Index

Computer-based Statistics ......................................................................................................... 2
Fundamentals of Biomechanics ................................................................................................. 3
Electrical Metrology ................................................................................................................... 4
Applied Mathematics .................................................................................................................. 5
Specific Data Analysis I .............................................................................................................. 7
Advanced Biomechanics............................................................................................................. 8
Neurophysiological Foundations of Human Movement ............................................................ 9
Movement Specific Measurement Methods .............................................................................. 10
Specific Data Analysis II ............................................................................................................ 12
Motor Control and Learning ...................................................................................................... 13
Study Project: Development and Practical Application of Measurement Methods .............. 14
Elective Module(s) 1 ................................................................................................................. 15
Elective Module(s) 2 ................................................................................................................. 16
Rehabilitation Technology / Geriatrics ..................................................................................... 17
Pathomechanics ....................................................................................................................... 18
Ergonomics ............................................................................................................................... 19
Thesis ........................................................................................................................................ 20
<table>
<thead>
<tr>
<th>Module code</th>
<th>Computer-based Statistics</th>
<th>Faculty/Subject/Department</th>
<th>Faculty 06, Department of Sports Science</th>
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<tr>
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<tr>
<td>Prerequisites</td>
<td>None</td>
<td></td>
<td></td>
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<tr>
<td>Learning outcomes</td>
<td>The students use current statistics software to analyse given data sets. The students are familiarised with the editing of data formats for specific analysis purposes. Students can determine the parameters of the applied methods in an appropriate manner. Furthermore, students can interpret the printed results and create simple graphical representations of these results.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Module contents | The students practice the use of the following statistical methods on given example data sets:  
  - Descriptive statistics  
  - Statistical analysis of difference and connection hypotheses with parametric and non-parametric methods  
  - Uni- and multi-factorial analysis of variance  
  - Analysis of variance with repeated measurements | | |
| Percentage share of instruction form(s) | Seminar 50%/Tutorial 50% | | |
| Total workload | 90 hours = 3 ECTS credits | | |
| Course type and title | A courses a contact hours b preparation/revision B autonomous work C examination incl. preparation Sum | | |
| S Seminar “Computer-assisted Statistics” | 15 | 15 | 0 | 0 | 30 |
| T Tutorial “Computer-assisted Statistics I” | 15 | 30 | 10 | 5 | 60 |
| Sum | 30 | 45 | 10 | 5 | 90 |
| Prerequisite(s) for examination | Regular and active participation (minimum 80%) | | |
| Form(s) of assessment | Report of results about the processing of an analytical task | | |
| Contribution to final mark | 100% report of results | | |
| Form of module-component retake examination | Results report of a further analytical task | | |
| Form of module retake examination | Retake examination: oral examination, duration: 45 minutes | | |
| Frequency | Every year duration: 1 semester winter semester: S and T summer semester: | | |
| Intake capacity | 30 | | |
| Language of instruction | German and English | | |
| Additional information: | Guidance on module and required literature: see notice board/date: see course catalogue | | |
## MA-BMB-02: Fundamentals of Biomechanics

<table>
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<th>MA-BMB-02; KMUB-10490 and KMUB-10510</th>
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<td>04 KMUB</td>
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<td>Associated degree course/semester taken</td>
<td>MA BMB/1 + 2</td>
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<td>Cf. German version</td>
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<td>Prerequisites</td>
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</table>

### Learning outcomes

- Biomechanics 1: Clinical biomechanics, multibody systems; sensorimotor functions; gait analysis; introduction into metrology in gait analysis
- Biomechanics 2: Mechanical kinesiology, dynamics; biological materials; modelling of the human being; physical properties of subsegments; contact forces; biomechanics of athletic motion; metrology in biomechanics; data processing; visualization of biomechanical motions

### Module contents

- **Biomechanics 1**: Clinical biomechanics, multibody systems; sensorimotor functions; gait analysis; introduction into metrology in gait analysis
- **Biomechanics 2**: Mechanical kinesiology, dynamics; biological materials; modelling of the human being; physical properties of subsegments; contact forces; biomechanics of athletic motion; metrology in biomechanics; data processing; visualization of biomechanical motions

