Universiteit van Pretoria Jaarboek 2017

BScHons Wiskunde (02240182)

Duur van studie	1 jaar
Totale krediete	135

Programinligting

Hierdie inligting is slegs in Engels beskikbaar.

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Renewal of registration

1. Subject to exceptions approved by the Dean, on the recommendation of the head of department, and in the case of distance education where the Dean formulates the stipulations that will apply, a student may not sit for an examination for the honours degree more than twice in the same module.
2. A student for an honours degree must complete his or her study, in the case of full-time students, within two years and, in the case of after-hours students, within three years of first registering for the degree and, in the case of distance education students, within the period stipulated by the Dean. Under special circumstances, the Dean, on the recommendation of the head of department, may give approval for a limited extension of this period.

In calculating marks, General Regulation G.12.2 applies.

Apart from the prescribed coursework, a research project is an integral part of the study.

Toelatingsvereistes

'n Toepaslike BSc-graad met 'n minimum van 60% vir alle Wiskunde / Toegepaste Wiskunde modules op derde vlak. In die keuringsprosedure sal die kandidaat se volledige voorgraadse akademiese rekord oorweeg word. In die besonder, is dit nodig dat die kandidaat Reële analise en Algebra op derde vlak (elk met 'n punt van minstens 60%) voltooi het.

Bevordering tot volgende studiejaar

The progress of all honours candidates is monitored biannually by the postgraduate coordinator/head of department. A candidate’s study may be terminated if the progress is unsatisfactory or if the candidate is unable to finish his/her studies during the prescribed period.

Slaag met lof

The BScHons degree is awarded with distinction to a candidate who obtains a weighted average of at least 75% in all the prescribed modules and a minimum of 65% in any one module.

Kurrikulum: Finale jaar

Minimum krediete: 135

Kernmodules

Funksionaalanalise 710 (WTW 710)

Modulekrediete	15.00
Voorvereistes	Reële analise op derdejaarvlak
Kontaktyd	2 lesings per week
Onderrigtaal	Module word in Engels aangebied
Akademiese organisasie	Wiskunde en Toegepaste Wisk
Aanbiedingstydperk	Semester 1

Module-inhoud

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An introduction to the basic mathematical objects of linear functional analysis will be presented. These include metric spaces, Hilbert spaces and Banach spaces. Subspaces, linear operators and functionals will be discussed in detail. The fundamental theorems for normed spaces: The Hahn-Banach theorem, Banach-Steinhaus theorem, open mapping theorem and closed graph theorem. Hilbert space theory: Riesz' theorem, the basics of projections and orthonormal sets.

Algebra 731 (WTW 731)

Modulekrediete	15.00
Voorvereistes	Algebra op derdejaarvlak
Kontaktyd	2 lesings per week
Onderrigtaal	Module word in Engels aangebied
Akademiese organisasie	Wiskunde en Toegepaste Wisk
Aanbiedingstydperk	Semester 1

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

The following topics will be covered: Galois theory and solving equations by radicals, introduction to the theory of R-modules, direct sums and products, projectivity and injectivity, finitely generated modules over Euclidean domains, primary factorisation, applications to Jordan and rational canonical forms of matrices.

Maatteorie en waarskynlikheid 734 (WTW 734)

Modulekrediete	15.00
Voorvereistes	Reële analise op derdejaarvlak
Kontaktyd	2 lesings per week
Onderrigtaal	Module word in Engels aangebied

Akademiese organisasie	Wiskunde en Toegepaste Wisk
Aanbiedingstydperk	Semester 1

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Measure and integration theory: The Caratheodory extension procedure for measures defined on a ring, measurable functions, integration with respect to a measure on a σ-ring, in particular the Lebesgue integral, convergence theorems and Fubini's theorem.
Probability theory: Measure theoretic modelling, random variables, expectation values and independence, the Borel-Cantelli lemmas, the law of large numbers. L^1-theory, L^2-theory and the geometry of Hilbert space, Fourier series and the Fourier transform as an operator on L^2, applications of Fourier analysis to random walks, the central limit theorem.

Topologie 790 (WTW 790)

Modulekrediete	15.00
Voorvereistes	Reële analise op derdejaarvlak
Kontaktyd	2 lesings per week
Onderrigtaal	Module word in Engels aangebied
Akademiese organisasie	Wiskunde en Toegepaste Wisk
Aanbiedingstydperk	Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

General topology: Concepts such as convergence, compactness, connectedness, separation axioms and continuity are introduced in topological spaces. Their basic properties are treated. Important topologies like the product topology and the quotient topology are discussed.
Algebraic topology: Homotopy, the fundamental group, covering spaces, homotopy type.

Projek 795 (WTW 795)

Modulekrediete	30.00
Voorvereistes	Geen voorvereistes.
Onderrigtaal	Module word in Engels aangebied
Akademiese organisasie	Wiskunde en Toegepaste Wisk
Aanbiedingstydperk	Jaar

Module-inhoud

Raadpleeg Departement.

