Universiteit van Pretoria Jaarboek 2018

BIngHons Meganiese Ingenieurswese (12240052)

Minimum duur van studie	1 jaar
Totale krediete	128

Programinligting

Verwys ook na Algemene Regulasies G.16 tot G.29.

Die leergang word in oorleg met die betrokke departementshoofde bepaal. 'n Student moet in modules met 'n totaal van minstens 128 krediete slaag.

Die graad word slegs op grond van eksamens toegeken.

Toelatingsvereistes

Behoudens die bepalings van Reg. G.1.3 en G.54 word ‘n BIng-graad of ‘n gelykwaardige kwalifikasie vir toelating vereis.

Ander programspesifieke inligting

'n Beperkte aantal toepaslike modules uit ander departemente word toegelaat.

Nie alle modules wat gelys is, word elke jaar aangebied nie. Raadpleeg asseblief die departementele nagraadse brosjure.

Eksamens en slaagvereistes

i. Die eksamen in elke module wat die student volg, word in die eerste normale eksamentydperk na afsluiting van klasse (dit wil sê Oktober/November of Mei/Junie) afgeneem.
ii. 'n Student vir die honneursgraad moet sy of haar studie in die geval van voltydse studente binne twee jaar, en in die geval van na-uurse studente, binne drie jaar na eerste registrasie vir die graad voltooi, met dien verstande dat die Dekaan, op aanbeveling van die departementshoof, in buitengewone omstandighede 'n vasgestelde beperkte verlenging van die tydperk kan goedkeur.
iii. 'n Student moet in elke module minstens 50% in die eksamen behaal waar 'n semester- of jaarpunt nie vereis word nie. 'n Module mag net een maal herhaal word.
iv. In gevalle waar daar wel 'n semester- of jaarpunt toegeken word, word 'n minimum eksamenpunt van 40% en 'n finale punt van 50% vereis.
v. Geen her- of spesiale eksamens word op nagraadse vlak toegestaan nie.

Slaag met lof

'n Student slaag met lof as hy of sy 'n geweegde gemiddelde van minstens 75% behaal het in die eerste 128 krediete waarvoor geregistreer is (modules wat betyds gestaak is, uitgesluit). Indien die student enige module druip (modules wat betyds gestaak is, uitgesluit), kan die graad nie met lof behaal word nie.

Kurrikulum: Finale jaar

Minimum krediete: 128

Kernmodules

Vliegtuigaandrywing 780 (MAY 780)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Review of thermodynamic cycles applicable to aircraft propulsion with emphasis on turbocharged piston cycles and gas turbine cycles. Optimisation of gas turbine cycles, 2D and 3D turbomachinery design and fluid mechanics and loss mechanisms in gas turbines.

Beheerstelsels 780 (MBB 780)

Modulekrediete	16.00
Voorvereistes	'n Gangbare kennis van MATLAB/OCTAVE
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Introduction to state space methods, full state feedback design, disturbances and tracking systems, linear observers, compensator design by the separation principle, linear quadratic optimum control, Kalman filter, linear quadratic Gaussian compensator.

Nie-vernietigende toetsing 780 (MCT 780)

Modulekrediete	16.00
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese

Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Probabilty, design and management in non-destructive testing (NDT). Fundamental theory of commonly used NDT methods: Ultrasonic testing, Electromagnetic testing (MT and ACFM). Radiographic testing, Penetrant testing, Eddy current testing. Other NDT technologies, including phased array UT, time-of flight diffraction. Digital (RT and Acoustic emission. Monitoring.

Gevorderde eindige elementmetodes 781 (MEE 781)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Non-linear statics: Overview of non-linear effects: geometric, material and boundary conditions. Continuum mechanics: tensors, indicial notation, deformation gradients, stress and strain measures, transformations and rotations, stress-strain relationships, constitutive models. Principles of virtual work. Solution methods: direct iteration, Newton methods, incremental/iterative procedures. Lagrange engineering strains. Large displacement finite element analysis of continua: total Lagrangian formulation. Small strain plasticity: Additive decomposition, flow rule, hardening laws, continuum and consistent tangents.

