

## Master of Science in Engineering Physics (M.Sc.)

Start in winter and summer semester, PO 2015

	CP ->	3	6	9	12	15	18	21	24	27	30	Summe	
<b>Semester -&gt;</b>	4	<b>Thesis</b>											
	CP	30										<b>30</b>	
	3	Theoretical Methods	Seminar Advanced Topics in EP	<i>Specialization IV</i>			Advanced Research Project (Preparation Master Thesis)						
	CP	6		3	6			15				<b>30</b>	
	2	Advanced Physics II (z. B. Quantenmechanik)	<i>Engineering Sciences III</i>			<i>Specialization II</i>		<i>Specialization III</i>		Tools and Skills in Engineering Sciences			
	CP	6		6			6		6		6		<b>30</b>
	1	Advanced Physics I	Advanced Metrology		<i>Engineering Sciences I</i>			<i>Engineering Sciences II</i>		<i>Specialization I</i>			
	CP	6		6			6		6		6		<b>30</b>

Physics/ Mathematics	Engineering Sciences	Speziali- zation	Laboratory	Manage- ment	<b>Mandatory</b>	<i>compulsory</i>
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(Curriculum when starting in the winter semester)

	CP ->	3	6	9	12	15	18	21	24	27	30	Summe	
Semester ->	4	Thesis											
	CP	30										30	
	3	Advanced Physics II	Seminar fortgeschr. Themen in EP	Spezialisierung IV			Advanced Research Project (Vorbereitung Master Thesis)						
	CP	6	3	6			15					30	
	2	Advanced Physics I (z. B. Quantenmechanik)	Ingenieurwissenschaften III			Spezialisierung II		Spezialisierung III		Management			
	CP	6	6			6		6		6			30
	1	Theoretical Methods	Advanced Metrology		Ingenieurwissenschaften I		Ingenieurwissenschaften II		Spezialisierung I				
	CP	6	6		6		6		6				30

Physik/ Mathematik	Ingenieurwissenschaften	Spezialisierung	Labor	Management	Pflicht	Wahlpflicht
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The field of specialization (Engineering Sciences I – III, Specialization I – IV) consists of [Biomedical Physics & Acoustics](#), [Laser & Optics](#), [Renewable Energies](#).

It is possible to study the program WITH a specialization focus (choose 5 modules Specialization/Engineering Sciences of BMP, A, L&O or RE + 2 modules Specialization/Engineering Sciences from the handbook) or WITHOUT (choose 7 modules Specialization/Engineering). In total: 18 CP Engineering Sciences + 24 CP Specialization. The assignment of lectures to "Engineering Sciences" and "Specialization" is flexible.

Check <http://www.uni-oldenburg.de/ep/> for the module descriptions:

**Advanced Physics I lectures:**

Fluidodynamik (WS I, SS II, 5.04.4071, 6 CP, Peinke)  
Fouriertechniken in der Physik (WS, 5.04.4651, 3 CP, Wollenhaupt) + Ultrashort Laser Pulses (SS, 5.04.4662, 3 CP, Teubner), 6 CP  
Photonics (WS, 5.04.4668, 6 CP, Brückner/Struve)

**Advanced Physics II lectures:**

Theoretische Physik III: Quantenmechanik (M. Ed.) (SS, 5.04.741, 6 KP, Petrovic)  
Kosmologie (SS, 5.04.4539, 3 KP, Kunz) & Akkretionsscheiben (SS, 5.04.1003, 3 KP, Grunau)  
Akustik (SS 5.04.711, 6 KP, van de Par)

**Advanced Physics I and II** are two different modules and 6 CP of each module need to be fulfilled. Other courses like Theoretische Physik (Quantenmechanik) (SS, 5.04.221, 9 CP, Kunz-Drolshagen, Biehs) are possible on request.

