Technology
Arts Sciences
TH Köln

# Course Manual BVM

Medical Imaging

Version: 1 | Last Change: 29.09.2019 18:36 | Draft: 0 | Status: vom verantwortlichen Dozent freigegeben

## General information

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|---|---|
| **Long name** | Medical Imaging |
| **Approving CModule** | BMO_BaET, BMO_BaOPT |
| **Responsible** | Prof. Dr. Uwe Oberheide<br>Professor Fakultät IME |
| **Valid from** | summer semester 2023 |
| **Level** | Bachelor |
| **Semester in the year** | summer semester |
| **Duration** | Semester |
| **Hours in self-study** | 78 |
| **ECTS** | 5 |
| **Professors** | Prof. Dr. Uwe Oberheide<br>Professor Fakultät IME |
| **Requirements** | Physics: wave propagation, acoustics, thermodynamics<br>Laser technology: laser types, coherence length, beam shaping<br>light-matter interaction: absorption, scattering, refractive index<br>Detection methods of electromagnetic radiation, simulation options for light propagation<br>Mathematics: integral calculus, Fourier transformation |

### Literature

Dössel - Bildgebende Verfahren in der Medizin, Springer

Kaschke, Donnerhacke, Rill – Optical Devices in Ophthalmology and Optometrie

### Final exam

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|---|---|
| **Details** | Testing the taxonomy levels of understanding and applying by describing interaction processes in an idealized application environment.<br>Testing the taxonomy level of analyzing by means of real use cases to select diagnostic or therapeutic procedures. |
| **Minimum standard** | 50 % of the questions and tasks correctly solved |
| **Exam Type** | EN mündliche Prüfung, strukturierte Befragung |

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| **Language** | German |
| **Separate final exam** | Yes |

## − Lecture / Exercises

### Learning goals

| Goal type | Description |
|---|---|
| Knowledge | Overview of imaging techniques (Ultrasound imaging, X-ray projection method / computer tomography, Magnetic resonance imaging, Posittron emission tomography, Optical (coherence) tomography, Hybrid process of optical and acoustic methods, Scheimpflug imaging)<br>Interaction between radiation and matter (absorption, emission, dispersion, reflection, refractive index, ionization)<br>Areas of application and limitations of individual methods (resolution, imaging vs. penetration depth, image reconstruction algorithms) |
| Skills | Selection of the appropriate procedure by analysis of the advantages and disadvantages<br>Transfer of processes to industrial areas (quality assurance, material testing)<br>apply basic social and ethical values<br>Finding meaningful system boundaries by abstracting the essential aspects of a technical problem |

### Special requirements

none

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|---|---|
| **Accompanying material** | Presentation slides for the lecture<br>Links to Internet resources with basic information |
| **Separate exam** | No |

### Expenditure classroom teaching

| Type | Attendance (h/Wk.) |
|---|---|
| Lecture | 2 |
| Exercises (whole course) | 1 |
| Exercises (shared course) | 0 |
| Tutorial (voluntary) | 0 |

## − Lecture / Exercises

### Learning goals

| Goal type | Description |
|---|---|
| Knowledge | Presentation of a current publication of an english-language professional journal |
| Skills | Procurement of suitable literature/information<br>Familiarisation with new technical field of expertise<br>Use of english technical literature<br>Evaluation of available literature<br>Checking the relevance of information<br>Filtering out essential information and preparing it for the appropriate target group |

### Expenditure classroom teaching

| Type | Attendance (h/Wk.) |
|---|---|
| Seminar | 1 |
| Tutorial (voluntary) | 0 |

### Special requirements

none

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|---|---|
| **Accompanying material** | Links to specialist journals and university library interlibrary loans<br>Current publications from specialist journals |
| **Separate exam** | Yes |

### Separate exam

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|---|---|
| **Exam Type** | EN Fachgespräch (Interview) zu besonderen Fragestellungen (Szenario, Projektaufgabe, Lieraturrecherche) |
| **Details** | Presentation on a given topic with literature research<br>The presentation should be adapted to the previous knowledge of the students of the course and enable a discussion of the content. |
| **Minimum standard** | structured presentation of the most important points with a list of related sources |