Axiomatic set theory and mathematical logic 724 (WTW 724)

Modulekrediete	15.00
Kontaktyd	1 lesing per week

Onderrigtaal	Module word in Engels aangebied
Akademiese organisasie	Wiskunde en Toegepaste Wisk
Aanbiedingstydperk	Semester 1

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Axiomatic set theory, ordinals, transfinite induction and recursion, ordinal arithmetic, the axiom of choice, cardinal arithmetic, the continuum hypothesis. Propositional and first order logic. The completeness and compactness theorems. Decidability, Gödel's incompleteness theorems.

Keusemodules

Stogastiese calculus 764 (WTW 764)

Modulekrediete	15.00
Voorvereistes	WTW 734 of WTW 735
Kontaktyd	2 lesings per week
Onderrigtaal	Module word in Engels aangebied
Akademiese organisasie	Wiskunde en Toegepaste Wisk
Aanbiedingstydperk	Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Mathematical modelling of Random walk. Conditional expectation and Martingales. Brownian motion and other Lévy processes. Stochastic integration. Ito's Lemma. Stochastic differential equations. Application to finance.

Special topics 727 (WTW 727)

Modulekrediete	15.00
Voorvereistes	WTW 710, WTW 731, WTW 734 and WTW 724.
Kontaktyd	1 lesing per week
Onderrigtaal	Module word in Engels aangebied
Akademiese organisasie	Wiskunde en Toegepaste Wisk
Aanbiedingstydperk	Semester 2

Module-inhoud

A selection of special topics will be presented that reflects the expertise of researchers in the Department. The presentation of a specific topic is contingent on student numbers. Consult the website of the Department of Mathematics and Applied Mathematics for more details.

Parsiële differensiaalvergelykings van wiskundige fisika 776 (WTW 776)

Modulekrediete	15.00
Voorvereistes	WTW 710 of WTW 735

Kontaktyd	2 lesings per week
Onderrigtaal	Module word in Engels aangebied
Akademiese organisasie	Wiskunde en Toegepaste Wisk
Aanbiedingstydperk	Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Field-theoretic and material models of mathematical physics. The Friedrichs-Sobolev spaces. Energy methods and Hilbert spaces, weak solutions – existence and uniqueness. Separation of variables, Laplace transform, eigenvalue problems and eigenfunction expansions. The regularity theorems for elliptic forms (without proofs) and their applications. Weak solutions for the heat/diffusion and related equations.

Wiskundige metodes en modelle 772 (WTW 772)

Modulekrediete	15.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	2 lesings per week
Onderrigtaal	Module word in Engels aangebied
Akademiese organisasie	Wiskunde en Toegepaste Wisk
Aanbiedingstydperk	Semester 1

Module-inhoud

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This module aims at using advanced undergraduate mathematics and rigorously applying mathematical methods to concrete problems in various areas of natural science and engineering.
The module will be taught by several lecturers from UP, industry and public sector. The content of the module may vary from year to year and is determined by relevant focus areas within the Department. The list of areas from which topics to be covered will be selected, includes: Systems of differential equations; dynamical systems; discrete structures; Fourier analysis; methods of optimisation; numerical methods; mathematical models in biology, finance, physics, etc.

Eindige-elementmetode 763 (WTW 763)

Modulekrediete	15.00
Voorvereistes	WTW 733 word ten sterkste aanbeveel
Kontaktyd	2 lesings per week
Onderrigtaal	Module word in Engels aangebied
Akademiese organisasie	Wiskunde en Toegepaste Wisk
Aanbiedingstydperk	Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

An analysis as well as an implementation (including computer programs) of methods is covered. Introduction to the theory of Sobolev spaces. Variational and weak formulation of elliptic, parabolic, hyperbolic and eigenvalue problems. Finite element approximation of problems in variational form, interpolation theory in Sobolev spaces, convergence and error estimates.

Numeriese analise 733 (WTW 733)

Modulekrediete	15.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	2 lesings per week
Onderrigtaal	Module word in Engels aangebied
Akademiese organisasie	Wiskunde en Toegepaste Wisk
Aanbiedingstydperk	Semester 1

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

An analysis as well as an implementation (including computer programs) of methods are covered. Numerical linear algebra: Direct and iterative methods for linear systems and matrix eigenvalue problems: Iterative methods for nonlinear systems of equations. Finite difference method for partial differential equations: Linear elliptic, parabolic, hyperbolic and eigenvalue problems. Introduction to nonlinear problems. Numerical stability, error estimates and convergence are dealt with.

Die inligting wat hier verskyn, is onderhewig aan verandering en kan na die publikasie van hierdie inligting gewysig word.. Die Algemene Regulasies (G Regulasies) is op alle fakulteite van die Universiteit van Pretoria van toepassing. Dit word vereis dat elke student volkome vertroud met hierdie regulasies sowel as met die inligting vervat in die Algemene Reëls sal wees. Onkunde betrefffende hierdie regulasies en reels sal nie as ‘n verskoning by oortreding daarvan aangebied kan word nie.