Fachhochschule
Münster University of
Applied Sciences

Faculty of
Applied Physics

Curriculum of
Faculty of Applied Physics

Version 2011

Table of Contents

I Bachelor of Science Engineering Physics – Biomedical Engineering 3
II Bachelor of Science Engineering Physics – Laser Technology 6
III Bachelor of Science Industrial Engineering 9
IV Bachelor of Engineering Orthopaedic Engineering 13
V Bachelor of Engineering Orthopaedic Engineering (dual) 17
VI Master of Science Photonics 21
VII Master of Science Biomedical Engineering 24

I Bachelor of Science Engineering Physics

Specialization: Biomedical Engineering

STRUCTURE OF STUDIES

	Work load	Credit Points
Management Courses	120 h	4
Foreign Languages	120 h	4
Basic Courses	1650 h	55
Major Courses	960 h	32
Specialization Courses	1650 h	55
Professional Internship	450 h	15
Bachelor Thesis	360 h	12
Colloquium	90 h	3

LIST OF COURSES

Management Courses

Name of Courses	Work load	Credit Points
Principles of Business Administration	120 h	4

Foreign Languages

Name of Courses	Work load	Credit Points
Technical English	120 h	4

Basic Courses

Name of Courses	Work load	Credit Points
Applied Mechanics	240 h	8
Chemistry I	60 h	3
Computer Science	270 h	9
Electrical Engineering	240 h	8
Mathematics	390 h	13
Physics	420h	14

Major Courses

Name of Courses	Work load	Credit Points
Analogue and Digital Electronics	270 h	9
Design Engineering	330 h	11
Measurement and Control	360 h	12

Specialization Courses

Name of Courses	Work load	Credit Points
Anatomy and Physiology	180 h	6
Biophysics	210 h	7
Chemistry II	90 h	3
Electrical Biosignals	180 h	6
Materials Engineering	180 h	6
Medical Biochemistry	120 h	4
Medical Devices	210 h	7
Medical Devices: Laws, Regulations and Standards	150 h	5
Medical Physics	180 h	6
Radiology	150 h	5

LIST OF COURSES BY SEMESTER

Semester 1

Name of Courses	L	E	LC	Work Load	Credit Points
Applied Mechanics I	2	1	0	120 h	4
Chemistry I	2	1	0	90 h	3
Computer Science I	2	0	2	150 h	5
Design Engineering I	1	2	0	60 h	2
Mathematics I	5	2	0	210 h	7
Materials Engineering I	2	0	1	90 h	3
Physics I	4	1	0	180 h	6

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 2

Name of Courses	L	E	LC	Work Load	Credit Points
Applied Mechanics II	2	1	0	120 h	4
Chemistry II	2	0	1	90 h	3
Computer Science II	2	0	2	120 h	4
Design Engineering II	1	0	2	60 h	2
Mathematics II	4	1	0	180 h	6
Materials Engineering II	2	0	1	90 h	3
Physics II	4	1	2	240 h	8

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 3

Name of Courses	L	E	LC	Work Load	Credit Points
Anatomy and Physiology	3	1	0	180 h	6
Biophysics	2	1	2	210 h	7
Electrical Engineering	4	1	2	240 h	8
Measurement and Control I	3	1	0	150 h	5
Principles of Business Administration	3	1	0	120 h	4

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 4

Name of Courses	L	E	LC	Work Load	Credit Points
Analogue and Digital Electronics	5	1	2	360 h	9
Electrical Biosignals	2	1	1	180 h	6
Measurement and Control II	3	1	2	210h	7
Medical Devices I	2	0	0	90 h	3
Radiology	2	0	2	150 h	5

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 5

Name of Courses	L	E	LC	Work Load	Credit Points
Design Engineering III / CAD	3	2	0	210 h	7
Medical Biochemistry	2	1	0	120 h	4
Medical Device II	1	0	2	120 h	4
Medical Devices: Laws, Regulations and Standards	2	1	1	150 h	5
Medical Physics	2	1	2	180 h	6
Technical English	2	2	0	120 h	4

