group discussion on topics in analysis, geometry, algebra and applied mathematics. (For Mathematics Majors only.)

MAT 1310

Calculus and Linear Algebra for Applications

Limits, differential and integral calculus of one variable, elementary ODE, matrix and determinant, eigenvalues. This course is specially designed for students coming from 6-year high school system. Moreover, students who are not familiar with English terminology of mathematics will find this course particularly helpful. (Not for Mathematics Majors from 7-year high school system.)

MAT 2010

Advanced Calculus I

Functions of several variables, partial differentiation, differential and its geometric meaning, chain rule, maxima and minima, Lagrange multiplier, mean value theorem, Taylor series, and implicit function theorem.

MAT 2020

Advanced Calculus II

This is a continuation of MAT 2010. The following topics will be discussed: multiple integrals, change of variables formula, vector analysis, line and surface integral, Green's Theorem, divergence theorem, and Stokes' theorem.

MAT 2030

Linear Algebra I

This course is intended to provide conceptual understandings and computational techniques of linear algebra. Topics include: Gaussian elimination, theory of simultaneous linear equations, matrices, determinants, vectors spaces, bases and linear independence.

MAT 2040

Linear Algebra II

This is a continuation of MAT 2030. Topics include: linear mapping and its matrix representation, eigenvalues and eigenvectors, inner product spaces, Gram-Schmidt process, dual space, and quadratic form.

MAT 2050

Elementary Analysis I

This course is intended to provide conceptual understanding in the theory of functions of one variable. Topics include: real numbers, real valued functions, elementary set theory, limits of sequences and continuous functions.

MAT 2060

Elementary Analysis II

This is a continuation of MAT 2050. Topics include: differentiability, Riemann integrals, series, sequences and series of functions, and uniform convergence.

MAT 2071

Symbolic Computing

2 U; 1 Lect. 2 Lab.; 1st term

This course is intended to teach symbolic computation and graph visualization through the use of mathematical software such as Mathematica or Maple, so as to consolidate the concepts and skills of symbolic computation. (For Mathematics Majors or Mathematics Education Majors only.)

MAT 2072

Numerical Computing

2 U; 1 Lect. 2 Lab.; 2nd term

This course is intended to teach numerical computing and graph visualization through the use of computational software such as MATLAB, Octave or SciLab, so as to consolidate the concepts and skills of numerical computing. (For Mathematics Majors or Mathematics Education Majors only.)

MAT 2080

Essential Mathematical Methods I

This course is intended to provide basic concepts, methods and skills in higher mathematics. Topics include: inequalities, computational techniques in calculus of one variable, elementary functions, power series and methods for solving differential equations.

MAT 2090

Essential Mathematical Methods II

This is a continuation of MAT 2080. Topics include: logic, sets and functions, number systems, complex plane and its geometry, complex functions, and further computational techniques in calculus.

MAT 2110

Mathematics and Culture

In this course, we shall survey mathematics primarily in historical order to show how its ideas have helped to mould modern life and thought. Students will be expected to have knowledge about the history of Chinese mathematics from early to later development, have deeper understanding of the development of different fields of western mathematics at different stages, understand the influence of early western mathematics on later developments and appreciate masterpieces of prestigious mathematicians. Topics are selected from: development of Chinese mathematics, early western mathematics, later developments of European mathematics, mathematics and modern culture. (Not for students who have taken GEE 250N.)

MAT 2300

Perspectives in Mathematics

This course is designed for interested students with a minimum of mathematical experience. Particular emphasis will be laid on the nature of mathematical reasoning related to the number system, aspects of algebra, probability and statistics. (Not for Mathematics Majors, Mathematics Education Majors or students who have taken GEE 243N.)

MAT 2310

Linear Algebra and Applications

This course is intended to introduce those methods and concepts in linear algebra which are often used in the studies of engineering and finance. Topics are usually selected from: system of linear equations, vector spaces, matrix, linear transformation, inner product, pseudo inverse, singular value decomposition, determinants, eigenvalues and eigenvectors. (Not for Mathematics Majors or Mathematics Education Majors.)

MAT 2320

Mathematics for Social Sciences I

Functions of one variable, limit and continuity, calculus of one variable and its applications. (Not for Mathematics Majors or Mathematics Education Majors.)

MAT 2330

Mathematics for Social Sciences II

Functions of several variables, partial derivatives, maxima and minima, Lagrange multipliers, matrices, determinants, and system of linear equations. Students taking this course are expected to have knowledge in calculus of one variable. (Not for Mathematics Majors or Mathematics Education Majors.)

