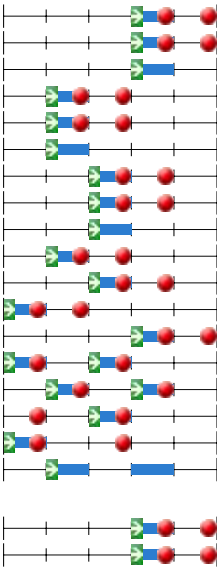
# Program overview

**01-Sep-2009 10:45**

| | |
|---|---|
| **Year** | **2009/2010** |
| **Organization** | **Werktuigbouwkunde, Maritieme Techniek & Technische Materiaalwetenschappen** |
| **Education** | **Pre-Master Mechanical Engineering** |

| Code | Omschrijving | ECTS | p1 \| p2 \| p3 \| p4 \| p5 |
|---|---|---|---|
| **Pre-Master ME 2009** | **Pre-Master Mechanial Engineering 2009** | | |
| WB1216-06 | Dynamics 2 | 3 | |
| *WB1216-06 D1* | *Dynamics 2, Exam* | *2,5* | |
| *WB1216-06 D2* | *Dynamics 2, Practical* | *0,5* | |
| WB1217 | Strength of materials 2 | 3 | |
| *WB1217 D1* | *Strength of Materials 2 - Exam* | *2* | |
| *WB1217 D2* | *Strength of Materials 2 - Practical* | *1* | |
| WB1218-07 | Non Linear Mechanics | 2 | |
| *WB1218-07 D1* | *Non Linear Mechanics - Exam* | *1,5* | |
| *WB1218-07 D2* | *Non Linear Mechanics - Practical* | *0,5* | |
| WB1224 | Thermodynamics 2 | 3 | |
| WB1225 | Fluid Dynamics | 3 | |
| WB2207-07 | Systems and Control Engineering | 3 | |
| WB3550 | Warmte en stofoverdracht | 3 | |
| WI1708TH1 | Analysis 1 | 3 | |
| WI1708TH2 | Analysis 2 | 3 | |
| WI1708TH3 | Analysis 3 | 3 | |
| WI1807TH1 | Linear Algebra 1 | 3 | |
| WI1909TH | Differential Equations | 3 | |
| **Aanvulling HZS-studenten** | **Supplementation HZS-students** | | |
| WB1116 | Dynamics A ME and MT | 4 | |
| WB2104 | Introduction Modelling and Control Engineering | 3 | |



| | |
|---|---|
| **Year** | **2009/2010** |
| **Organization** | **Werktuigbouwkunde, Maritieme Techniek & Technische Materiaalwetenschappen** |
| **Education** | **Pre-Master Mechanical Engineering** |

## Pre-Master ME 2009

| | |
|---|---|
| **Responsible Program Employee** | E.P. van Luik |
| **Contact for Students** | Drs. Evert Vixseboxse,<br>e-mail: e.vixseboxse@tudelft.nl<br>tel. +31 15 278 2996 |
| **Introduction 1** | A candidate with a TH-degree Mechanical Engineering, Vehicle Engineering (Automobieltechniek), Aeronautical Engineering (Luchtvaarttechniek) or a degree of Hogere Zeevaartschool can be admitted to the pre-master program.<br><br>A so-called pre-master program, consisting of a number of second and third year courses of the Mechanical Engineering BSc program has to be followed.<br><br>Candidates are allowed to follow both the pre-master program and some MSc courses. Final admission to the MSc-program is given only after completing the pre-master program.<br><br>Pre-master courses are given in Dutch. A summary of the pre-master program is given below:<br><br>* The TH- and HZS-student can attend courses and tests of the chosen track/specialization, while following the pre-master program.<br>* The TH- and HZS-student is exempted from the internship (15 EC), keeping in mind the earlier study program.<br>* The HZS-student is exempted also from the 6 EC society oriented courses.<br>* In consult with the coordinator of the specialization, a number of courses will be included in the program to comply with the BSc- and MSc- level of the specialization.<br>* The entire study program for the TH-student amounts to 35 + 120 - 15 = 140 EC.<br>* The entire study program for the HZS-student amounts to 42 + 120 - 15 -6 = 141 EC.<br><br>From September 2006 it is possible for Mechanical Engineering students of the Haagse Hogeschool/TH Rijswijk and the Hogeschool Rotterdam to follow a minor program, which gives, after completion of the BEng study, an unconditional admission to the Mechanical Engineering MSc program.<br>This minor involves a significant part of the pre-master program, which can be followed during the third and fourth years of the TH-study.<br>To this end these students will attend lectures, examinations and a project at Delft University during two days per week.<br>The missing part of the pre-master program will be included in the MSc-program instead of the internship.<br>The total study load of the MSc-program is 120 EC in this case. |