### Percentage share of instruction form(s)

<table>
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<tr>
<th>Lecture</th>
<th>Laboratory</th>
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<tr>
<td>57%</td>
<td>43%</td>
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### Workload in hours

<table>
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<th>A courses</th>
<th>B autonomous work</th>
<th>C examination incl. preparation</th>
<th>Sum</th>
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<tbody>
<tr>
<td><strong>L1 Biomechanics 1</strong></td>
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<td>30</td>
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<tr>
<td><strong>P1 Biomechanics 1</strong></td>
<td>30</td>
<td>15</td>
<td>15</td>
<td>75</td>
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<tr>
<td><strong>L2 Biomechanics 2</strong></td>
<td>30</td>
<td>30</td>
<td>15</td>
<td>75</td>
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<tr>
<td><strong>P2 Biomechanics 2</strong></td>
<td>15</td>
<td>15</td>
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<td>7</td>
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<tr>
<td><strong>Sum</strong></td>
<td>105</td>
<td>90</td>
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</table>

### Module examination

- **Prerequisite(s) for examination**: Regular and active participation in laboratories
- **Form(s) of assessment (scope)**: Biomechanics 1 and Biomechanics 2, one technical discussion each, lasting approx. 15 minutes
- **Contribution to final mark**: Biomechanics 1: 57%, Biomechanics 2: 43%
- **Form of module component retake examination**: Technical discussion
- **Form of module retake examination**: Retake examination: oral examination with duration of 45 minutes, examining all module content

### Frequency

- Every year, duration: 1 year
- Winter semester: Biomechanics 1 L1 and P1
- Summer semester: Biomechanics 2 L2 and P2

### Intake capacity

- 15

### Language of instruction

- German and English

### Additional information

- Guidance on module and required literature: see notice board/date: see course catalogue
<table>
<thead>
<tr>
<th>MA-BMB-03</th>
<th>Electrical Metrology</th>
<th>1st sem.</th>
<th>6 CP</th>
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<td>Master Biomechanics-Motor Skills-Motion Analysis/1st semester</td>
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<td>Module coordinator</td>
<td>Cf. German version</td>
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</tr>
<tr>
<td>Prerequisites</td>
<td>None</td>
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</tr>
</tbody>
</table>

**Learning outcomes:**
- can plan, prepare, document and analyse results of a practical measurement task and can present the acquired results,
- are familiar with the components of measurement systems and can describe their properties,
- learn the calculation of errors

**Module contents:**
- Fundamental metrology terminology; measurement systems: measurement errors, statistical and dynamical characteristics of measurement systems; measurement chains, transmission behaviour; sensors, fundamentals of computer-assisted metrology
- Laboratory: documentation and reporting, accuracy of measurement systems, sensor circuits; dynamic features of a temperature sensor

**Percentage share of instruction form(s):**
Lecture 50%/Seminar 0%/Tutorial 25%/Laboratory 25%

**Total workload:**
180 hours = 6 ECTS credits

<table>
<thead>
<tr>
<th>Course type and title</th>
<th>A courses</th>
<th>B autonomous work</th>
<th>C examination incl. preparation</th>
<th>Sum</th>
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<tbody>
<tr>
<td>Lecture “Electrical Metrology”</td>
<td>30</td>
<td>15</td>
<td>15</td>
<td>75</td>
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<tr>
<td>Tutorial “Electrical Metrology”</td>
<td>15</td>
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<tr>
<td>Laboratory “Electrical Metrology”</td>
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<td>45</td>
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</table>

**Module examination:**
- Active participation in all laboratory experiments including documentation and reporting of the experiments
- Final examination 90 minutes
- Part 1: 60% contents of lecture, part 2: 40% contents of tutorial and laboratory
- Technical discussion (30 minutes)
- Final examination 90 minutes

**Frequency:**
Every year
duration: 1 semester
fall semester: complete module
summer semester:

**Intake capacity:**
16 (capacity of laboratory), unlimited (capacity of lecture hall)

**Language of instruction:**
German

**Additional information:**
Guidance on module and required literature: see notice board/date: see timetable of department
### MA-BMB-04: Applied Mathematics