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 6

Name of Courses	L	E	LC	Work Load	Credit Points
Professional Internship	0	0	0	450 h	15
Bachelor Thesis	0	0	0	360 h	12
Colloquium	0	0	0	90 h	3

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

II Bachelor of Science Engineering Physics

Specialization: Laser Technology

STRUCTURE OF STUDIES

	Work load	Credit Points
Management Courses	120 h	4
Foreign Languages	120 h	4
Basic Courses	1650 h	55
Major Courses	960 h	32
Specialization Courses	1650 h	55
Professional Internship	450 h	15
Bachelor Thesis	360 h	12
Colloquium	90 h	3

LIST OF COURSES

Management Courses

Name of Courses	Work load	Credit Points
Principles of Business Administration	120 h	4

Foreign Languages

Name of Courses	Work load	Credit Points
Technical English	120 h	4

Basic Courses

Name of Courses	Work load	Credit Points
Applied Mechanics	240 h	8
Chemistry I	60 h	3
Computer Science	270 h	9
Electrical Engineering	240 h	8
Mathematics	390 h	13
Physics	420h	14

Major Courses

Name of Courses	Work load	Credit Points
Analogue and Digital Electronics	270 h	9
Design Engineering	330 h	11
Measurement and Control	360 h	12

Specialization Courses

Name of Courses	Work load	Credit Points
Applied Optics	360 h	12
Computer Aided Simulation	120 h	4
Laser Applications	210 h	7
Materials Engineering and Manufacturing Technology	270 h	9
Mathematics III	150 h	5
Principles of Laser Technology	150 h	5
Quantum Physics	240 h	8
Sensor Technology	150 h	5

LIST OF COURSES BY SEMESTER

Semester 1

Name of Courses	L	E	LC	Work Load	Credit Points
Applied Mechanics I	2	1	0	120 h	4
Chemistry I	2	1	0	90 h	3
Computer Science I	2	0	2	150 h	5
Design Engineering I	1	2	0	60 h	2
Mathematics I	5	2	0	210 h	7
Materials Engineering I	2	0	1	90 h	3
Physics I	4	1	0	180 h	6

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 2

Name of Courses	L	E	LC	Work Load	Credit Points
Applied Mechanics II	2	1	0	120 h	4
Computer Science II	2	0	2	120 h	4
Design Engineering II	1	0	2	60 h	2
Manufacturing Technology	2	0	0	90 h	3
Materials Engineering II	2	0	1	90 h	3
Mathematics II	4	1	0	180 h	6
Physics II	4	1	2	240 h	8

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 3

Name of Courses	L	E	LC	Work Load	Credit Points
Electrical Engineering	4	1	2	240 h	8
Mathematics III	3	1	0	150 h	5
Measurement and Control I	3	1	0	150 h	5
Principles of Business Administration	3	1	0	120 h	4
Quantum Physics	3	1	2	240 h	8

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 4

Name of Courses	L	E	LC	Work Load	Credit Points
Analogue and Digital Electronics	5	1	2	360 h	9
Applied Optics	2	1	0	150 h	5
Computer Aided Simulation	1	0	2	120 h	4
Measurement and Control II	3	1	2	210h	7
Principles of Laser Technology	2	1	0	150 h	5

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 5

Name of Courses	L	E	LC	Work Load	Credit Points
Applied Optics	2	1	2	210 h	7
Design Engineering III / CAD	3	2	0	210 h	7
Laser Applications	3	0	2	210 h	7
Sensor Technology	2	1	1	150 h	5
Technical English	2	2	0	120 h	4

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 6

Name of Courses	L	E	LC	Work Load	Credit Points
Professional Internship	0	0	0	450 h	15
Bachelor Thesis	0	0	0	360 h	12
Colloquium	0	0	0	90 h	3

