

DOUBLE DEGREE MASTER PROGRAM
in Engineering Science/Mechanical Engineering
at Warsaw University of Technology and Technical University Berlin
(WUT/TUB)

COURSE PROGRAM

I SEMESTER

WUT		TUB	
SUBJECT	ECTS	ECTS	SUBJECT
Complex number analysis	4	6	Mathematical methods and basic subjects elective module 1 *
Probability and statistics	4		
Physics	4	6	Mathematical methods and basic subjects elective module 2 *
Analytical mechanics	5	6	Elective subject at thing strong point 1 core module 1**
Automatic control	3	6	Elective subject at thing strong point 1 core module 2**
Machine diagnostics	2		
Numerical methods in mechanics	2		
Integrated manufacturing systems	2	6	Elective subject at thing strong point 2 core module 1**
Elective courses***	4		
SUM	30	30	SUM

(*) – subject in table on page 7

(**) – subject in table on page 8-11

(***) – subject in table on page 5-6

II SEMESTER

WUT		TUB	
SUBJECT	ECTS	ECTS	SUBJECT
Computer modeling in engineering	2	6	Mathematical methods and basic subjects elective module 3*
Optimization of structures	2		
Advanced structural materials	2		
Modelling and testing of machines	6	6	Elective subject at thing strong point 1 core module 3**
Genetic algorithms and neural networks	3	6	Elective subject at thing strong point 2 core module 2**
Selected topics of thermodynamics and fluid dynamics	3		
Safety of technical systems Introduction to robotics	2	6	Elective subject at thing strong point 1 advanced course 1**
Elective courses***	4		
Elective courses***	6	6	Elective subject (free choice)****
SUM	30	30	SUM

(*) – subject in table on page 7

(**) – subject in table on page 8-11

(***) – subject in table on page 5-6

(****) – subject in table on page 7-11

III SEMESTER

WUT		TUB	
SUBJECT	ECTS	ECTS	SUBJECT
Elective courses***	6	6	Elective subject at thing strong point 1 advanced course 2**
Elective courses***	6	6	Elective subject at thing strong point 2 advanced course 1**
Interim project	6	6	Project
Elective courses***	6	6	Elective subject (free choice)****
Elective courses***	6	6	Elective subject (free choice)****
SUM	30	30	SUM

(**) – subject in table on page 8-11

(***) – subject in table on page 5-6

(****) – subject in table on page 7-11

IV SEMESTER

WUT		TUB	
SUBJECT	ECTS	ECTS	SUBJECT
Elective courses***	4	6	Elective subject at thing strong point 2 advanced course 2**
Introduction to labour law	2	6	Elective subject (free choice)****
Elective course HES	2		
Diploma seminar	2		
Master of science thesis	20	18	Master thesis
SUM	30	30	SUM

COURSE PROGRAM DDM 1 YEAR AT WUT 1 YEAR AT TUB

WUT/TUB	ECTS	TUB/WUT	ECTS
1 YEAR	60	1 YEAR	60
1 YEAR	60	1 YEAR	60
TOTAL SUM	120	TOTAL SUM	120

(**) – subject in table on page 8-11

(***) – subject in table on page 5-6

(****) – subject in table on page 7-11

ELECTIVE COURSES DDMP AT WUT

List of Elective Courses	ECTS
Design of automotive suspensions	2
Measurement systems in vehicles	2
Introduction to CAE	2
Computer aided manufacturing	2
Knowledge based systems in engineering design	2
Advanced digital signal analysis	2
Mechanics of composite elements	2
Non-linear problems of FEM	2
Smart structures	2
Recycling of construction machinery and vehicles	2
Dynamic problems of FEM	2
Degradation of load-carrying structures	2
Design of vehicle drives	2
Hyperelastic structural materials	2
Modeling and control of construction machinery	2
Hybrid drives	2
Structural strength calculation in ANSYS	2
Foundations of ecological powertrains	2
Design of low-noise device	2
Movement simulation of vehicles and machines	2
Advanced smart materials in vehicles	2
Combustion and catalysis	2
Active vibration control of vehicles	2
Hydraulic and electric cranes	2
Reduction of vibration and noise of machines	2
Design of bearings and gears in vehicle drive systems	2
Reconstruction of road traffic accidents	2

Engineering problem solving	2
Advanced modeling of construction machines	2
Systems of active safety in vehicles	2
Maintenance and operation of construction machines	2
Statics of structures	2
Mechanics of composite structural elements of vehicle body	2
Digging soil mechanics	2
Object-oriented programming	2
Design of hydraulic systems	2
Advanced applications of CAD systems	2
Distributed mechatronics systems	2
Energy cogeneration in vehicles	2
Identification of noise-vibration environment hazards	2
Thermo-acoustics	2