<table>
<thead>
<tr>
<th>Course type and title</th>
<th>A courses</th>
<th>B autonomous work</th>
<th>C examination incl. preparation</th>
<th>Sum</th>
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</thead>
<tbody>
<tr>
<td>Lecture “Applied Mathematics”</td>
<td>A contact hours: 60</td>
<td>b preparation/revision: 30</td>
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<td>120</td>
</tr>
<tr>
<td>Seminar 1 “Applied Mathematics”</td>
<td>A contact hours: 0</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Seminar 2 “Applied Mathematics”</td>
<td>A contact hours: 0</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Tutorial Mathematics</td>
<td>A contact hours: 75</td>
<td>B contact hours: 15</td>
<td>C contact hours: 90</td>
<td>190</td>
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<tr>
<td>Matlab</td>
<td>A contact hours: 15</td>
<td>B contact hours: 35</td>
<td>C contact hours: 10</td>
<td>50</td>
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<tr>
<td>Sum</td>
<td>A contact hours: 150</td>
<td>B contact hours: 45</td>
<td>C contact hours: 125</td>
<td>360</td>
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</table>

**Module Examination**

- **Prerequisite(s) for examination**: Written assignments: submission of a detailed, handwritten solution to 15 exercises in part (a); electronic submission of 10 Matlab solutions to exercises.

- **Form(s) of assessment (scope)**: Final examination (120 minutes); written assignments from parts (b) and (c): evaluation of 10 selected handwritten exercises and 5 Matlab solutions.

- **Contribution to final mark**: 70% final examination; 30% evaluated written assignments (2% per assignment). In order to pass, the sum must be ≥ 50%.

- **Form of module-component retake examination**: If the final examination is not passed: oral examination (30 minutes). If the written assignments are not passed: 30 minutes for the solution of an exercise using Matlab (examination conditions without auxiliary means) at a PC including a handwritten approach to the solution.

- **Form of module retake examination**: Final examination (120 minutes) with maximum 100% of the final grade.

**Frequency**: Every year, duration: 1 semester

*Winter semester: lecture and tutorials
  Summer semester:
**Intake capacity** | 24 (capacity of PC-laboratory), unlimited (capacity of lecture hall)
---|---
**Language of instruction** | German
**Additional information** | Guidance on module and required literature: see notice board/date: see timetable of department
### MA-BMB-05: Specific Data Analysis I

<table>
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<tr>
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<th>Sum</th>
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<tbody>
<tr>
<td>Lecture Specific Methods of Data Analysis</td>
<td>30</td>
<td>0</td>
<td>30</td>
<td>90</td>
</tr>
<tr>
<td>Seminar Statistics 1</td>
<td>30</td>
<td>15</td>
<td>15</td>
<td>90</td>
</tr>
<tr>
<td>Programming MATLAB2</td>
<td>30</td>
<td>30</td>
<td></td>
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<tr>
<td>Sum</td>
<td>90</td>
<td>45</td>
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<td>270</td>
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#### Learning outcomes
- Detection of outliers/measurement errors
- Smoothing methods (e.g. moving average, Butterworth)
- Trend analysis
- ARIMA models
- Signal analysis and programming with MATLAB

#### Module contents
- Detection of outliers/measurement errors
- Smoothing methods (e.g. moving average, Butterworth)
- Trend analysis
- ARIMA models
- Signal analysis and programming with MATLAB

#### Prerequisites
None

#### Workload in hours
- Total workload: 270 hours = 9 ECTS credits
- Lecture: 30 hours, Seminar: 30 hours, Tutorial: 30 hours
- Processing of an analytical task: Writing of a report and a Matlab programme

#### Module examination
- Regular and active participation in seminar and tutorials (minimum 80%)
- Processing of an analytical task: Writing of a report and a Matlab programme
- Contribution to final mark: 100% analytical task
- Retake examination: oral examination with duration of 45 minutes, examining all module content

#### Frequency
- Every year: 1 semester
- Winter semester: L, S and T

#### Intake capacity
30

#### Language of instruction
German and English

#### Additional information
Guidance on module and required literature: see notice board/date: see course catalogue
<table>
<thead>
<tr>
<th>Module code/Department</th>
<th>Faculty/Subject/Department</th>
<th>Associated degree course/semester taken</th>
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<th>Prerequisites</th>
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<td>MA-BMB-06; KMUB-10190</td>
<td>04 KMUB</td>
<td>MA BMB/2</td>
<td>Cf. German version</td>
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</table>

### Learning outcomes

Through the comparison of technical designs, structures, phenomena, the students shall be encouraged to develop new biomechanical solutions. The students should have the capability to evaluate and estimate the limitations of technical solutions. Typical applications examples are taken from the areas of technical orthopaedics, prosthetics, and orthotics.