Megatronika 780 (MEG 780)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	13 lesings per week
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Sensors: mechanical and optical limit switches, encoders, thermocouples, strain gauges, CCD cameras, IR sensors, piezo-electric sensors, capacitive sensors, torque sensors, tactile sensors, gyroscope and ultrasonic sensors. Actuators: DC motors, stepper motors, AC motors, pneumatic actuators, hydraulic actuators, memory shape alloys. Signal conditioning: component interconnection, amplifiers, analogue filters, modulators and demodulators, analogue-digital conversion, sample-and-hold circuitry, multiplexers, software and hardware implementation of digital filters and Wheatstone bridge. Control: H-Bridge motor control, PWM motor control, control of stepper motors, non-linear control of hydraulic and pneumatic actuators, PLCs, SCADA systems, industrial Fieldbus, micro-processor control.

Vibrasiegebaseerde toestandsmonitering 781 (MEV 781)

Modulekrediete	16.00
Voorvereistes	Gangbare kennis van MATLAB/OCTAVE
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Vibration measurement: conventional and optical technique, digital signal processing in vibrations, vibration monitoring: diagnostics and prognostics, artificial intelligence in vibration monitoring, human vibration.

Gevorderde warmte- en massa-oordrag 780 (MHM 780)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Convection correlations: high speed flows, boundary layers, similarity, conservation equations, scale analysis. Thermal radiation: physics, exchange between surfaces, solar, directional characteristics, spectral characteristics, radiation through gasses. Convection, evaporation and boiling: film condensation, film evaporation, pool boiling, forced-convection boiling and condensation, flow regime maps, phase change at low pressures, heatpipes. Heat exchangers: types, regenerators, heat exchanger design. Mass transfer: Fick’s Law, mass diffusion, mass convection, simultaneous heat and mass transfer, porous catalysts. High mass transfer rate theory. Mass exchangers.

Toestandgebaseerde instandhouding 780 (MIC 780)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Module word slegs in Engels aangebied.

Instandhoudingspraktyk 780 (MIP 780)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Failure characteristics and analysis. Maintenance economics – Budgeting and cost control. Life cycle partnering and maintenance contracting. Legal aspects and case study. Performance measurement and benchmarking. Maintenance programming – Network analysis. Variability analysis. Maintenance strategy, plan, and protocol design – a new look at RCM. Maintenance tactic selection techniques. Introduction to condition-based maintenance. Tribology and contamination control presented with case studies. Maintenance Maturity Indexing and Variable Relationships development.

Instandhoudingslogistiek 782 (MIP 782)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	2 lesings per week
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Introduction to Logistics, RAM (Reliability, Maintainability, and Availability), Measures of Logistics, Inventory Systems,
Systems Engineering and Supportability Analysis: Systems Engineering Process, Supportability Analysis,
Aspects of Logistical Design: Logistics in the Design and Development Phase, Just-in-Time Systems, Facility Layout, Job Design and Work Measurement,
Logistics from the Development to the Retirement Phase: Logistics in the Production/Construction Phase, Logistics in the Utilisation and Support Phase,
Planning and Scheduling: Forecasting, Planning, Maintenance Scheduling, Project Management, Theory of Constraints,
Logistics Management: Quality Management, Supply Chain Management, Logistics Management.

Betroubaarheidsingenieurswese 781 (MIR 781)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Introduction to probabilistic distributions, computation of system reliability, building reliability models and optimisation of system reliability; Fault Tree Analysis; Failure Modes, Effects and Criticality Analysis (FMECA), Monte Carlo Simulation; probability-based design.