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

III Bachelor of Science Industrial Engineering

STRUCTURE OF STUDIES

	Work load	Credit Points
Management Courses	930 h	31
Management Integration Course	120 h	4
Management Consolidation Course	120 h	4
Foreign Languages	240 h	8
Basic Courses	1590 h	53
Major Courses	870 h	29
Specialization Courses	630 h	21
Professional Internship	450 h	15
Bachelor Thesis	360 h	12
Colloquium	90 h	3

LIST OF COURSES

Management Courses

Name of Courses	Work load	Credit Points
Business Law	120 h	4
Finance and Controlling	210 h	7
Marketing	210 h	7
Principles of Business Administration	120 h	6
Strategic Management	210 h	7

Management Integration Courses

Name of Courses	Work load	Credit Points
Communication	120 h	4
Operations Management	120 h	4
Principles and Technologies of Scientific Work	120 h	4
Principles of Project Management	120 h	4
Technology and Products	120 h	4
TOPSIM: Enterprise Simulation Game	120 h	4

Management Consolidation Courses

Name of Courses	Work load	Credit Points
Appraisal of Business	120 h	4
Brand Management	120 h	4
Current Topics of Economy	120 h	4
Human Resource Management	120 h	4
International Management	120 h	4
Marketing Research	120 h	4
Patents and Innovations	120 h	4
Principles of Integrated Information Systems	120 h	4
Principles of Taxes	120 h	4

Foreign Languages

Name of Courses	Work load	Credit Points
Business English	120 h	4
Technical English	120 h	4

Basic Courses

Name of Courses	Work load	Credit Points
Applied Mechanics	120 h	4
Computer Science	270 h	9
Electrical Engineering	210 h	7
Mathematics	480 h	16
Physics	510 h	17

Major Courses

Name of Courses	Work load	Credit Points
Analogue and Digital Electronics	270 h	9
Design Engineering	310 h	11
Materials Engineering and Manufacturing Technology	270 h	9

Specialization Courses Technology I

Name of Courses	Work load	Credit Points
Applied Computer Science	210 h	7
Applied Optics	360 h	12
Computer Aided Simulation	120 h	4
Laser Applications	210 h	7
Principles of Laser Technology	150 h	5
Measurement Technology	150 h	5
Sensor Technology	150 h	5

Specialization Courses Technology II

Name of Courses	Work load	Credit Points
Anatomy and Physiology	180 h	6
Chemistry I	90 h	3
Clinical Biomechanics	180 h	6
Medical Biochemistry	120 h	4
Medical Devices	150 h	5
Medical Devices: Laws, Regulations and Standards	150 h	5
Medical Physics	180 h	6
Radiology	150 h	5

LIST OF COURSES BY SEMESTER

Semester 1

Name of Courses	L	E	LC	Work Load	Credit Points
Applied Mechanics	2	1	0	120 h	4
Design Engineering I	1	2	0	60 h	2
Materials Engineering I	2	0	1	90 h	3
Mathematics I	4	2	0	210 h	7
Physics I	3	2	0	240 h	8
Principles of Business Administration	3	3	0	180 h	6

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 2

Name of Courses	L	E	LC	Work Load	Credit Points
Design Engineering II	1	0	2	60 h	2
Finance and Controlling	3	3	0	210 h	7
Manufacturing Technology	2	0	0	90 h	3
Materials Engineering II	2	0	1	90 h	3
Mathematics II	4	2	0	180 h	6
Physics II	3	2	2	270 h	9

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 3

Name of Courses	L	E	LC	Work Load	Credit Points
Business Law	3	1	0	120 h	4
Computer Science I	2	0	2	150 h	5
Design Engineering III	3	2	0	210 h	7
Electrical Engineering	4	1	1	210 h	7
Mathematics III (Statistics)	2	1	0	90 h	3
Technical English	2	2	0	120 h	4

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 4

Name of Courses	L	E	LC	Work Load	Credit Points
Analogue and Digital Electronics	5	1	2	270 h	9
Business English	1	1	0	60 h	2
Computer Science II	2	0	2	120 h	4
Management Integration Course	2	0	2	120 h	4
Marketing	3	3	0	210 h	7
Specialisation Course				120 h	4