| WB1216-06 | Dynamics 2 | 3 |
|---|---|---|
| **Responsible Instructor** | Dr.ir. P.T.L.M. van Woerkom | |
| **Contact Hours / Week x/x/x/x** | 0/0/0/4 | |
| **Education Period** | 4 | |
| **Start Education** | 4 | |
| **Exam Period** | 4<br>5 | |
| **Course Language** | Dutch | |
| **Department** | 3mE Department Precision & Microsystems Engineering | |

| *WB1216-06 D1* | *Dynamics 2, Exam* | *2.5* |
|---|---|---|
| **Responsible Instructor** | Dr.ir. P.T.L.M. van Woerkom | |
| **Education Period** | 4 | |
| **Start Education** | 4 | |
| **Exam Period** | 4<br>5 | |
| **Course Language** | Dutch | |
| **Department** | 3mE Department Precision & Microsystems Engineering | |

| *WB1216-06 D2* | *Dynamics 2, Practical* | *.5* |
|---|---|---|
| **Responsible Instructor** | Ir. M.G. van de Ruijtenbeek | |
| **Education Period** | 4 | |
| **Start Education** | 4 | |
| **Exam Period** | none | |
| **Course Language** | Dutch | |
| **Department** | 3mE Department Precision & Microsystems Engineering | |

| WB1217 | Strength of materials 2 | 3 |
|---|---|---|
| **Responsible Instructor** | Ir. G. Wisse | |
| **Assistent** | Ir. M.G. van de Ruijtenbeek | |
| **Contact Hours / Week x/x/x/x** | 0/3/0/0 | |
| **Education Period** | 2 | |
| **Start Education** | 2 | |
| **Exam Period** | 2<br>3 | |
| **Course Language** | Dutch | |
| **Department** | 3mE Department Precision & Microsystems Engineering | |

| *WB1217 D1* | *Strength of Materials 2 - Exam* | *2* |
|---|---|---|
| **Responsible Instructor** | Ir. G. Wisse | |
| **Education Period** | 2 | |
| **Start Education** | 2 | |
| **Exam Period** | 2<br>3 | |
| **Course Language** | Dutch | |
| **Department** | 3mE Department Precision & Microsystems Engineering | |

| *WB1217 D2* | *Strength of Materials 2 - Practical* | *1* |
|---|---|---|
| **Responsible Instructor** | Ir. M.G. van de Ruijtenbeek | |
| **Education Period** | 2 | |
| **Start Education** | 2 | |
| **Exam Period** | none | |
| **Course Language** | Dutch | |
| **Department** | 3mE Department Precision & Microsystems Engineering | |

| WB1218-07 | Non Linear Mechanics | 2 |
|---|---|---|
| **Responsible Instructor** | Ir. M.G. van de Ruijtenbeek | |
| **Instructor** | Prof.dr.ir. A. van Keulen | |
| **Contact Hours / Week x/x/x/x** | 0/0/3/0 | |
| **Education Period** | 3 | |
| **Start Education** | 3 | |
| **Exam Period** | 3<br>4 | |
| **Course Language** | Dutch | |
| **Department** | 3mE Department Precision & Microsystems Engineering | |

| *WB1218-07 D1* | *Non Linear Mechanics - Exam* | *1.5* |
|---|---|---|
| **Responsible Instructor** | Ir. M.G. van de Ruijtenbeek | |
| **Instructor** | Prof.dr.ir. A. van Keulen | |
| **Education Period** | 3 | |
| **Start Education** | 3 | |
| **Exam Period** | 3<br>4 | |
| **Course Language** | Dutch | |
| **Department** | 3mE Department Precision & Microsystems Engineering | |

| *WB1218-07 D2* | *Non Linear Mechanics - Practical* | *.5* |
|---|---|---|
| **Responsible Instructor** | Ir. M.G. van de Ruijtenbeek | |
| **Contact Hours / Week x/x/x/x** | 0/0/x/0 | |
| **Education Period** | 3 | |
| **Start Education** | 3 | |
| **Exam Period** | none | |
| **Course Language** | Dutch | |
| **Department** | 3mE Department Precision & Microsystems Engineering | |