### Module contents

- Materials
- Model making/construction/lightweight design
- Joints
- Optimization strategies
- Technical realizations

### Percentage share of instruction form(s)

Lecture 50%/Laboratory 25%/Tutorial 25%

### Total workload

<table>
<thead>
<tr>
<th>Course type and title</th>
<th>A courses</th>
<th>B autonomous</th>
<th>C examination incl. preparation</th>
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<tr>
<td></td>
<td>a contact hours</td>
<td>b preparation/revision-</td>
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<tr>
<td>L</td>
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<tr>
<td>P</td>
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<td>15</td>
<td>15</td>
<td>45</td>
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<tr>
<td>T</td>
<td>15</td>
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<td>45</td>
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<tr>
<td>Sum</td>
<td>60</td>
<td>30</td>
<td>30</td>
<td>180</td>
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</table>

### Workload in hours

- Prerequisite(s) for examination: Regular and active participation in tutorials and laboratories (minimum 80%)
- Form(s) of assessment (scope): Technical discussion 15 minutes
- Contribution to final mark: 100% technical discussion
- Form of module-component retake examination: Technical discussion
- Form of module retake examination: Retake examination: oral examination with duration of 45 minutes, examining all module content

### Frequency

- Every year, duration: 1 semester, winter semester: L, T and P
- summer semester: L, T and P

### Intake capacity

30

### Language of instruction

German and English

### Additional information

Guidance on module and required literature: see notice board/date: see course catalogue
### Module: Neurophysiological Foundations of Human Movement

**Module code:** MA-BMB-07  
**Faculty/Subject/Department:** BMB  
**Associated degree course/semester taken:** 3rd semester  
**Module coordinator:** Cf. German version  
**Prerequisites:** None

#### Learning outcomes
The students gain a fundamental knowledge in the area of cognitive neuroscience and deepen this knowledge in the areas of perception and action. They have the ability to apply this knowledge to motor learning and the associated consequences for the rehabilitation process.

#### Module contents
- Fundamentals of cognitive neuroscience  
- Perception and action  
- Physiology of motor control  
- Neuroplasticity and motor learning

#### Percentage share of instruction form(s)
Lecture 28%/Seminar 50%/Tutorial 22%

#### Total workload
180 hours = 6 ECTS credits

<table>
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<th>Course type and title</th>
<th>A courses a contact hours</th>
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<th>B autonomous work</th>
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<td>15</td>
<td>10</td>
<td></td>
<td>40</td>
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<tr>
<td>S Specialisation Seminar “Neurophysiology of Motor Skills”</td>
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<td>90</td>
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<tr>
<td><strong>Sum</strong></td>
<td><strong>60</strong></td>
<td><strong>60</strong></td>
<td><strong>40</strong></td>
<td><strong>20</strong></td>
<td><strong>180</strong></td>
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</table>

**Prerequisite(s) for examination:** Successful participation in lecture/oral presentation in specialisation seminar  

**Form(s) of assessment (scope):**  
- Examination (90 minutes)  
- Presentation

**Contribution to final mark:** Grade of examination (50%), grade of oral presentation (50%)

**Form of module-component retake examination:**  
- Examination (90 minutes), Written assignment (10 pages)

**Form of module retake examination:** Examination (90 minutes), examining all module content

**Frequency:** Every semester  
**Duration:** 2 semesters  
**Winter semester: L/T**  
**Summer semester: 5**

**Intake capacity:** L (unlimited) T (30) S (15)

**Language of instruction:** German or English

**Additional information:** Guidance on module and required literature: see notice board / Date: see course catalogue
### Module: Movement Specific Measurement Methods
#### Module Code: MA-BMB-08
#### Faculty/Subject/Department:
Faculty 06/Department of Sports Science/Sports Psychology and Kinesiology