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 5

Name of Courses	L	E	LC	Work Load	Credit Points
Business English	1	1	0	60 h	2
Management Consolidation Course	2	2	0	120 h	4
Specialisation Courses				510 h	17
Strategic Management	3	3	0	210 h	7

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 6

Name of Courses	L	E	LC	Work Load	Credit Points
Professional Internship				450 h	15
Bachelor Thesis				360 h	12
Colloquium				90 h	3

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

IV Bachelor of Engineering Orthopaedic Engineering

STRUCTURE OF STUDIES

	Work load	Credit Points
Management Courses	120 h	4
Basic Courses	2040 h	68
Major Courses	2610 h	87
Compulsory Elective Courses	180 h	6
Bachelor Thesis	360 h	12
Colloquium	90 h	3

LIST OF COURSES

Management Courses

Name of Courses	Work load	Credit Points
Principles of Business Administration	120 h	4

Basic Courses

Name of Courses	Work load	Credit Points
Anatomy and Physiology	150 h	5
Applied Mechanics	240 h	8
Computer Science	270 h	9
Electrical Engineering	210 h	7
Introduction to Scientific Working	120 h	4
Materials Engineering	180 h	6
Mathematics	360 h	12
Physics	510h	17

Major Courses

Name of Courses	Work load	Credit Points
Analogue and Digital Electronics	270 h	9
Clinical Biomechanics	270 h	9
Clinical Qualification	120 h	4
Design Engineering	330 h	11
Healthcare Systems and Medical Devices (Laws, Regulations and Standards)	240 h	8
Measurement Technology	180 h	6
Orthopaedic Pathology	150 h	5
Orthopaedic Shoe Making	180 h	6
Orthotics	180 h	6
Prosthetics	180 h	6
Rehabilitation Technology	120 h	4
Signal Processing	120 h	4
Technical Biomechanics	270 h	9

Compulsory Elective Courses

Name of Courses	Work load	Credit Points
Chemistry I	90 h	3
Chemistry II	90 h	3
Electrical Biosignals	180 h	6
Human Resource Management	120 h	4
Marketing Research	120 h	4
Operations Management	120 h	4
Patents and Innovation	120 h	4
Principles of Project Management	120 h	4
Technical English	120 h	4
TOPSIM: Enterprise Simulation Game	120 h	4

LIST OF COURSES BY SEMESTER

Semester 1

Name of Courses	L	E	LC	Work Load	Credit Points
Anatomy and Physiology	3	1	0	150 h	5
Applied Mechanics I	2	1	0	120 h	4
Materials Engineering I	2	0	1	90 h	3
Mathematics I	4	2	0	180 h	6
Physics I	3	2	0	240 h	8
Principles of Business Administration	2	1	0	120 h	4

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 2

Name of Courses	L	S	E	LC	Work Load	Credit Points
Applied Mechanics II	2	0	1	0	120 h	4
Clinical Qualification	1	1	0	2	120 h	4
Introduction in Scientific Working	1	2	1	0	120 h	4
Materials Engineering II	2	0	0	1	90 h	3
Mathematics II	4	0	2	0	180 h	6
Physics II	3	0	2	2	270 h	9

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

Semester 3

Name of Courses	L	S	E	LC	Work Load	Credit Points
Compulsory Elective Course					90 h	3
Computer Science I	2	0	0	2	150 h	5
Design Engineering I	1	0	2	0	60 h	2
Electrical Engineering	4	0	1	1	210 h	7
Orthopaedic Pathology	2	3	0	1	150 h	5
Signal Processing	2	0	1	1	120 h	4
Technical Biomechanics I	2	0	1	1	120 h	4

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

Semester 4

Name of Courses	L	S	E	LC	Work Load	Credit Points
Analogue and Digital Electronics	5	0	1	2	270 h	9
Compulsory Elective Course					90 h	3
Computer Science II	2	0	0	2	120 h	4
Design Engineering II	1	0	0	2	60 h	2
Orthopaedic Shoe Making	1	1	0	3	180 h	6
Technical Biomechanics II	2	0	1	1	150 h	5