Lugdinamika 780 (MLD 780)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Review of the fundamentals of thermodynamics. Introduction to compressible flows. Advanced topics in compressible flows: transonic flow and supersonic flow. Oblique shock waves, expansion waves, shock-expansion theory, wave interactions and wave drag. Linearized compressible-flow theory. Effects of heat and friction on gas flow. Design aspects of high speed aeroplanes and viscous effects. Fundamentals of hypersonic flow and high temperature gas dynamics. On completion of this module the student will be able to understand the fundamental phenomena associated with compressible flow and competently apply analytical theory to compressible flow problems

Missiellugdinamika en -ontwerp 781 (MLD 781)

Modulekrediete	16.00
Voorvereistes	(recommended) aircraft design, aerodynamics, flight mechanics
Kontaktyd	21 lesings per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

The aerodynamic discipline of missiles or slender bodies and general configuration design concepts, submarine, airship and munition development. Slender body theory, aerodynamics of bodies, aerodynamics of low aspect ratio wings, vortices, wing body interference, downwash, the wake and wing tail interference, aerodynamic controls, drag, stability derivatives, design considerations, performance, manoeuvering flight, store carriage and separation. Prerequisites for the course are aircraft design, subsonic and supersonic aerodynamics (including the concepts of potential flow, vortex theory, thin aerofoil theory, finite wing theory, compressible gas dynamics and shock wave theory) and flight dynamics.

Eksperimentele metodes 782 (MLD 782)

Modulekrediete	16.00
Voorvereistes	(recommended) any module where experiments are frequent (such as Physics 1)
Kontaktyd	21 lesings per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.
Terminology, Data analysis, Uncertainty, Displacement, Strain, Pressure, Flow measurements Temperature measurements. Emphasis will be placed on the experimental process from calibration through to analyses. Different experimental techniques will be covered to showcase the process.

Onbemande vliegtuigstelsels 783 (MLD 783)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 lesings per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.
Introduction to Unmanned Aerial Systems, applications and examples. System breakdown and major components. Airframe and systems. Core avionics, architecture, flight control, navigation, health monitoring. Mission systems, sensors, weapons and stores, electronic warfare. Aircraft installation and integration. Ground segment, control station, take off / launch support system, landing and recovery. Command and Control, data and video link. Logistic support system. Safety and regulatory elements.

Avionika 784 (MLD 784)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 lesings per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.
Introduction to the functions performed by the avionics system in modern aircraft; the way in which these functions are mapped to the avionics components, starting from a presentation of the major avionics function, and the associated equipment and technologies: Human / Machine Interface, Flight Sensing (attitude, altitude, airspeed), Navigation (INS, SATNAV, Radio Nav), Flight Control and Guidance (autopilot), Radio Communication, Engine Management, Mission Sensors (radar, optronics), Health and Usage Monitoring. The main engineering challenges in Avionics System design, system integration, flight testing, safety justification and certification.

Klimaatreling 780 (MLR 780)

Modulekrediete	16.00

Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Comfort and indoor air quality. Psychometrics. System types and selection. Cooling and heating load calculations: conduction, radiation, convection, internal loads and thermal storage. Design of air handling unit, ducts, plant and reticulation. Control systems. Introduction to integrated system simulation.

Vlugmeganika 780 (MLV 780)

Modulekrediete	16.00
Voorvereistes	Working knowledge of MATLAB/OCTAVE/Python or similar
Kontaktyd	21 lesings per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Drag: friction, pressure, induced, interference, cooling, trim, drag estimation and reduction, piston engines, propellers, gas turbines, turbojet, turboprop and turbofan engines, propfan engines, aircraft performance, take off, climb, level flight, range, flight and manoeuvre envelopes, landing, energy methods, static stability and control: stick fixed, stick free, lateral stability and control, dihedral effect, coupling, dynamic longitudinal stability, short period oscillations, phugoid oscillations, dynamic damping, flight characteristics.

Ontwerpoptimering 780 (MOO 780)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 2

Module-inhoud

Introduction to design and elements of computer aided design. Optimum design problem formulation. Optimum design concepts. *Hierdie inligting is slegs in Engels beskikbaar.
Linear programming methods. Integer programming. Numerical methods for unconstrained and constrained optimum design. Model reduction. Interactive and practical design optimisation.

Breukmeganika 780 (MSF 780)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Historical development; Linear Elastic Fracture Mechanics (LEFM): Stress concentrations and singularities, stress intensity factor, stability of crack propagation; Elasto-plastic fracture mechanics: crack tip plasticity, small scale yielding, measurement of Kic, J-integral; Fatigue crack growth: Paris Law; life prediction; combined mode fracture, strain energy density methods.