| WB1224 | Thermodynamics 2 | 3 |
|---|---|---|
| **Responsible Instructor** | Prof.dr.ing. J. Gross | |
| **Contact Hours / Week x/x/x/x** | 0/4/0/0 | |
| **Education Period** | 2 | |
| **Start Education** | 2 | |
| **Exam Period** | 2<br>3 | |
| **Course Language** | Dutch | |
| **Department** | 3mE Department Process & Energy | |

| WB1225 | Fluid Dynamics | 3 |
|---|---|---|
| **Responsible Instructor** | Dr. R. Delfos | |
| **Contact Hours / Week x/x/x/x** | 0/0/6/0 | |
| **Education Period** | 3 | |
| **Start Education** | 3 | |
| **Exam Period** | 3<br>4 | |
| **Course Language** | Dutch | |
| **Required for** | wb3550 (3rd year) | |
| **Expected prior knowledge** | Analysis 1, 2 and 3 | |
| **Course Contents** | Based on a general integral approach the following topics are discussed:<br>The integral balances in their general form<br>Dimensionless numbers, dynamic similarity<br>Couette and Poiseulle flow and their application to lubrication theory<br>Flow through pipes, Moody diagram, loss factors<br>Momentum integral for the boundary layer, drag due to friction<br>Flow around bodies, drag due to pressure forces, lift, instationarity, wing sections<br>Inviscid compressible flow, isentropic flow, shock waves<br>Viscous compressible flow through pipes | |
| **Study Goals** | The student can:<br>1. define, specify and use the following concepts: pressure, velocity, mass- and volume flowrate, momentum, surface tension, cavitation and compressibility.<br>2. derive and apply the laws of hydrostatic equilibrium and Archimedes.<br>3. define and apply the general integral balances (mass-, momentum- and energy balances) for a flow.<br>4. define and apply the general differential balances for mass- and momentum for a flow.<br>5. formulate and apply Bernoulli's law.<br>6. apply dimensional analysis and derive dimensionless numbers for dynamical similarity.<br>7. describe simple flows such as Couette and Poiseuille flow, and apply it to lubrication theory.<br>8. calculate flows (laminar and turbulent) through pipes and pipe systems using friction- and loss factors.<br>9. analyse flows through variable cross-section ducts (diffusor, convergent-divergent channels).<br>10. describe the background of external flow forces on non-streamlined bodies (such as a cylinder) in stationary and instationary flow; calculate drag and lift forces.<br>11. define, specify and use the following concepts: external flow along flat plates; boundary layer under influence of a pressure gradient; separation.<br>12. derive and apply the relations for a one-dimensional compressible flow with and without friction.<br>13. describe the concept of subsonic and supersonic flow, and derive and apply the normal shock. | |
| **Education Method** | Lectures (2/wk) & Instructions (1/wk) | |
| **Literature and Study Materials** | - Fluid Mechanics (F.M. White), 4th - 6th edition, Mc Graw-Hill (via Leeghwater available; this book is also used for the obligatory course 'Heat and Mass transfer' in the third year)<br>- Overheadsheets lectures are published on Blackboard | |
| **Assessment** | Written exam | |
| **Percentage of Design** | 0% | |
| **Department** | 3mE Department Process & Energy | |