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

Semester 5

Name of Courses	L	S	E	LC	Work Load	Credit Points
Clinical Biomechanics	3	0	2	2	270 h	9
Design Engineering III	3	0	2	0	210 h	7
Measurement Technology	0	2	0	2	180 h	6
Medical Devices: Laws, Regulations and Standards	2	0	1	1	150 h	5
Rehabilitation Engineering	1	1	0	2	120 h	4

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

Semester 6

Name of Courses	L	S	E	LC	Work Load	Credit Points
Health Care	2	0	0	0	90 h	3
Orthotics	1	1	0	3	180 h	6
Prosthetics	1	1	0	3	180 h	6
Bachelor Thesis					360 h	12
Colloquium					90 h	3

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

V Bachelor of Engineering Orthopaedic Engineering (dual)

The dual course of studies Bachelor of Engineering Orthopaedic Engineering is a combination of in the job training and scholastics. The student passes an in the job training at four days per week within the first fourteen month. At one day per week the student joins courses at a vocational school. From the third to the sixth semester the student passes courses within the study and continues the in the job training. The in the job training will be finished after the sixth semester and the student continues the studies for the following two semesters.

STRUCTURE OF STUDIES

	Work load	Credit Points
Management Courses	120 h	4
Basic Courses	2040 h	68
Major Courses	2610 h	87
Compulsory Elective Courses	180 h	6
Bachelor Thesis	360 h	12
Colloquium	90 h	3

LIST OF COURSES

Management Courses

Name of Courses	Work load	Credit Points
Principles of Business Administration	120 h	4

Basic Courses

Name of Courses	Work load	Credit Points
Anatomy and Physiology	150 h	5
Applied Mechanics	240 h	8
Computer Science	270 h	9
Electrical Engineering	210 h	7
Introduction to Scientific Working	120 h	4
Materials Engineering	180 h	6
Mathematics	360 h	12
Physics	510h	17

Major Courses

Name of Courses	Work load	Credit Points
Analogue and Digital Electronics	270 h	9
Clinical Biomechanics	270 h	9
Clinical Qualification	120 h	4
Design Engineering	330 h	11
Healthcare Systems and Medical Devices (Laws, Regulations and Standards)	240 h	8
Measurement Technology	180 h	6
Orthopaedic Pathology	150 h	5
Orthopaedic Shoe Making	180 h	6
Orthotics	180 h	6
Prosthetics	180 h	6
Rehabilitation Technology	120 h	4
Signal Processing	120 h	4
Technical Biomechanics	270 h	9

Compulsory Elective Courses

Name of Courses	Work load	Credit Points
Chemistry I	90 h	3
Chemistry II	90 h	3
Electrical Biosignals	180 h	6
Human Resource Management	120 h	4
Marketing Research	120 h	4
Operations Management	120 h	4
Patents and Innovation	120 h	4
Principles of Project Management	120 h	4
Technical English	120 h	4
TOPSIM: Enterprise Simulation Game	120 h	4

LIST OF COURSES BY SEMESTER

Semester 1

Name of Courses	L	E	LC	Work Load	Credit Points
Materials Engineering Ia	0	0	1	30 h	1
Technical Biomechanics I	2	1	1	120 h	4
Design Engineering Ia	0	0	1	30 h	1

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 2

Name of Courses	L	S	E	LC	Work Load	Credit Points
Introduction in Scientific Working	1	2	1	0	120 h	4
Technical Biomechanics II	2	0	1	1	150 h	5

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

Semester 3

Name of Courses	L	E	LC	Work Load	Credit Points
Anatomy and Physiology	3	1	0	150 h	5
Applied Mechanics I	2	1	0	120 h	4
Materials Engineering Ib	2	0	0	60 h	2
Mathematics I	4	2	0	180 h	6
Physics I	3	2	0	240 h	8
Principles of Business Administration	2	1	0	120 h	4