Numeriese termostroming 780 (MSM 780)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Fluid Mechanics refresher (governing equations, boundary conditions, application of inviscid, laminar and turbulent flow). Methods of weighted residuals (finite element, finite volume and difference methods). Mesh generation and boundary conditions: Types of mesh structured and unstructured mesh generation and application (inviscid flow, heat conduction etc.). Heat conductions: Governing equations, discretisation, finite approximation, solution methods (Gauss-Seidel, Tri-diagonal matrix algorithm) etc. This module is suited to postgraduate students doing research in thermofluids and who wants to use available CFD codes or who wants to write their own codes to solve fluid mechanics, heat and mass transfer problems.

Numeriese termostroming 781 (MSM 781)

Modulekrediete	16.00

Voorvereistes	MSM 780 Numeriese termostroming 780
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

The Efficient Solvers: Background, muligrid theory and detailed description of the algorithm. Finite Volume method: Understand the governing equations, general form of the transport equations, Gauss's theorem and the finite volume discretisation. Iterative solution algorithm: Pressure-velocity coupling, types of grids, unsteady flows, multiple phases. Finite Volume Discretisation: Diffusion term, convection term and source term for steady flows. Convection-diffusion problems: Boundary conditions, higher order discretisation, accuracy / stability. Solution Algorithm for Pressure-Velocity coupling: SIMPLE, SIMPLER, SIMPLEC and PISO. Laminar, transitional and turbulent flow: Background and theory. Turbulence modelling and examples: Definition of turbulence, turbulence modelling approaches, turbulence models (zero-equation models, one equation, two equation, Reynolds Stress Model (RSM), Large Eddy Simulation, wall function approach), turbulence modelling guidelines. Recent CS developments: Current state of the art in turbulence modelling etc. Viscous boundary meshes: Background and objectives, internal and external flow, turbulence modelling considerations.

Navorsingstudie 732 (MSS 732)

Modulekrediete	32.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	12 ander kontak per week
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

This module allows a student to do research on a certain topic in mechanical or aeronautical engineering, as specified by a lecturer in the Department of Mechanical and Aeronautical Engineering, on an individual basis, under the supervision of that lecturer. The study should be seen as a precursor to the master’s degree research that may follow the honours degree. The total volume of work that is to be invested in this module by an average student must be 320 hours. The body of knowledge studied must be of an advanced nature, at the level of the other postgraduate modules offered by the Department. Normal requirements for assessment that include the use of an external examiner apply to this module also.

Vermoeidheid 780 (MSV 780)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.

Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Fatigue principles addressing both elasticity and plasticity; notch effects; variable amplitude loading conditions; multi-axial fatigue and weld fatigue.

Stromingsleer 780 (MSX 780)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Mathematical preliminaries: historical overview, scalar, vector and tensor algebra (in context of partial differential equations), Green's lemma and the Divergence theorem, Eularian/Lagrangian representations, derivative of a function, Reynolds transport theorem. Governing equations: viscous compressible and incompressible flow, derivation of conservation of mass, derivation of conservation of momentum, boundary conditions, mathematical characteristics, non-dimensionalisation. Viscous compressible and incompressible flow: derivation of conservation of mass, derivation of conservation of momentum, boundary conditions, mathematical characteristics, non-dimensionalisation.

Gevorderde stromingsleer 781 (MSX 781)

Modulekrediete	16.00
Voorvereistes	MSX 780 Stromingsleer780
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Exact solutions: potential flow, Couette flow, Poiseuille flow and combined Couette-Poiseuille flow, laminar boundary layers (similarity solutions for flat plate flow). Stability of laminar flows: introduction, linearised stability, transition to turbulence, approximate prediction of transition. Turbulent flow: Reynolds averaged equations, two-dimensional turbulent-boundary-layer equations, velocity profiles, turbulent flow in ducts, flat plate flow, turbulence modelling.

Gevorderde termodinamika en energiestelsels 780 (MTX 781)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Fundamental concepts of thermodynamics, total flow exergy, restricted dead state and unconstrained equilibrium state, heat transfer, fluid flow and chemical irreversibilities, thermodynamic optimisation, irreversibility distribution ratio, lost exergy, application of entropy generation minimisation (EGM) technique to the fundamentals of power generation, solar power, wind power, and low temperature refrigeration.

