Mathematik

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| **EE7401** | | | | **PROBABILITY & RANDOM PROCESSES** | | | | | | | | | | **3.0 AU** | | |
| Probability concepts. Random variables. Multiple random variables. Sum of random variables and multidimensional distributions. Random Sequences. Probability density function estimation. Random variable simulation. Random processes. Correlation functions. Spectral density. Random processes in linear systems. Optimum linear systems. Nonlinear systems.  Probability Theorie/Wahrscheinlichkeitstheorie (9CP) | | | | | | | | | | | | | | | | |
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| **MH4701** | | | | | **MATHEMATICAL PROGRAMMING** | | | **4.0** | | | **MATH(SPS)** | | | |
| **Prerequisite:** | | | | | **MAS212 & MAS326 OR** | | | | | |  | | | |
|  | | | | | **MTH211 & MTH336 OR** | | | | | |  | | | |
|  | | | | | **MH2100 & MH3701** | | | | | |  | | | |
| **Mutually exclusive with:** | | | | | **MAS445, MTH436** | | | | | |  | | | |
| **Not available to all Programme:** | | | | | **(Admyr 2004-2010)** | | | | | |  | | | |
| Unconstrained optimization: one-dimensional search, gradient method, Newton-Raphson method. Constrained optimization: feasible direction methods, penalty/barrier function methods, modern interior point methods for convex programming. Discrete optimization: formulations, cutting plane methods, branch-and-bound methods, Lagrangian relaxation, dynamic programming approach.  Einführung in die Optimierung (9CP) | | | | | | | | | | | | | | |

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| **MA4804** | **OPTIMIZATION THEORY AND APPLICATIONS** | **3.0** | **ME** |
| **Prerequisite:** | **FE1006 OR** | |  |
|  | **MH1810 OR** | |  |
|  | **CY1201 OR** | |  |
|  | **MH2812** | |  |
| Introduction and Overview; Fundamental Concepts in Optimization; Categorization of Optimization Problems and Methods; Non-Linear Programming; Linear Programming; Discrete Optimization; Software Tools; Multi-Objective Optimization.  Einführung in die Optimierung (9CP) | | | |

Maschinenbau

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| **CV7802** | | | **ADVANCED HYDRODYNAMICS** | | | | | | | | | | | **3.0 AU** |
| Important aspects of fluid dynamics, Potential flow, Linear and nonlinear wave mechanics, Ship waves.  Fortgeschrittene Strömungsmechanik? | | | | | | | | | | | | | | |
| **MA7111** | | | | **ADVANCED SOLID MECHANICS** | | | | | | | **3.0 AU** | | | |
| By using the tensor notation, the first part of the course introduces the boundary value problem which includes (1) equation of the equilibrium (2) compatibility equation and (3) the constitutive equations (linear elastic, linear viscoelastic and plastic materials). The analytical derivation for the one-dimensional (beam bending and torsion) and two-dimensional (plane stain and plane stress) boundary value problems are presented as the second part of the course.  Kontinuumsmechanik 1 (6CP) | | | | | | | | | | | | | | |
| **MA4845** | | | | **MANUFACTURING AUTOMATION** | **3.0** | | | **ME** | |
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| **Mutually exclusive with:** | | | | **MP4F02** | | | |  | |
| **Not available as UE to Programme:** | | | | **ACBS, ACC, ADM, AERO, ASEC, BCE, BCG, BEEC, BIE, BMS, BS, BUS, CBE, CBEC, CE, CEE, CEEC, CHEM, CHIN, CS, CSC, CSEC, CVEC, ECON, EEE, EEEC, EESS, ELH, ENE, ENEC, ENG, HIST, IEEC, IEM, LMS, MAEC, MAT, MATH, ME, ME(DES), ME(MEC), MEEC, MEEC(DES), MEEC(MEC), MS, MTEC, PHIL, PHY, PPGA, PSY, REP, SOC, SSM** | | | |  | |
| In this 39-hour course, students will acquire the basic knowledge of manufacturing automation. The content includes topics on types of manufacturing automation, Additive Manufacturing (AM) and its applications, Computer-aided manufacturing and automatic assembly.  Automatisierung der Fertigung (4CP ), Management industrieller Produktion? (4CP) | | | | | | | | | |
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Elektrotechnik

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| **EE7207** | **NEURAL & FUZZY SYSTEMS** | **3.0 AU** |
| This course contains three major parts. The first part covers fundamental theories and learning methods of a few typical neural networks, including Hopfield neural network, multi-layer perception neural networks, self-organizing map neural networks, radial basis function neural networks, and the recently developed support vector machines. The second part of the course covers fundamental theories of fuzzy logic, fuzzy-logic based learning methods and systems. The third pat will focus on applications of these techniques for solving problems in control, power and energy systems. | | |

Fuzzy-Logik, Neuronale Netze und evolutionäre Algorithmen (4CP)

Informatik

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| **MA4825** | **ROBOTICS** | **3.0** | **ME** |
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| **Mutually exclusive with:** | **MP4006, MP4G02** | |  |
| **Not available to all Programme:** | **(Admyr 2004-2010)-Non Direct Entry, (Admyr 2004-2011), (Admyr 2004-2011)-Direct Entry** | |  |
| Introduction to robotics. Robot actuators and sensing systems. Fundamentals of rigid body motion. Kinematics of robot manipulators. Motion planning and programming. Dynamics and control of robot manipulators. Robotics design and applications  Grundlagen der Robotik () | | | |