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 4

Name of Courses	L	S	E	LC	Work Load	Credit Points
Applied Mechanics II	2	0	1	0	120 h	4
Clinical Qualification	1	1	0	2	120 h	4
Materials Engineering II	2	0	0	1	90 h	3
Mathematics II	4	0	2	0	180 h	6
Physics II	3	0	2	2	270 h	9

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

Semester 5

Name of Courses	L	S	E	LC	Work Load	Credit Points
Compulsory Elective Course					90 h	3
Computer Science I	2	0	0	2	150 h	5
Design Engineering Ib	1	0	1	0	30 h	1
Electrical Engineering	4	0	1	1	210 h	7
Orthopaedic Pathology	2	3	0	1	150 h	5
Signal Processing	2	0	1	1	120 h	4

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

Semester 6

Name of Courses	L	S	E	LC	Work Load	Credit Points
Analogue and Digital Electronics	5	0	1	2	270 h	9
Compulsory Elective Course					90 h	3
Computer Science II	2	0	0	2	120 h	4
Design Engineering II	1	0	0	2	60 h	2
Orthopaedic Shoe Making	1	1	0	3	180 h	6

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

Semester 7

Name of Courses	L	S	E	LC	Work Load	Credit Points
Clinical Biomechanics	3	0	2	2	270 h	9
Design Engineering III	3	0	2	0	210 h	7
Measurement Technology	0	2	0	2	180 h	6
Medical Devices: Laws, Regulations and Standards	2	0	1	1	150 h	5
Rehabilitation Engineering	1	1	0	2	120 h	4

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

Semester 8

Name of Courses	L	S	E	LC	Work Load	Credit Points
Health Care	2	0	0	0	90 h	3
Orthotics	1	1	0	3	180 h	6
Prosthetics	1	1	0	3	180 h	6
Bachelor Thesis					360 h	12
Colloquium					90 h	3

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

VI Master of Science Photonics

STRUCTURE OF STUDIES

	Work load	Credit Points
Foundations in Mathematics, Natural Science and Technology	870 h	29
Systems	540 h	18
Applications	570 h	19
Compulsory Elective Courses	720 h	24
Master Thesis	750 h	25
Colloquium	150 h	5

LIST OF COURSES

Foundations in Mathematics, Natural Science and Technology

Name of Courses	Language	Work load	Credit Points
Laser Physics	English	210 h	7
Semiconductor Technology*	English	120 h	4
Theoretical Optics	English	210 h	7
Wave and Quantum Optics	English	330 h	11

* Semiconductor Technology and MOEMS Design Using FEM together constitute one module.

Systems

Name of Courses	Language	Work load	Credit Points
MOEMS Design Using FEM*	English	150 h	5
Optical System Design	English	180 h	6
Solid State Laser Engineering	English	210 h	7

* Semiconductor Technology and MOEMS Design Using FEM together constitute one module.

Applications

Name of Courses	Language	Work load	Credit Points
Laser Materials Processing	English	180 h	6
Laser Measurement Technology	English	180 h	6
Optical Measurement Technology	English	210 h	7

Compulsory Elective Courses

Select four courses of the following catalogue

Name of Courses	Language	Work load	Credit Points
Incoherent Light Sources	English	180 h	6
Industrial Image Processing	German	180 h	6
Microscopy and Surface Analysis	German	180 h	6
Nanotechnology	English	180 h	6
Optical Communications	English	180 h	6
Optical Functional Materials	German	180 h	6
Photovoltaics	German	180 h	6
Seminar Paper	English / German	180 h	6

LIST OF COURSES BY SEMESTER

Semester 1

Name of Courses	L	E	LC	Work Load	Credit Points
Compulsory Elective Course				180 h	6
Laser Physics	2	1	2	210 h	7
Optical System Design	2	0	2	180 h	6
Semiconductor Technology	2	1	0	120 h	4
Theoretical Optics	3	2	0	210 h	7

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 2

Name of Courses	L	E	LC	Work Load	Credit Points
Compulsory Elective Courses				320 h	12
Laser Measurement Technology	2	0	2	180 h	6
MOEMS Design Using FEM	2	0	2	150 h	5
Wave Optics	2	1	2	210 h	7