MAT 2340

Mathematics for Science

Calculus, series, elementary ordinary differential equations, matrices, system of linear equations, determinants, eigenvalues and eigenvectors. (Not for Mathematics Majors or Mathematics Education Majors.)

MAT 2350

Mathematics for Applications

This course is intended to introduce quantitative methods for students in biological and physical sciences. Topics are selected from: descriptive statistics, probability, discrete and continuous probability distributions, point estimation, interval estimation, hypothesis testing, linear regression, applications of differential and integral calculus, differential equations, and method of least square. Data analysis using computer softwares. (Not for Mathematics Majors, Mathematics Education Majors or Statistics Majors.)

MAT 2360

Mathematics for Physical Sciences I

Brief introduction to differentiation and integration, power series, basic ordinary differential equations, partial derivatives, multiple integrals; matrices and linear systems, determinant, vectors and eigenvalue problem. (Not for Mathematics Majors or Mathematics Education Majors.)

MAT 2370

Mathematics for Physical Sciences II

More on ordinary differential equations, multiple integration and field theory, partial differential equations of mathematical physics, Fourier series and introduction to complex analysis. Students taking this course are expected to have knowledge in calculus of one variable. (Not for Mathematics Majors or Mathematics Education Majors.)

MAT 3010

Higher Geometry

This course is to provide prospective high school teachers in mathematics a rigorous treatment of the foundations of Euclidean geometry and an introduction to non-Euclidean geometry. Topics include: Euclid's postulates, attempts to prove the parallel postulate, Hilbert's axioms—a reformulation of the foundations of Euclidean geometry, geometry without the parallel postulate, the discovery of non-Euclidean geometry, consistency of hyperbolic geometry and models of hyperbolic geometry of Beltrami-Klein and Poincaré.

MAT 3030

Algebra I

Group theory: Lagrange theorem, normal subgroups, group homomorphism, isomorphism theorems, Cayley's theorem, Sylow's theorems, direct products, structure of finitely generated abelian groups.

Ring theory: ring, ideal, maximal ideal, prime ideal and integral domain.

Module theory: Fundamental theorem on finitely generated modules over principal ideal domain.

MAT 3040

Algebra II

Ring theory: Polynomial rings, factorization in integral domain, principal ideal domain, unique factorization domain and Euclidean domain.

Field theory: field extension, algebraic extension, geometric construction, normal extension, finite fields, Galois theory and solvability by radicals.

MAT 3070

Introduction to Topology

Topological Space: open set, closed set, compact set, limit point, Heine-Borel Theorem, continuous map, homeomorphism, connectedness, metric space, group action on a topological space and quotient topology. Fundamental Group: loop, space of loops, homotopy, calculation of fundamental groups of some spaces, path lifting lemma, homotopy lifting lemma and fundamental groups of quotient spaces of free discrete group actions.

MAT 3080

Number Theory

This course is intended to introduce the students to the intriguing structure of integers. Topics are usually selected from: divisibility theory of the integers, primes, congruence, Fermat's little theorem, some arithmetic functions, primitive roots and indices.

MAT 3210

Linear Programming

Simplex method, dual problems, dual simplex method, duality theorems, complementary slackness, sensitivity analysis and transportation problem. Students taking this course are expected to have knowledge in linear algebra.

MAT 3220

Operations Research and Logistics

Transshipment problem, assignment problem, dynamic programming and applications, resource allocation problem, routing and scheduling problem, inventory and production problem, cargo loading problem, equipment replacement problem, reliability problem and integer programming. Students taking this course are expected to have knowledge in linear programming.

MAT 3230

Numerical Analysis

Floating-point numbers and roundoff errors, absolute and relative errors, stable and unstable computations, solutions of nonlinear equations, linear systems, interpolation, numerical differentiation, and numerical integration. Students taking this course are expected to have knowledge in advanced calculus and linear algebra.

MAT 3240

Numerical Methods for Differential Equations

Numerical solution of ordinary differential equations, numerical solution of partial differential equations. Students taking this course are expected to have knowledge in advanced calculus and linear algebra.

MAT 3250

Complex Variables and Applications

This course is intended to provide computational techniques and a concise theory of functions of one complex variable. Topics are selected from: complex numbers and functions, analytic functions, Cauchy-Riemann equations, elementary functions, contour integration, Cauchy integral formula, series expansion, zeros, singularities, residue theorem and definite integrals, linear fractional transformation, harmonic functions and their applications. Students taking this course are expected to have knowledge in advanced calculus.