**Theoretical Methods lectures:**

Computational Fluid Dynamics (CFD I & II), (SS, 5.04.4072-4075, 6 CP, Peinke/Albensoeder/Stoevesandt)  
Computerorientierte Physik, WS, 5.04.4521, 6 CP, Hartmann)  
Personalized Medicine (from SS 2017, 6 CP, Schmidt)  
Modelling and Simulation (WS, 5.04.4665, 6 CP, Strybny)

**Tools and Skills in Engineering Sciences lectures:**

Tools in advanced photonics (SS 5.04.4665, 6 CP, HS Emden)  
Workshop Management (SS, 5.04.4666, 6 CP, Koch, Reck)  
Economics (WS, 2.12.061, 3 CP, Böhringer)Energy  
Sustainable Supply Chain Management (SS, 2.12.073, 3 CP, Busse)  
International Sustainability Management (WS, 2.12.021/2.12.022, 6 CP, Siebenhüner / Bukowski/Michel)  
Energieökonomik (WS, 2.02.391, 3 CP, Schneider) & Ressourcenökonomik (WS, 2.02.392, 3 CP, Biermann), 5 Places

**Advanced Metrology lectures:**

Lecture series 5.04.4660 (2 SWS) plus ONE additional seminar

- 5.04.4849 Blockpraktikum Psychophysik, Neurosensorik und auditorische Signalverarbeitung (Termin: 17.02.-24.02.2017) (Biomed. Physics and Acoustics)
- 5.04.4221 Grundkurs im Strahlenschutz mit Praktikum (Biomed. Physics and Acoustics)
- 5.04.6610 Modern Methods in Optical Microscopy (Laser & Optics)
- 5.04.6611 Advanced optical spectroscopy (Laser & Optics)
- 5.04.4234 Wind Physics Measurement Project (SS17) (Renewable Energies)
- 5.06.402 Energy Meteorology (Renewable Energies)

**A specialization in Biomedical Physics & Acoustics with focus on Acoustics requires the following:**

**Compulsory lectures in engineering sciences:**

- Psychophysik und Audiologie (WS, 5.04.4021) (6 CP)
- Digital Signal Processing (SS, 5.04.4586) (6 CP)

**Compulsory subjects in specialization:**

- Akustik (SS) (6 CP)

And two of the following (= 12 CP)

- Advanced Topics Speech and Audio Processing (WS, 5.04.4586)(6 CP)
- Prinzipien der Signalverarbeitung in Hörgeräten (WS, 5.04.4204) (3 CP) & Statistical Signal Processing (WS, 5.04.4209) (3 CP)
- Akustische Messtechnik (SS) (3 CP) & Angewandte Psychophysik (WS, 5.04.4203) (3 CP)
- Processing and analysis of biomedical data (WS, 5.04.4207) (6 CP)
- Machine Learning - Probabilistic Unsupervised Learning (WS, 5.04.4213) (6 CP)
- Informationsverarbeitung und Kommunikation (SS) (6 CP)

**Specialization in Renewable Energies requires the following:**

**Compulsory lectures in engineering sciences:**

two of the following lectures (=12CP)

- Energy Systems I (WS, 5.06.501) & Energy Systems II (SS) (6 CP)
- Energy Storage I (WS, 5.06.411) & Energy Storage II (SS) (6 CP)
- Fuzzy-Regelung und kuenstliche neuronale Netze in Robotik und Automation (SS) (6 CP)
- Energy Systems II (SS) & Energy Storage II (SS) (6 CP)
- Digital Signal Processing (SS, 5.04.4586) (6CP)

**Compulsory subjects in specialization:**

three of the following lectures (=18CP)

- Design of Wind Energy Systems & Aeroelastic Simulation of Wind Turbines (SS, 5.04.4235 & 5.04.4236) (6 CP)
- Physikalische Grundlagen der Photovoltaik (WS, 5.04.4063) (6 CP)
- Solar Energy Systems - Electric and Thermal (WS, 5.06.300, / SS, 5.04.4245)) (6 CP)
- Wind Energy I (WS, 5.04.4061) & Wind Energy II (SS) (6 CP)
- Wind Physics Students' Lab (SS, 5.04.4238) (6 CP)
- Smart Grid Management (SS, 2.01.511) (6 CP)
- Advanced Solar Energy Meteorology (SS, 5.04.4064) & Advanced Wind Energy Meteorology (SS, 5.04.4063) (6 CP); nur im SS 2017!