Reaktorkoelmiddelvloei en -warmteoordrag 782 (MUA 782)

Modulekrediete	16.00
Voorvereistes	MUA 783 Reaktoringinieurswetenskap 783
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Design of reactor coolant system, heat sources in reactor systems, heat transmission principles, heat transmission in systems with internal sources, temperature distribution along path of reactor coolant flow, heat transfer characteristics of fluids, heat transfer to boiling liquids, heat transfer characteristics of gasses.

Reaktoringenieurswetenskap 783 (MUA 783)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.

Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Atomic structure, nuclear energy and nuclear forces, nuclear fission, nuclear reactions and radiation, energy removal, nuclear reactor systems, radiation protection, radiation shielding, meteorology, reactor safety analysis.

Reaktorfisika 784 (MUA 784)

Modulekrediete	16.00
Voorvereistes	MUA 783 Reaktoringinieurswetenskap 783#
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Probability concepts and nuclear cross sections, multiplication factor and neutron flux, slowing-down process in the infinite medium, diffusion theory the homogeneous one-velocity reactor, Fermi age theory: the homogeneous multi-velocity reactor, transport theory, reflected reactors, reactor kinetics, heterogeneous reactors, control-rod theory.

Reaktormateriaalingenieurswese 785 (MUA 785)

Modulekrediete	16.00
Voorvereistes	MUA 783 Reaktoringinieurswetenskap 783#
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1

Module-inhoud

*Module word slegs in Engels aangebied.

Reaktormateriaalingenieurswese 786 (MUA 786)

Modulekrediete	16.00
Voorvereistes	MAU 785 Reaktormateriaalinginieurswese 785
Kontaktyd	21 kontakure per semester

Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Creep deformation, fracture processes and metallurgical fracture mechanics, fatigue fracture in nuclear materials, fabrication processes of nuclear materials.

Fossielbrandstofkragstasies 781 (MUU 781)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	13 lesings per week
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 2

Module-inhoud

* Hierdie inligting is slegs in Engels beskikbaar.

This module contains a comprehensive study of all mechanical systems and processes of a fossil fuel power station. The module will include the analysis of steam cycles, combined cycle power generation, fuels and combustion, combustion mechanisms, combustion equipment and firing methods, the draught group, steam generators, steam turbines, condenser, feed water and circulating water systems, coal handling, ash handling, compressor plant, water treatment, the importance of HVAC, control and instrumentation, control philosophies and environmental considerations.

Voertuigdinamika 780 (MVI 780)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Tyres: Characteristics and tyre models used in simulation of ride comfort and handling. Road inputs: Classification of roads. Road profiles. Road roughness. Suspension components: springs, dampers. Controllable suspension systems. Modelling aspects. Human reaction: Human response to vibration. Driver models. Human reaction times. Vertical vehicle dynamics (ride comfort): Vibration levels in a vehicle. Simulation of ride comfort. Effect of seat characteristics on vibration levels. Test and evaluation procedures. Lateral vehicle dynamics (handling): Simulation of steady state and dynamic handling. Rollover propensity. Test procedures. Computer applications: Application of computer codes in the analysis of vehicle dynamics.

Numeriese metodes 780 (MWN 780)

Modulekrediete	16.00
Voorvereistes	Geen voorvereistes.
Kontaktyd	21 kontakure per semester
Onderrigtaal	Module word in Engels aangebied
Departement	Meganiese en Lugvaartkundige Ingenieurswese
Aanbiedingstydperk	Semester 1 of Semester 2

Module-inhoud

*Hierdie inligting is slegs in Engels beskikbaar.

Solving systems of linear algebraic equations using direct and iterative methods from small to large scale systems. Numerical solutions of nonlinear systems of equations. Solving eigenvalue problems. Numerical approximation strategies. Numerical differentiation. Numerical Integration. Numerical solutions to initial-value problems for ordinary differential equations. Numerical solutions to boundary-value problems for ordinary differential equations. Numerical solutions to partial-differential equations.