MAT 3260

Graph Theory

Definitions and applications of graphs and digraphs, Eulerian graphs, Hamiltonian graphs, path algorithm, connectivity, trees, planarity and coloring graphs.

MAT 3270

Ordinary Differential Equations

Ordinary differential equations arise from quantitative description of natural and social phenomena. Topics are: method of explicit solution, linear equations and systems, series solutions, Sturm-Liouville boundary value problems, dynamical systems and stability, applications to mechanics, electrical networks and population of species.

MAT 3280

Introductory Probability

Axioms of probability, conditional probability, independence, discrete random variables, continuous random variables, mean, variance and covariance, moment generating function, Poisson distributions, normal distributions, central limit theorem, law of large numbers, random walks, transition probabilities and Markov chains. Students taking this course are expected to have knowledge in advanced calculus.

MAT 3290

Discrete Mathematics

This course is intended to introduce those discrete structures commonly used in computer science and mathematics. Topics are usually selected from: sets, relations, graphs and trees, Boolean algebras and switching functions, recurrence relations, algorithms, groups, rings and modular mathematics.

MAT 3300

Mathematical Modeling

This course introduces the concept of mathematical modeling. Topics include: different modeling techniques such as modeling with differential equations and modeling with linear programming, forecasting; economic models such as Markov models, network models and financial models such as input-output models and scheduling models.

MAT 3310

Computational and Applied Mathematics

This course introduces the general solution methods used in computational and applied mathematics. The central topics are differential equations and matrix equations. Methods include Fourier series, orthogonal expansion, conformal mapping, Fourier integrals, complex integration, LU decomposition, Newton method, semi-direct and iterative methods, the finite element methods and fast Fourier transform. Students taking this course are expected to have knowledge in advanced calculus and linear algebra.

MAT 3320

Scientific Computing

2 U; 1 Lect. 2 Lab.

This course is intended to use numerical methods and mathematical software to solve some practical problems, so as to consolidate computational concepts and skills of using computers. Topics include data structure, computer organization, design and analysis of algorithms and computer programming, internet usage, "C" programming language. Students taking this course are expected to have knowledge in at least one computer language.

MAT 3330

IT for Mathematics Teaching

3 U; 2 Lect. 2 Lab.

This course is designed for prospective teachers. Students will develop the skills of preparing mathematics documents, which typically includes formulas and graphics. Moreover, they will be trained to present and communicate mathematics through multimedia, which enhances

their teaching skills in the future. Specifically, students will develop their skills in IT using a group of office-type commercial software. Upon the completion of the course, students are able to design and construct teaching aids, either as web pages or as computer documents, with market available software. Moreover, they are able to write simple programmes on using the software. Topics: internet communications, multimedia authoring, mathematics documentation, spreadsheets, databases, mathematics graphics and computing and multimedia presentation. (Not for students who have taken MAT 3320.)

MAT 4001, 4002

Project

3 U each; 3 STOT

A project in pure or applied mathematics, either in research or in reviewing the literature of an advanced topic. Each section may be taken by an individual student or a team of two students. Prerequisite: permission of the instructor and satisfaction of at least one of the following conditions: 1) with Major GPA in the preceding academic term of at least 3.0; 2) with cumulative Major GPA of at least 3.0; and 3) any special case explicitly endorsed by the Board of the Department.

MAT 4010

Functional Analysis

Metric spaces, fixed point theorems, Banach spaces, Hilbert spaces, continuous linear operator, the Hahn-Banach extension theorem, the uniform boundedness principle and the open mapping theorem, and applications of the above topics. Students taking this course are expected to have knowledge in elementary analysis and linear algebra.

MAT 4020

Calculus of Variations

This course is intended to provide a basic theory of calculus of variations. Topics are usually selected from: necessary condition for extremum, Euler equation, fixed end point problem for unknown functions involving higher-order derivatives, natural boundary condition and transversality, Weierstrass-Erdman corner conditions, and sufficient conditions. Students taking this course are expected to have knowledge in advanced calculus.

MAT 4030

Differential Geometry I

This course covers basic theory on curves and surfaces in the Euclidean three space. Topics include: regular curves, Frenet formulas, local theory of curves, global properties of curves such as isoperimetric inequality and four-vertex theorem, regular surfaces, 1st and 2nd fundamental form, Gaussian curvature and mean curvature, Gauss map, special surfaces such as ruled surfaces, surfaces of revolution, parallel surfaces and minimal surfaces. Students taking this course are expected to have knowledge in advanced calculus and linear algebra.