**Specialization in Laser & Optics requires the following:**

**Compulsory lectures in engineering sciences:**

- Applied Photonics I (WS, 5.04.4661 Spectrophysics) und Applied Photonics II (WS, 5.04.457 Fundamentals of Optics) (= 12 CP)

**Compulsory subjects in specialization:**

three of the following (= 18 CP)

- Biophotonics and Spectroscopy (SS, 5.04.4667) (6 CP)
- Laser Design and Beam Guiding (SS, 5.04.4664) (6 CP)
- Laser Material Processing (WS) (6 CP), ab WS 2016/17
- Fiber Technology and Integrated Optics (WS, 5.04.664) (6 CP)
- Physics with Ultrashort Pulses and Intense Light (SS, 5.04.4663) (6 CP)

**Plus two open modules engineering sciences/specialization**

**A specialization in Biomedical Physics with certification as Medical Physician, i.e. the Fachanerkennung DGMP (Deutsche Gesellschaft für Medizinische Physik e.V.) requires the following:**

<b>Gruppe A1:</b>			
mdst. 60 WB-Punkte			
<b>N1. Anatomie und Physiologie</b>		<b>CP (WP)</b>	<b>Semester</b>
05.02.271	Physiologie der Tiere und Menschen (3 von 6!)	3 (24)	WS
05.04.4022	Neurokognition (Neurophysik)	3 (24)	SS
05.04.317	Einführung in die Biomedizinische Physik und Neurophysik	6 (48)	SS, Bachelor
<b>Gruppe A2:</b>			
mdst. 60 WB-Punkte, mdst. 2 Fächer			
		<b>CP</b>	
<b>N3. Biomathematik/informatik/Computational Physics</b>			
02.01.302	Standard und System für Kommunikation in der Medizin	6 (48)	WS
<b>N4. Medizintechnik/ Biomedical engeneering</b>			
02.01.305	Medizintechnik	6 (48)	WS
<b>Gruppe B:</b>		<b>Spezialgebiet</b>	<b>mdst 120 WB-Punkte CP</b>
<b>N6. Strahlentherapie</b>			
05.04.4642	Medizinische Strahlenphysik	3 (24)	SS
05.04.4221	Grundkurs im Strahlenschutz	3 (24)	WS, Bachelor
05.04.4242	Selected Topics on Medical Radiation Physics	3 (24)	SS
05.04.4222	Spezialkurs Strahlenschutzseminar	6 (48)	WS
<b>N9. Klinische Audiologie</b>			
05.04.4021	Psychophysik und Audiologie (PPAA)	6 (48)	WS
05.04.4203	Angewandte Psychophysik	3 (24)	WS
05.04.4586	Advanced Topics Speech and Audio Processing	6 (48)	WS
<b>Wahlgebiete, soweit nicht Spezialgebiet; mdst 120 WB-Punkte. mdst 2 Gebiete mit mdst je 20 WB-Punkten</b>			
<b>N11. Klinisch-medizinische Optik</b>			
05.04.663	Medizinische Optik	3 (24)	WS
<b>N14. Physikalische Messtechniken in der Medizin</b>			

5.04.4586	<i>Digital Signal Processing</i>	6 (48)	SS
05.04.4012	<i>Informationsverarbeitung und Kommunikation</i>	6 (48)	SS
05.04.663	<i>Akustische Messtechnik</i>	3 (24)	SS
05.04.4052	<i>Optische Messtechnik</i>	3 (24)	SS
<b>N17. Bilderzeugung und Bildverarbeitung in der Medizin</b>			
05.04.4021	<i>Bildgebende Verfahren</i>	3 (24)	SS

**In general:**

- All lectures described in in the “old” ([http://www.ep.uni-oldenburg.de/download/Module\\_MA\\_online.pdf](http://www.ep.uni-oldenburg.de/download/Module_MA_online.pdf)) and “new” (PO 2015) ([http://www.uni-oldenburg.de/fileadmin/user\\_upload/physik/stud/ep/15\\_09\\_09\\_Modulhandbuch\\_MA.pdf](http://www.uni-oldenburg.de/fileadmin/user_upload/physik/stud/ep/15_09_09_Modulhandbuch_MA.pdf)) module handbook Engineering Physics M.Sc. can be accepted as Engineering Sciences or Specialization. Other lectures on request.
- Lectures absolved in the Bachelor: If a lecture has been done in the Bachelor, e.g. “Wind Energy Utilisation” and therefore “Wind Energy 1” can’t be accepted, please replace the lecture with another compulsory lecture of the specialization.