| WB2207-07 | Systems and Control Engineering | 3 |
|---|---|---|
| **Responsible Instructor** | Prof.dr. R. Babuska | |
| **Instructor** | Dr.ir. S.W. van der Hoeven | |
| **Instructor** | Dr.ir. P.R. Fraanje | |
| **Contact Hours / Week x/x/x/x** | 4/0/0/0 | |
| **Education Period** | 1 | |
| **Start Education** | 1 | |
| **Exam Period** | 1<br>2 | |
| **Course Language** | Dutch | |
| **Required for** | wb2420 | |
| **Expected prior knowledge** | wb2104 (Systeem- en regeltechniek 1),WB101-05 (Cluster Wiskunde) | |
| **Course Contents** | The course deals with the representation, analysis and control of linear time-invariant dynamic systems.<br>Both the transfer function and state-space models are covered.<br>A strong focus will be on the drawing and interpretation of bode, root-locus and nyquist plots for system stability analysis and feedback control design. In this perspective, the concepts of gain, phase margin, static and dynamic compensation will be taught. Different compensations that get attention are: PD-compensation, lead compensation, PI compensation, Lag compensation and PID compensation.<br>Other control theoretical aspects of sensitivity functions, robustness, time delay, state-space control design and pole placement will also be treated. | |
| **Study Goals** | The student is able to:<br>- Represent a dynamic system as a transfer function and a state-space model.<br>- Analyze the influence of a given controller on the closed-loop dynamics by using the root-locus method.<br>- Sketch a root-locus for simple dynamic systems.<br>- Sketch a Nyquist plot for simple dynamic systems.<br>- Sketch a Bode plot for a given dynamic system.<br>- Analyze the properties of a dynamic system in the frequency domain.<br>- Given requirements on stability margins, design a controller in frequency domain.<br>- Analyze the influence of time delay on the closed-loop performance.<br>- Design a state-feedback controller by pole placement.<br>- Use effectively Matlab and Simulink for control design purposes. | |
| **Education Method** | - Lectures (4 hours per week) including several instructions.<br>- Practical work (2 hours per week for 3 weeks) consisting of Matlab/ Simulink control design and simulation and the implementation of a controller for a DC motor. | |
| **Computer Use** | MATLAB and SIMULINK will be used in the instruction lectures and the practical work. It will be stimulated to check examples from the book and lectures yourself in MATLAB. | |
| **Literature and Study Materials** | Course material:<br>G.F.Franklin, J.D.Powell, A.Emami-Naeini ,Feedback Control of Dynamic Systems, Addison & Wesley, 2006, 4th or 5th edition<br><br>References from literature:<br>J.C.Cool, F.J.Schijff, T.J.Viersma ,Regeltechniek, Delta Press, 1985, 7-e druk.<br>R.C.Dorf, R.H.Bishop A Modern Control Systems, Addison & Wesley, 1998, 8th edition<br>John van de Vegte "Feedback Control Systems" Prentice Hall, 1994, 3rd edition. | |
| **Assessment** | See Dutch description | |
| **Enrolment / Application** | Students need to enroll for this course in BlackBoard in order to participate! | |
| **Remarks** | Participation and successful completion of the practical work is required to obtain a mark for the course. The students are strongly advised to prepare well for the instruction lectures as it is strongly connected to the practical work.<br>During the lectures, instructions and practical work, there will be the possibility of interaction. | |
| **Percentage of Design** | 25% | |
| **Design Content** | Designing control systems and evaluation of performance of the designed systems. | |
| **Department** | 3mE Department Delft Center for Systems and Control | |

| WB3550 | Warmte en stofoverdracht | 3 |
|---|---|---|
| **Responsible Instructor** | Dr. R. Delfos | |
| **Instructor** | Dr.ir. M.J.B.M. Pourquie | |
| **Contact Hours / Week x/x/x/x** | 0/0/0/6 | |
| **Education Period** | 4 | |
| **Start Education** | 4 | |
| **Exam Period** | 4<br>5 | |
| **Course Language** | Dutch | |
| **Required for** | wb1428, wb1427-03, wb1424A | |
| **Expected prior knowledge** | Fluid Mechanics (wb1225), Analysis 1, 2 & 3 (WI 1251 & 1252 & 2253) and Differential Equations (WI2051) | |
| **Course Contents** | The following topics are discussed:<br><br>- Stationary heat transfer, law, of Fourier, cooling fins, Biot number, electric analogon.<br>- Instationary heat transfer, Fourier number, boundary conditions.<br>- Forced convection in pipe and boundary layer flows, Prandtl number.<br>- Free convection.<br>- Radiation, view factors, radiation exchange between gray bodies, spectral distribution.<br>- Condensation, film regimes, pool boiling, boiling regimes.<br>- Mass transfer, law of Fick. | |
| **Study Goals** | The student can:<br>1. Describe and disinguish between the various forms of heat transfer (conduction, radiation and free- and forced convection).<br>2. Derive the differential equation for stationairy heat conduction; solve it for simple geometries, and apply and interpret the solution from a look-up table for more complex geometries.<br>3. Derive the differential equation for instationairy heat conduction; solve it for simple geometries, and apply and interpret the solution from a look-up table for more complex geometries.<br>4. Derive and interpret the general conservation laws (mass balance, momentum balance, conservation of energy) in differential form.<br>5. Apply the conservation laws for simple problems considering forced and free convection including solving the equations.<br>6. Interpret and apply closure relations from the literature (correlations) for convective heat transport.<br>7. Derive and solve the equations for heat transport through radiation, both for 'black' and for 'grey' surfaces. Calculate view factors, and interpret and apply results from a look-up table.<br>8. Distuingish between the various forms of heat transfer through phase change (boiling and condensation) and describe these in terms of laminar and turbulent film transport in case of condensation, and in terms of the various regimes in case of boiling.<br>9. Distinguish between the various forms of mass transport (diffusion, convection) and describe the difference between low and high concentrations. | |
| **Education Method** | Lectures (4 hours per week) / Instructions (2 hours per week) | |
| **Literature and Study Materials** | Heat and Mass Transfer (A.F. Mills), last edition, Prentice-Hall<br>Fluid Mechanics (F.M. White), last edition, Mc Graw-Hill (available through Leeghwater). | |
| **Assessment** | Written exam 'open book' | |
| **Percentage of Design** | 0% | |
| **Department** | 3mE Department Process & Energy | |