MAT 4040

Differential Geometry II

This course is an introduction to Riemannian geometry of surfaces. Topics include: Theorema Egregium, covariant differentiation, parallel vector fields, geodesics, Gauss-Bonnet theorem and applications, the Poincare theorem on vector fields, exponential map, normal coordinates, Gauss lemma, completeness, Hopf-Rinow theorem, 1st and 2nd variation of the arc length, and Bonnet theorem. Students taking this course are expected to have knowledge in MAT 4030.

MAT 4050

Real Analysis

This is an introductory course on the Lebesgue integration theory on real line. Topics include: measurable sets, measurable functions, Lebesgue integral, Fatou's lemma, monotone convergence theorem, Lebesgue dominated convergence theorem and differentiation. Students taking this course are expected to have knowledge in elementary analysis.

MAT 4210

Financial Mathematics

Topics of this course will include: Basic option theory, forward and futures contracts, model of asset price, Ito's Lemma, asset price random walk, Black-Scholes model, free boundary problems of options, constrained matrix problems and the projected SOR method, discrete random walk model and the binomial methods. Students taking this course are expected to have knowledge in probability and differential equations.

MAT 4220

Partial Differential Equations

This is an introduction to the classical theory of partial differential equations. Topics are usually selected from: First-order equations, types of second-order equations, well-posedness of the wave and the heat equations, boundary value problems for the Laplace and Poisson equations, separation of variables. Students taking this course are expected to have knowledge in advanced calculus.

MAT 4230

Optimization Theory

Unconstrained and equality optimization models, constrained problems, optimality conditions for constrained extrema, convex sets and functions, duality in nonlinear convex programming, descent methods, conjugate direction methods and quasi-Newton methods. Students taking this course are expected to have knowledge in advanced calculus.

MAT 4240

Stochastic Processes

Bernoulli processes and sum of independent random variables, Poisson processes, times of arrivals, Markov chains, transient and recurrent states, stationary distribution of Markov chains, Markov pure jump processes, and birth and death processes. Students taking this course are expected to have knowledge in probability.

MAT 4250

Game Theory

Principles and techniques of game theory, matrix games, minimax theorem and calculation of optimal strategies, cooperative and non-cooperative solutions of bimatrix games, coalitional games and applications. Students taking this course are expected to have knowledge in linear algebra.

MAT 4260

Coding Theory and Cryptography

Coding theory: information theory, linear codes, cyclic codes and geometric codes. Cryptography: classical cryptosystems and public key cryptosystems. Students taking this course are expected to have some knowledge in algebra and number theory.

MAT 4270

Discrete Dynamics and Fractals

This course is intended to introduce modern concepts in discrete dynamics. Topics include the following. One-dimensional discrete dynamical systems: chaos, symbolic dynamics, Poincaré recurrence theorem and Sarkovskii's theorem; higher-dimensional discrete dynamical systems: iterative functions system, fractals; introduction to complex analytic dynamics, Julia and Mandelbrot sets. Students taking this course are expected to have knowledge in advanced calculus.

MAT 5011

Real Analysis I

3 U; 3 Lect.

This course provides a solid foundation in the Lebesgue integration theory and basic techniques in analysis. Topics include σ -algebra of sets, measure theory, Lebesgue integration theory, convergence theorems, L_p -spaces and differentiation. Students taking this course are expected to have knowledge in advanced calculus and elementary analysis.

MAT 5012

Real Analysis II

3 U; 3 Lect.

This course provides more advanced topics in real analysis. Topics include signed measures, Hahn decomposition theorem, Lebesgue decomposition theorem, product measures, Fubini theorem, measure and topology, and Riesz representation theorem. Students taking this course are expected to have knowledge in MAT 5011 or its equivalent.

MAT 5031

Complex Analysis I

3 U; 3 Lect.

This course is intended to provide a solid and advanced training in the basic techniques and theorem of complex analysis. Topics include properties of holomorphic functions, complex integration, conformal mappings, singularities and residues. Students taking this course are expected to have knowledge in advanced calculus and elementary analysis.

MAT 5032

Complex Analysis II

3 U; 3 Lect.

This is a continuation of MAT 5031. Advanced topics will be selected from: Schwarz lemma, Riemann mapping theorem, Picard theorem, Weierstrass theorem and Mittag-Leffler theorem, analytic continuation and introduction to Riemann surfaces. Students taking this course are expected to have knowledge in advanced calculus and elementary analysis.