#### Associated degree course/semester taken:
Master Biomechanics-Motor Skills-Motion Analysis/2nd and 3rd semester

#### Module coordinator:
Cf. German version

### Prerequisites
The practical part of the module “General Metrology” has to be completed successfully.

### Learning outcomes
- Measurement methods for the acquisition of external forces, pressure distribution and acceleration
- Optical measurement methods
- Electromyography
- Visual programming language: fundamentals, objects, process structures, data types and data structures
- Data acquisition with a DAQ
- Analysis and illustration of data with corresponding software

### Module contents
- Measurement methods for the acquisition of external forces, pressure distribution and acceleration
- Optical measurement methods
- Electromyography
- Visual programming language: fundamentals, objects, process structures, data types and data structures
- Data acquisition with a DAQ
- Analysis and illustration of data with corresponding software

### Percentage share of instruction form(s)
Lecture 17%/Seminar 33%/Tutorial 50%

### Total workload
270 hours = 9 ECTS credits

<table>
<thead>
<tr>
<th>Course type and title</th>
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<th>C examination incl. preparation</th>
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<tr>
<td>Tutorial “Programming Measurement Data Acquisition”</td>
<td>30</td>
<td>15</td>
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<td>90</td>
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<tr>
<td><strong>Sum</strong></td>
<td><strong>90</strong></td>
<td><strong>75</strong></td>
<td><strong>85</strong></td>
<td><strong>270</strong></td>
</tr>
</tbody>
</table>

### Workload in hours
- Lecture: 15 hours
- Seminar: 30 hours
- Tutorial: 15 hours

### Module examination
- **Prerequisite(s) for examination:** Regular and active participation in tutorials and seminar
- **Form(s) of assessment:** Examination (60 minutes) of L, graded presentation in S, measurement report T1
- **Contribution to final mark:** Examination (50%)/presentation (25%)/measurement report (25%)
- **Form of module-component retake examination:** Examination (60 minutes)/written assignment(10 pages)/re-submission of measurement report
- **Form of module retake examination:** Oral examination regarding content of L, S, T1 (30 minutes)

### Frequency
- Frequency of module: annual
- Duration of module: 2 semesters
- Winter semester: T2
- Summer semester: L, S, T1
<table>
<thead>
<tr>
<th>Intake capacity</th>
<th>L (unlimited) S (30) T (15)</th>
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<tbody>
<tr>
<td>Language of instruction</td>
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<tr>
<td>Additional information</td>
<td>Guidance on module and required literature: see notice board / Date: see course catalogue</td>
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### Module: Specific Data Analysis II

**Module Code:** MA-BMB-09  
**Faculty/Subject/Department:** Faculty 06, Department of Sports Science  
**Associated degree course/semester taken:** MA BMB/3  
**Module coordinator:** Cf. German version  
**Prerequisites:** None

#### Learning outcomes
The students have the ability to estimate expected values for multivariate non-linear interrelations typically occurring in human motions on the basis of measured stochastic parameters. They can calculate the frequency of occurrence of certain results and can apply this in the context of problem-specific inferential statistics. The students have the ability to apply these calculation methods in programming tasks.

#### Module content
- Assessment of expected values
- Monte Carlo method
- Bootstrapping
- Bayesian inference
- Specific analytical methods

#### Percentage share of instruction form(s)
Seminar 100%

#### Total workload
180 hours = 6 ECTS credits

<table>
<thead>
<tr>
<th>Course type and title</th>
<th>A courses (hours)</th>
<th>B autonomous work</th>
<th>C examination incl. preparation</th>
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<tr>
<td></td>
<td>a contact</td>
<td>b preparation/revision</td>
<td></td>
<td></td>
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<tr>
<td>S Seminar “Specific Methods of Data Analysis“</td>
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<td>60</td>
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<tr>
<td>S Seminar “Project Specific Inferential Statistics“</td>
<td>30</td>
<td>30</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>Sum</td>
<td>60</td>
<td>60</td>
<td>15</td>
<td>180</td>
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#### Workload in hours

<table>
<thead>
<tr>
<th>Prerequisite(s) for examination</th>
<th>Regular and active participation (minimum 80%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form(s) of assessment (scope)</td>
<td>Solving of an analytical task: submission of a report</td>
</tr>
<tr>
<td>Contribution to final mark</td>
<td>100% analytical task</td>
</tr>
<tr>
<td>Form of module-component retake examination</td>
<td>Retake of analytical task</td>
</tr>
<tr>
<td>Form of module retake examination</td>
<td>Retake examination: oral examination with duration of 45 minutes, examining all module content</td>
</tr>
</tbody>
</table>