| WI1708TH1 | Analysis 1 | 3 |
|---|---|---|
| **Responsible Instructor** | Dr. P.M. Visser | |
| **Contact Hours / Week x/x/x/x** | 4/0/0/0 or 0/0/4/0 | |
| **Education Period** | 1<br>3 | |
| **Start Education** | 1<br>3 | |
| **Exam Period** | 1<br>3 | |
| **Course Language** | Dutch | |

| WI1708TH2 | Analysis 2 | 3 |
|---|---|---|
| **Responsible Instructor** | Dr. P.M. Visser | |
| **Contact Hours / Week x/x/x/x** | 0/4/0/0 of 0/0/0/4 | |
| **Education Period** | 2<br>4 | |
| **Start Education** | 2<br>4 | |
| **Exam Period** | 2<br>4 | |
| **Course Language** | Dutch | |

| WI1708TH3 | Analysis 3 | 3 |
|---|---|---|
| **Responsible Instructor** | Dr. P.M. Visser | |
| **Contact Hours / Week x/x/x/x** | 4/0/0/0 or 0/0/4/0 | |
| **Education Period** | 3 | |
| **Start Education** | 3 | |
| **Exam Period** | 1<br>3 | |
| **Course Language** | Dutch | |

| WI1807TH1 | Linear Algebra 1 | 3 |
|---|---|---|
| **Responsible Instructor** | Dr. B.J. Meulenbroek | |
| **Contact Hours / Week x/x/x/x** | 4/0/0/0 or 0/0/4/0 | |
| **Education Period** | 1 | |
| **Start Education** | 1 | |
| **Exam Period** | 1<br>3 | |
| **Course Language** | Dutch | |

| WI1909TH | Differential Equations | 3 |
|---|---|---|
| **Responsible Instructor** | Drs. I.A.M. Goddijn | |
| **Contact Hours / Week x/x/x/x** | 0/4/0/4 | |
| **Education Period** | 2<br>4 | |
| **Start Education** | 2 | |
| **Course Language** | Dutch | |

| | |
|---|---|
| **Year** | **2009/2010** |
| **Organization** | **Werktuigbouwkunde, Maritieme Techniek & Technische Materiaalwetenschappen** |
| **Education** | **Pre-Master Mechanical Engineering** |

## Aanvulling HZS-studenten

| WB1116 | Dynamics A ME and MT | 4 |
|---|---|---|
| **Responsible Instructor** | I. Paraschiv | |
| **Contact Hours / Week x/x/x/x** | 0/0/0/4 | |
| **Education Period** | 4 | |
| **Start Education** | 4 | |
| **Exam Period** | 4<br>5 | |
| **Course Language** | Dutch | |
| **Department** | 3mE Department Precision & Microsystems Engineering | |

| WB2104 | Introduction Modelling and Control Engineering | 3 |
|---|---|---|
| **Responsible Instructor** | Dr.ir. A.J.J. van den Boom | |
| **Contact Hours / Week x/x/x/x** | 0/0/0/4 | |
| **Education Period** | 4 | |
| **Start Education** | 4 | |
| **Exam Period** | 4<br>5 | |
| **Course Language** | Dutch | |
| **Required for** | wb2207 | |
| **Expected prior knowledge** | None | |
| **Course Contents** | Control of dynamic systems by feedback. System dynamics. Examples from the electricity, fluid mechanics, thermodynamics, mechanics. Linearity of systems. State space representation of systems. Responses of dynamic systems. Convolution and solutions in the Laplace domain. Description of dynamic systems with blockdiagrams ans signal flow diagrams. Poles and zeros of systems to describe the system behaviour. Modelling of dynamic systems. | |
| **Study Goals** | See dutch study goals | |
| **Education Method** | Lectures (4 hours per week) | |
| **Computer Use** | Computer examples in MATLAB are given during the lectures. | |
| **Literature and Study Materials** | `Modeling and control engineering', Lecture notes by Ton van den Boom, 2010. | |
| **Assessment** | Written assessment | |
| **Percentage of Design** | 25% | |
| **Design Content** | The goal is the model system behaviour to enable the control of the system. | |
| **Department** | 3mE Department Delft Center for Systems and Control | |