MAT 5051

Abstract Algebra I

3 U; 3 Lect.

This course is intended to provide a solid background knowledge in Abstract Algebra. Topics include group theory, Sylow's theorems, structure of finitely generated abelian groups, rings and ideals, polynomial rings, principal ideal domain (PID), modules, fields and Galois theory. Students taking this course are expected to have knowledge in a first course in algebra.

MAT 5052

Abstract Algebra II

3 U; 3 Lect.

This is a continuation of MAT 5051. Topics include fields, cyclic extensions, separable extensions, integral ring extensions, integral Galois extensions, Noetherian rings and modules, localization, Hilbert basis theorem and primary decomposition. Students taking this course are expected to have knowledge in MAT 5051 or equivalent.

MAT 5070

Topology of Manifolds

3 U; 3 Lect.

This course is an introduction to several basic topological invariants for manifolds. Major topics are: differentiable manifolds and maps, Sard's Theorem, degree of maps, fundamental group, covering space and homology group. Students taking this course are expected to have knowledge in elementary analysis.

MAT 570S

Guided Studies I

3 U; 3 STOT

Series of projects in pure or applied mathematics focusing on a central theme. Prerequisite: permission of the instructor.

MAT 580S

Guided Studies II

3 U; 3 STOT

Series of projects in pure or applied mathematics focusing on a central theme. Prerequisite: permission of the instructor.

Study Scheme

I. Major Programme

There are three streams of specialization: Mathematics Stream, Computational and Applied Mathematics Stream, and Enrichment Stream in Mathematics. All students are under Mathematics Stream unless they apply to specialize in Computational and Applied Mathematics Stream or Enrichment Stream in Mathematics and select certain courses as prescribed below. Students of all the streams are required to complete a minimum of 68 units of courses as follows:

A. Applicable to students admitted in 2002-03 and thereafter

Mathematics Stream

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|------|--|-------------|
| (i) | Required Courses (Please see Notes 1 and 2):
MAT 0310, 0320, 2010, 2020, 2030, 2040, 2050,
2060, 2071, 2072, 2080, 2090 | 26-32 units |
| (ii) | 36-42 units of elective courses in Mathematics courses coded 3000 or above, or IEG 4130 [#] , 5124 [#] , SEG 3540 [#] , 4430 [#] | 36-42 units |

Total: 68 units

Computational and Applied Mathematics Stream

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|------|---|-------------|
| (i) | Required Courses (Please see Notes 1 and 2):
MAT 0310, 0320, 2010, 2020, 2030, 2040, 2050,
2060, 2071, 2072, 2080, 2090, 3230 | 29-35 units |
| (ii) | 33-39 units of elective courses from Group I, II or III
with at least 15 units from Group I
Group I : Mathematics courses coded MAT 32xx,
33xx, 42xx or 43xx
Group II : Other Mathematics courses coded 3000 or
above
Group III: IEG4130 [#] , 5124 [#] , SEG 3540 [#] , 4430 [#] | 33-39 units |

 Total: 68 units
Enrichment Stream in Mathematics

Requirement for entering this Stream:

Applicable to students with GPA results: Accumulative Major GPA of at least 3.3, or the preceding two semesters' Major GPA of at least 3.3.Applicable to students without GPA results: Grade "B" or above in the HKALE* "Pure Mathematics" (the condition for exemption of MAT 2080/2090).

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|------|--|----------|
| (i) | Required Courses (Please see Note 1):
MAT 0200, 0310, 0320, 2010, 2020, 2030, 2040,
2050, 2060, 2071, 2072, 4001 | 30 units |
| (ii) | 38 units of elective courses in Mathematics coded
3000 or above or IEG4130 [#] , 5124 [#] , SEG 3540 [#] , 4430 [#]
with at least 27 units from the following: MAT
3030, 3040, 3070, 3230, 3240, 3250, 3270, 4002,
4010, 4030, 4040, 4050, 4220, 4230, 5011, 5012,
5031, 5032, 5051, 5052, 5070 | 38 units |

 Total: 68 units
[#] to be included in the Major GPA as well**B. Applicable to students admitted in 2001-02****Mathematics Stream and Computational and Applied Mathematics Stream**