#### Frequency
Every year: duration: 1 semester  
Winter semester: S1, S2  
Summer semester:

#### Intake capacity
30

#### Language of instruction
German and English

#### Additional information
Guidance on module and required literature: see notice board / Date: see course catalogue
MA-BMB-10  Motor Control and Learning  3rd sem.  6 CP

Module code  MA-BMB-10
Faculty/Subject/Department  Faculty 06, Department of Sports Science
Associated degree course/semester taken  BMB/3rd semester
Module coordinator  Cf. German version
Prerequisites  None

Learning outcomes
The students are familiar with the fundamental paradigms of experimental research on motor skills. They learn to understand experimental designs and to develop these autonomously. In the specialisation seminar the students are taught the principles of literature reviewing, including documentation and discussion of results. These principles are then applied by the students in a literature review of the current state of the art in a specific subject.

Module contents
- Motor control of human motion
- Motor learning (fundamentals and application)
- Particular problems of motor development

Percentage share of instruction form(s)  Seminar 100%

<table>
<thead>
<tr>
<th>Course type and title</th>
<th>A courses</th>
<th>B autonomous work</th>
<th>C examination incl. preparation</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>S Seminar Motor Control and Motor Learning</td>
<td>30</td>
<td>10</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>S Specialisation Seminar Motor Skills</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>90</td>
</tr>
<tr>
<td>Sum</td>
<td>60</td>
<td>40</td>
<td>20</td>
<td>180</td>
</tr>
</tbody>
</table>

Prerequisite(s) for examination  Regular and active participation/group examination in S1/oral presentation and written assignment in S2

Form(s) of assessment (scope)  S1: group examination (30 minutes)
S2: presentation, literature review and/or written assignment

Contribution to final mark  Grade of group examination (50%)/grade of written assignment (50%)

Form of module-component retake examination  S1: oral examination (30 minutes)
S2: essayer-submission of written assignment within 4 weeks

Form of module retake examination  Examination (90 minutes)

Frequency  Every year  duration: 2 semester  winter semester: S1
Summer semester: S2

Intake capacity  S1 (30)
S2 (30)