MODULE CATALOGUE DDMP AT TUB

MODULE CATALOGUE OF MATHEMATICAL METHODS AND BASIC SUBJECTS

List of Mathematical methods and basic subjects	ECTS
Analysis III for engineers	6
Basics of continuum theory I	6
Basics of continuum theory II	6
Numerical methods for engineers II	10
Stochastics for programmers	6
Variational calculus and optimal control	10

**MODULE CATALOGUE OF THE STRONG POINTS
NUMERICS AND SIMULATION**

List of core area (level 1)	ECTS
Procedures of information and communication technology for engineers	6
Basics of industrial information technology	6
Numerical mathematics for engineers II	10
Numerical simulation methods in engineering	6
Numerical thermo- and hydrodynamics – basics (CFD1)	6
Numerical thermo- and hydrodynamics – advanced (CFD2)	6
Project – simulation tools and application	6
Structural dynamics	6
List of advanced courses (level 2)	ECTS
Analysis and simulation of machine tools and processing	6
Visualisation tools in medicine and neurobiology	6
Control theory	10
Methods of informatics in civil engineering	9
Modeling and simulation of traffic flow	6
Multi-agent simulation of traffic flow	6
Numerical simulation of fluid dynamical systems	6
Computational fluid acoustics	6
Computational fluid dynamics for marine systems I	6
Object oriented software development	6
Project in finite element method	6
Computer aided design of marine systems	6
Simulation in automotive industry	6
Simulation and measurement I	6
Simulation and measurement II	6
Modeling of turbulent flow	6

**MODULE CATALOGUE OF THE STRONG POINTS
MECHATRONICS**

List of core area (level 1)	ECTS
Electrical drives	6
Elements of mechatronics	6
Embedded operating systems	6
Basics of measurement and control technique	9
Theory of mechanical oscillations and dynamics of machines	6
Mechatronics and systems dynamics	6
Multi-parameter control in time domain	4,6 or 10
Measurement of vibrations	6
Robotics	6
List of advanced courses (level 2)	ECTS
Analog and digital electronics	6
Automation technology	6
Image guided automation I	6
Digital electronics and microcontroller programming	6
Power electronics	9
Mechatronics in industrial applications	3
Measurement exercises: measurement of mechanical oscillations	2
Oil hydraulic drives and control systems	6
Photonics	6
Vibration isolation and control	6
Simulation I	6
Simulations and measurements I	6
Simulations and measurements II	6
Systems dynamics in industrial applications	3

**MODULE CATALOGUE OF THE STRONG POINTS
SOLID STATE MECHANICS**

List of core area (level 1)	ECTS
Analytical mechanics	6
Introduction into vehicle dynamics / dynamics of rail vehicles	6
Flight dynamics II	6
Basics of continuum theory II	6
Contact mechanics and friction theory	6
Structure-borne noise - basics	6
Theory of mechanical vibrations and machine dynamics	6
Rotor dynamics	6
Structural mechanics II	6
List of advanced courses (level 2)	ECTS
Aero-elasticity	6
Elasticity and plasticity	6
Advanced course of structure-borne noise	6
Material science	6
Mechatronics in industrial applications	3
Mechatronics and system dynamics	6
Nonlinear vibrations	6
Numerical simulations in engineering	6
Project – rolling wheel on flexible ground (terra-mechanics)	6
Project – elasticity and fracture mechanics	6
Project - plasticity and fracture mechanics	6
Project – physics of friction	6
Project - finite element method	6
Vibrations of elastic continuum	6
Vibration isolation and control	6
Structural dynamics	6
System dynamics in industrial applications	3

Composites and composite structures: theory and application	6
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**MODULE CATALOGUE OF THE STRONG POINTS
TECHNICAL ACOUSTICS**

List of core area (level 1)	ECTS
Noise and vibration control	9
Fluid-borne sound – basics	6
Structure-borne sound – basics	6
Fundamentals of aeroacoustics	9
Theory of mechanical vibrations and machine dynamics	6
Measurement technique and signal processing	6
Vibration isolation and vibration control in machines systems	6
List of advanced courses (level 2)	ECTS
Advanced fluid-borne sound	6
Gas turbines and thermo-acoustics	6
Advanced noise and vibration control	9
Basics of thermo- and turbomachinery	6
Advanced structure-borne sound	6
Psychoacoustics, noise effects and urban noise protection	6
Advanced aeroacoustics	6
Nonlinear oscillations	6
Computational aero-acoustics	6
Psychoacoustics	6
Statistical energy analysis	6
Theoretical acoustics	6
Environmental impact of air transport	6