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|------|---|-------------|
| (i) | Required Courses (Please see Notes 1 and 3):
MAT 0310, 0320, 2010, 2020, 2030, 2040, 2050,
2060, 2071, 2072, 2080, 2090 | 26-32 units |
| (ii) | 36-42 units of elective courses from Group I, II or III.
Students of Computational and Applied Mathematics
Stream are required to complete at least 24 units out of
36-42 units of elective courses in Group I or III.
Group I : Mathematic courses coded MAT 32xx,
33xx, 42xx or 43xx
Group II : Other Mathematics courses coded 3000 or
above
Group III: IEG4130 [#] , 5124 [#] , SEG 3540 [#] , 4430 [#] | 36-42 units |

 Total: 68 units

Enrichment Stream in Mathematics

Requirement for entering this Stream:

Applicable to students with GPA results: Accumulative Major GPA of at least 3.3, or the preceding two semesters' Major GPA of at least 3.3.Applicable to students without GPA results: Grade "B" or above in the HKALE* "Pure Mathematics" (the condition for exemption of MAT 2080/2090).

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|------|--|----------|
| (i) | Required Courses (Please see Note 1):
MAT 0200, 0310, 0320, 2010, 2020, 2030, 2040,
2050, 2060, 2071, 2072, 4001 | 30 units |
| (ii) | 38 units of elective courses in Mathematics coded 3000
or above or IEG 4130#, 5124#, SEG 3540#, 4430#
with at least 27 units from the following:
MAT 3030, 3040, 3070, 3230, 3240, 3250, 3270,
4002, 4010, 4030, 4040, 4050, 4220, 4230, 5011,
5012, 5031, 5032, 5051, 5052, 5070 | 38 units |

Total: 68 units

to be included in the Major GPA as well

- Notes: 1. *Applicable to students admitted in 2001-02 and thereafter*
All Major students should obtain Grade "D" or above in each of the courses of MAT 2010, 2020, 2030 and 2040. Otherwise, they are required to repeat the course(s). Students who cannot meet the Grade "D" requirement in any one of the course mentioned above after two attempts will be required to withdraw from the University. Please refer to Reg. 15.2(d) of the General Regulations Governing Full-time Undergraduate Studies.
2. *Applicable to students admitted in 2002-03*
Students in Mathematics Stream or Computational and Applied Mathematics Stream who obtained Grade "B" or above in the HKALE* "Pure Mathematics" may apply for exemption from MAT 2080 and/or MAT 2090. These students should take 3 or 6 more units of Major courses in place of the exempted course(s). Otherwise, they should take this(ese) course(s) in their first year of attendance.
3. *Applicable to students admitted in 2001-02*
Students in Mathematics Stream or Computational and Applied Mathematics Stream who obtained Grade "B" or above in the HKALE* "Pure Mathematics" may apply for exemption from MAT 2080/2090. These students should take 6 more units of Major courses in place of the exempted courses.

* *Only applicable to students admitted on the strength of HKALE results. The HKALE results to be deemed acceptable for course exemption purpose must be obtained in that particular sitting of HKALE which the University has used to assess the admission qualification of the student concerned.*2. **Minor Programme****A. Applicable to students admitted in 2003-04 and thereafter**

Students are required to complete a minimum of 15 units of MAT courses with at least 9 units of code 3000 or above. Students may also select the following:

- (a) PHY 2601 in place of MAT 2020 (for Physics, Materials Science and Engineering Majors only)
- (b) STA 3007 in place of MAT 4240 (for Statistics and Risk Management Science Majors only)

- (c) ERG 2011, 2012, 2013, 2014, 2015, 2016 or 2017 in place of one of the courses: MAT 2010 or 2310 (for Majors from Faculty of Engineering only) to fulfil the Minor programme requirements.

B. Applicable to students admitted in 2002-03 and before

Students are required to complete a minimum of 15 units of MAT courses with at least 9 units of code 3000 or above. Students may also select the following:

- (a) PHY 2051 in place of MAT 2010 (for Physics Majors only)
- (b) PHY 2252 or 2601 in place of MAT 2020 (for Physics, Materials Science and Engineering Majors only)
- (c) STA 3007 in place of MAT 4240 (for Statistics and Risk Management Science Majors only)
- (d) ERG 2011, 2012, 2013, 2014, 2015, 2016 or 2017 in place of one of the courses: MAT 2010 or 2310 (for Majors from Faculty of Engineering only) to fulfil the Minor programme requirements.

3. *Faculty Language Requirement*

(Please refer to the "Faculty Language Requirement" of Faculty of Science for details.)