Language of instruction  German or English

Additional information  Guidance on module and required literature: see notice board / Date: see course catalogue
<table>
<thead>
<tr>
<th>MA-BMB-11</th>
<th>Study Project: Development and Practical Application of Measurement Methods</th>
<th>3rd sem.</th>
<th>9 CP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module</strong></td>
<td><strong>Study Project: Development and Practical Application of Measurement Methods</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Module code</strong></td>
<td>MA-BMB-11/KMUB-12900</td>
<td></td>
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</tr>
<tr>
<td><strong>Faculty/Subject/Department</strong></td>
<td>FB 04 KMUB</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Associated degree course/semester taken</strong></td>
<td>Master BMB/3rd semester</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Module coordinator</strong></td>
<td>Cf. German version</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prerequisites</strong></td>
<td>Participation in module MA-BMB-8 “Specific Measuring Methods”</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Learning outcomes</strong></td>
<td>The students will gain experience in academic research work and apply their knowledge in practically oriented projects, i.e. they shall be able to define, plan, prepare, implement and present a scientific project autonomously.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Module contents** | Topics of projects from the areas of:  
• Gait analysis  
• Clinical biomechanics  
• Accident reconstruction/passive safety  
• Ergonomics/rehabilitation technology  
• Technical orthopaedics, prosthetics/orthotics |          |      |
| **Percentage share of instruction form(s)** | Tutorial on principles of academic research work/Seminar 100% |          |      |
| **Workload in hours** | Total workload: 270 hours = 9 ECTS credits |          |      |
| **Course type and title** | A courses  
- a contact hours  
- b preparation/revision  
B autonomous work  
C examination incl. preparation |          |      |
| **Workload** | |          |      |
| **Project Dyna/Kine/Elec** | 90  
180  
270 |          |      |
| **Sum** | 90  
180  
270 |          |      |
| **Prerequisite(s) for examination** | Regular and active participation (minimum 80%) |          |      |
| **Form(s) of assessment (scope)** | Oral presentation 10 minutes, written scientific report, technical discussion 15 minutes |          |      |
| **Contribution to final mark** | Oral presentation 10%, written report 50%, technical discussion 40% |          |      |
| **Form of module-component retake examination** | If grade is between 30% and 50%: English version of scientific work with a scope of 4 pages in publication format |          |      |
| **Form of module retake examination** | Retake examination: oral examination in the scope of 45 minutes about all contents of the module |          |      |
| **Frequency** | Every year  
- duration: 1 semester  
- winter semester:  
- summer semester: project work |          |      |
| **Intake capacity** | 30 |          |      |
| **Language of instruction** | German and English |          |      |
| **Additional information** | Guidance on module and required literature: see notice board / Date: see course catalogue |          |      |
**MA-BMB-12** | **Elective Module(s) 1** |  | 2nd or 3rd sem. | 6 CP
---|---|---|---|---
**Module** | Elective Module(s) I |  |  |  
**Module code** | MA-BMB-12 |  |  |  
**Faculty/Subject/Department** | Faculty 06/Department of Sports Science/Sports Psychology and Kinesiology |  |  |  
**Associated degree course/semester taken** | Master Biomechanics-Motor Skills-Motion Analysis |  |  |  
**Module coordinator** | Cf. German version |  |  |  
**Prerequisites** | None |  |  |  
**Learning outcomes** | The students gain a fundamental knowledge in a broad range of science and engineering disciplines. Since the competences/learning outcomes depend on the chosen modules, these are detailed in the descriptions of the modules which are available for selection. |  |  |  
**Module contents** | The content of the elective modules depends on various factors (number of interested students, availability of lecturers, capacity of laboratory etc.) and can alter each semester. The range of courses usually offered is listed in the catalogue of elective modules. Upon application any module from the range of available courses at the university can be chosen; the examination board decides upon application on the acceptance of the chosen module as an elective module. |  |  |  
**Percentage share of instruction form(s)** | Lecture 0%/Seminar 0%/Tutorial 0% |  |  |  
**Total workload** | 0 hours = 0 ECTS credits |  |  |  
**Course type and title** |  |  |  |  
**A courses** | a contact hours |  |  |  
**B autonomous work** | b preparation/revision |  |  |  
**C examination incl. preparation** |  |  |  |  
**Sum** |  |  |  |  
L | Lecture Title |  |  |  
S1 | Seminar 1 Title |  |  |  
S2 | Seminar 2 Title |  |  |  
T | Tutorial Title |  |  |  
**Sum** |  |  |  |  
**Prerequisite(s) for examination** | See description of particular elective module |  |  |  
**Form(s) of assessment scope** | See description of particular elective module |  |  |  
**Contribution to final mark** | See description of particular elective module |  |  |  
**Form of module-component retake examination** | See description of particular elective module |  |  |  
**Form of module retake examination** | See description of particular elective module |  |  |  
**Frequency** | See description of particular elective module |  |  |  
**Intake capacity** | Depending on particular module |  |  |  
**Language of instruction** | Usually German |  |  |  
**Additional information** | Information on current elective modules can be obtained from the head of the relevant degree course |  |  |  

Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.
Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

<table>
<thead>
<tr>
<th>Module code</th>
<th>Module</th>
<th>2nd sem.</th>
<th>3 CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA-BMB-13</td>
<td>Elective Module(s) 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Module code**

MA-BMB-13

**Faculty/Subject/Department**

FB 04 KMUB

**Associated degree course/semester taken**

Master Biomechanics-Motor Skills-Motion Analysis/2nd semester

**Module coordinator**

Cf. German version

**Prerequisites**

None

**Learning outcomes**

The students gain a fundamental knowledge in a broad range of science and engineering disciplines. Since the competences/learning outcomes depend on the chosen modules, these are detailed in the descriptions of the modules which are available for selection.

**Module content**

The content of the elective modules depends on various factors (number of interested students, availability of lecturers, capacity of laboratory etc.) and can alter each semester. The range of courses usually offered is listed in the catalogue of elective modules. Upon application any module from the range of available courses at the university can be chosen; the examination board decides upon application on the acceptance of the chosen module as an elective module.