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| **LM9001** | **MALAY LANGUAGE LEVEL 1** | **3.0** | **HSS** |
| **Prerequisite:** | **No previous study of the language** | |  |
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| **Mutually exclusive with:** | **HMM1** | |  |
| **Not available as UE to Nationality:** | **ARGENTINA, BULGARIA, INDONESIA, MALAYSIA, PAKISTAN** | |  |
| **Not available as UE to Race:** | **ACHEHNESE, BOYANESE, INDONESIAN, JAVANESE, MALAY, PUNJABI** | |  |
| The course covers: The pronunciation system, basic language patterns and essential vocabulary (words and phrases ) to achieve basic competence in listening, speaking, reading and writing skills; Study of dialogues and graded readings covering common and everyday practices aimed at providing some insight into Malay culture; Basic communication skills such as understanding and conveying simple messages and ideas through lessons on greetings and meeting people, telling of time, numerals, colours and nature; and Writing of postcards, e-mail and beginners' composition in the form of paragraphs. | | | |

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| **MH4320** | | | | | **COMPUTATIONAL ECONOMICS** | **4.0** | | **MATH(SPS)** | | | | |
| **Prerequisite:** | | | | | **MAS215 OR** | | |  | | | | |
|  | | | | | **MTH214 OR** | | |  | | | | |
|  | | | | | **MH2500** | | |  | | | | |
| **Mutually exclusive with:** | | | | | **MAS471, MTH461** | | |  | | | | |
| **Not available to all Programme:** | | | | | **(Admyr 2004-2010)** | | |  | | | | |
| "Introduction to the background of Game Theory "Introduction to the basics of the Theory of Computation "Computation of equilibria (Nash equilibrium, market equilibrium, Walrasian equilibrium etc.) "Algorithmic Mechanism Design "Auction Theory (Vickrey auction, combinatorial auctions, digital-goods auctions, sponsored search auctions) "Profit maximization "Cost sharing mechanisms | | | | | | | | | | | | |
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| **MA4856** | | | **NAVAL ARCHITECTURE AND MARINE ENGINEERING** | | | **3.0** | | **ME** | | |
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| This course introduces Ship Layout & Stability, Ship Structural Strength, Ship Resistance, Ship Propulsion, Marine Power Plants, Advanced Power Plant Technologies, and Ship Service Systems. | | | | | | | | | | |

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| **MA7511** | **DESIGN & ANALYSIS OF EXPERIMENTS** | **3.0 AU** |
| General research methodology. Introduction to probability and statistics. Simple comparative experiments. Experimental design (DOE) with single factor. Factorial designs. Fractional designs. Advanced techniques in DOE including three- and mixed-level fractional factorial designs, response surface method, experiments with random factors, nested and split-plot designs, unbalanced data. | | |

Sehr geehrter Herr Professor Schäfer,   
  
ich studiere zur Zeit CE mit Vertiefung Maschinenbau im siebten Semester Bachelor, ab dem Sommersemester voraussichtlich im Master, und möchte ab August ein Auslandssemester in Singapur verbringen. Für die Bewerbung an der Nanyaang Technological University musste man zehn Kurse angeben, die einen interessieren, und bekommt davon zwei bis fünf zugeteilt. Nun muss ich für das Promos Stipendium ein Learning Agreement abgeben, auf dem alle zehn Kurse vermerkt sind und dafür für die einzelnen Fächer eine Vorabanerkennung der CE-Fachvertreter bekommen.  
  
Aus dem Bereich Maschinenbau interessieren mich folgende Fächer:

* Advanced Hydrodynamics: Important aspects of fluid dynamics, potential flow, linear and nonlinear wave mechanics, ship waves.
  + eventuell vergleichbar mit  fortgeschrittener Strömungsmechanik (6CP)
* Advanced Solid Mechanics: By using the tensor notation, the first part of the course introduces the boundary value problem which includes (1) equation of the equilibrium (2) compatibility equation and (3) the constitutive equations (linear elastic, linear viscoelastic and plastic materials). The analytical derivation for the one-dimensional (beam bending and torsion) and two-dimensional (plane stain and plane stress) boundary value problems are presented as the second part of the course.
  + Kontinuumsmechanik 1 (6CP)
* Manufacturing Automation:In this 39-hour course, students will acquire the basic knowledge of manufacturing automation. The content includes topics on types of manufacturing automation, Additive Manufacturing (AM) and its applications, Computer-aided manufacturing and automatic assembly.
  + Automatisierung der Fertigung (4CP), Management industrieller Produktion (4CP)
* Naval Architecture and Marine Engineering:This course introduces Ship Layout & Stability, Ship Structural Strength, Ship Resistance, Ship Propulsion, Marine Power Plants, Advanced Power Plant Technologies, and Ship Service Systems.
* Design and Analysis of Experiments: General research methodology. Introduction to probability and statistics. Simple comparative experiments. Experimental design (DOE) with single factor. Factorial designs. Fractional designs. Advanced techniques in DOE including three- and mixed-level fractional factorial designs, response surface method, experiments with random factors, nested and split-plot designs, unbalanced data.

Sämtliche Kurse geben dort 3 AU, was vermutlich 8 CP an der TU Darmstadt entspricht.