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 3

Name of Courses	L	E	LC	Work Load	Credit Points
Compulsory Elective Course				180 h	6
Laser Materials Processing	2	0	2	180 h	6
Optical Measurement Technology	2	1	2	210 h	7
Solid State Laser Engineering	2	1	2	210 h	7
Quantum Optics	2	1	0	120 h	4

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

Semester 4

Name of Courses	L	E	LC	Work Load	Credit Points
Master Thesis				750 h	25
Colloquium				150 h	5

L = Lecture; E = Exercise; LC = Laboratory course: number of hours per week

VII Master of Science Biomedical Engineering

STRUCTURE OF STUDIES

	Work load	Credit Points
Approximation Courses*		
Major Courses	660 h	22
Compulsory Elective Courses	1440 h	48
Professional Internship	600 h	20
Master Thesis	750 h	25
Colloquium	150 h	5

* Students without knowledge in engineering science or in biomedical have to pass three additional approximation courses. Approximation courses do not allocate credit points.

LIST OF COURSES

Approximation Courses

Student without knowledge in engineering science have to pass three approximation courses from the following list:

Name of Courses	Work load
Analogue and Digital Electronics	270 h
Applied Mechanics	240 h
Computer Science	270 h
Design Engineering	330 h
Electrical Engineering	240 h
Materials Engineering and Manufacturing Technology	270 h
Measurement Technology	150 h

Student without biomedical knowledge have to pass three approximation courses from the following list:

Name of Courses	Work load
Anatomy and Physiology	180 h
Biophysics	210 h
Electrical Biosignals	180 h
Medical Biochemistry	120 h
Medical Devices	120 h
Medical Devices: Laws, Regulations and Standards	150 h
Medical Physics	180 h
Radiology	150 h

Major Courses

Name of Courses	Work load	Credit Points
Biomedical Imaging and Biomedical Image Processing	270 h	9
Biomedical Sensors and Measurement	120 h	4
Biostatistics	120 h	4
Diagnostic and Therapy	150 h	5

Compulsory Elective Courses

Name of Courses	Work load	Credit Points
Applied Optics	360 h	12
Biopharmaceuticals	150 h	5
Bioprocessing	150 h	5
Cardiovascular Engineering	150 h	5
Cell Biology and Signal Transduction	150 h	5
Clinical Laboratory Devices	150 h	5
Clinical Management	150 h	5
Ergonomics	150 h	5
Genetic Engineering	150 h	5
Health Law	150 h	5
Immunology	150 h	5
Integrated Product Development	150 h	5
Principles of Laser Technology	150 h	5
Project Management	150 h	5
Public Health and Health Care Data Processing	150 h	5
Quantum Physics	150 h	5
Selected Topics in Medical Engineering	150 h	5
Study Project	150 h	5
Technical Biomechanics	300 h	10

Practical Internship

Name of Courses	Work load	Credit Points
Laboratory Research Project	600 h	20

LIST OF COURSES BY SEMESTER

Semester 1

Name of Courses	L	S	E	LC	Work Load	Credit Points
Biomedical Imaging	3	1	0	0	150 h	5
Biomedical Sensors and Measurement	3	0	0	0	120 h	4
Compulsory Elective Courses					600 h	20

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

Semester 2

Name of Courses	L	S	E	LC	Work Load	Credit Points
Biomedical Image Processing	2	0	0	2	120 h	4
Biostatistics	2	0	2	0	120 h	4
Compulsory Elective Courses					540 h	18
Diagnostics and Therapy	1	2	0	0	150 h	5

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

Semester 3

Name of Courses	L	S	E	LC	Work Load	Credit Points
Compulsory Elective Courses					300 h	10
Laboratory Research Project					600 h	20

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week

Semester 4

Name of Courses	L	S	E	LC	Work Load	Credit Points
Master Thesis					750 h	25
Colloquium					150 h	5

L = Lecture; S = Seminar; E = Exercise; LC = Laboratory course: number of hours per week