## Prof.dr. R. Babuska

**Unit** Mech, Maritime & Materials Eng
**Department** Delft Cent for Systems & Contr

**E-mail** R.Babuska@tudelft.nl
**Telephone** +31 (0)15 27 85117
**Room** 8C-3-18

## Dr.ir. A.J.J. van den Boom

**Unit** Mech, Maritime & Materials Eng
**Department** Delft Cent for Systems & Contr

**E-mail** A.J.J.vandenBoom@tudelft.nl
**Telephone** +31 (0)15 27 84052
**Room** 8C-3-09

## Dr. R. Delfos

**Unit** Mech, Maritime & Materials Eng
**Department** Fluid Mechanics

**E-mail** R.Delfos@tudelft.nl
**Telephone** +31 (0)15 27 82963
**Room** 5B-1-32

## Dr.ir. P.R. Fraanje

**Unit** Mech, Maritime & Materials Eng
**Department** Delft Cent for Systems & Contr

**E-mail** P.R.Fraanje@tudelft.nl
**Telephone** +31 (0)15 27 85189
**Room** 8C-2-19-K

## Drs. I.A.M. Goddijn

**Unit** Elektrotechn., Wisk. & Inform.
**Department** Analysis

**Telephone** +31 (0)15 27 86408
**Room** HB 04.240

## Prof.dr.ing. J. Gross

**Unit** Mech, Maritime & Materials Eng
**Department** Engineering Thermodynamics

**E-mail** J.Gross@tudelft.nl
**Telephone** +31 (0)15 27 86658
**Room** 1-10

## Dr.ir. S.W. van der Hoeven

**Unit** Mech, Maritime & Materials Eng
**Department** Delft Cent for Systems & Contr

**Telephone** +31 (0)15 27 81550
**Room** 8C-4-21

## Prof.dr.ir. A. van Keulen

**Unit** Mech, Maritime & Materials Eng
**Department** Fundamentals of Microsystems

**E-mail** A.vanKeulen@tudelft.nl
**Telephone** +31 (0)15 27 86515
**Room** 4B-1-32

## Dr. B.J. Meulenbroek

**Unit** Elektrotechn., Wisk. & Inform.
**Department** Mathematical Physics

**Telephone** +31 (0)15 27 89069
**Room** HB 05.300

## I. Paraschiv

**Unit** Mech, Maritime & Materials Eng
**Department** Fundamentals of Microsystems

**E-mail** I.Paraschiv@tudelft.nl
**Telephone** +31 (0)15 27 86510
**Room** 4A-1-07

## Dr.ir. M.J.B.M. Pourquie


| | |
|---|---|
| **Unit** | Mech, Maritime & Materials Eng |
| **Department** | Fluid Mechanics |
| **E-mail** | M.J.B.M.Pourquie@tudelft.nl |
| **Telephone** | +31 (0)15 27 82997 |
| **Room** | 5B-1-32 |


## Ir. M.G. van de Ruijtenbeek


| | |
|---|---|
| **Unit** | Mech, Maritime & Materials Eng |
| **Department** | Fundamentals of Microsystems |
| **E-mail** | M.G.vandeRuijtenbeek@tudelft.nl |
| **Telephone** | +31 (0)15 27 81278 |
| **Room** | 4A-1-06 |


## Dr. P.M. Visser


| | |
|---|---|
| **Unit** | Elektrotechn., Wisk. & Inform. |
| **Department** | Mathematical Physics |
| **Telephone** | +31 (0)15 27 89071 |
| **Room** | HB 05.120 |


## Ir. G. Wisse


| | |
|---|---|
| **Unit** | Mech, Maritime & Materials Eng |
| **Department** | Fundamentals of Microsystems |
| **E-mail** | G.Wisse@tudelft.nl |
| **Telephone** | +31 (0)15 27 82702 |
| **Room** | 4A-1-06 |


## Dr.ir. P.T.L.M. van Woerkom


| | |
|---|---|
| **Unit** | Mech, Maritime & Materials Eng |
| **Department** | Engineering Dynamics |
| **Telephone** | +31 (0)15 27 82792 |
| **Room** | 4B-1-26-O |


## ontbreekt

E.P. van Luik