**Percentage share of instruction form(s)**

Lecture 0%/Seminar 0%/Tutorial 0%

**Total workload**

0 hours = 0 ECTS credits

<table>
<thead>
<tr>
<th>Course type and title</th>
<th>A courses</th>
<th>B autonomous work</th>
<th>C examination incl. preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a contact hours</td>
<td>b preparation/revision</td>
<td>Sum</td>
</tr>
</tbody>
</table>

**Prerequisite(s) for examination**

See description of particular elective module

**Form(s) of assessment (scope)**

See description of particular elective module

**Contribution to final mark**

See description of particular elective module

**Form of module-component retake examination**

See description of particular elective module

**Form of module retake examination**

See description of particular elective module

**Frequency**

See description of particular elective module

**Intake capacity**

Depending on particular module

**Language of instruction**

Usually German

**Additional information**

Information on current elective modules available at head of degree course
MA-BMB-13a  Rehabilitation Technology / Geriatrics  2nd sem.  3 CP

Module
Rehabilitation Technology / Geriatrics

Module code
KMUB-11850

Faculty/Subject/Department
04 KMUB

Associated degree
course/semester taken
MA BMB/2

Module coordinator
Cf. German version

Prerequisites
None

Learning outcomes
In rehabilitation, the patient’s individual abilities and limitations must be identified in order to ensure a successful integration back into everyday and professional life. This can be achieved by means of a purposeful choice and adaptation of the support resources and of the surroundings. The specific environment of a patient due to particular surroundings must also be considered.

The students gain a profound knowledge of the complex interrelation between limitations and the environment. They can evaluate the current technological status through which the limitations can be compensated. The students can write reports in the form of an expert assessment.

Module content
• Perception
• Disability, support resources, accessibility, mobility
• Rehabilitation; visual impairment - deafness -/age-related disabilities and alteration of sensory perception/motion training; geriatrics, working aids
• Techniques for developing support resources/training methods and education

Percentage share of instruction form(s)
Lecture 50%/Practical training 50%

Workload in hours

<table>
<thead>
<tr>
<th>Course type and title</th>
<th>A courses</th>
<th>B autonomous work</th>
<th>C examination incl. preparation</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>L Rehabilitation Technology</td>
<td>0</td>
<td>15</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>Sum</td>
<td>30</td>
<td>15</td>
<td>30</td>
<td>15</td>
</tr>
</tbody>
</table>

Prerequisite(s) for examination
None

Form(s) of assessment (scope)
Oral examination 30 minutes

Contribution to final mark
Oral examination 100%

Form of module component retake examination
Oral examination

Form of module retake examination
Retake examination: oral examination

Frequency
Every year  duration: 1 year  winter semester:  summer semester: L

Intake capacity
15

Language of instruction
German and English

Additional information
Guidance on module and required literature: see notice board / Date: see course catalogue
### MA-BMB-13b Pathomechanics

**Module**
Pathomechanics

**Module code**
KMUB-11790

**Faculty/Subject/Department**
04 KMUB

**Associated degree course/semester taken**
MA BMB/2

**Module coordinator**
Cf. German version

**Prerequisites**
None

**Learning outcomes**
The aim of accident research is to avoid human injury. In order to achieve this, biomechanical knowledge is required. Such knowledge is also necessary in accident assessment, for which the motion sequence and acting forces need to be evaluated. The students are familiarised with the interrelation between acting forces and tissue damage. The students can geometrically reconstruct a motion sequence in the context of an accident. They are familiar with safety devices which can be used to avoid an overloading of the human body and can an adequate safety device for a corresponding situation.

**Module content**
- Loading behaviour
- Material behaviour
- Morphometrics of injuries
- Accident reconstruction
- Passive safety

**Percentage share of instruction form(s)**
Lecture 67%/Laboratory 33%

**Workload in hours**
<table>
<thead>
<tr>
<th>Course type and title</th>
<th>Total workload</th>
<th>A courses</th>
<th>B autonomous work</th>
<th>C examination incl. preparation</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>90 hours = 3 ECTS credits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L Pathomechanics</td>
<td></td>
<td>30</td>
<td>15</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>P Pathomechanics</td>
<td></td>
<td>15</td>
<td>8</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td></td>
<td>45</td>
<td>23</td>
<td>22</td>
<td>90</td>
</tr>
</tbody>
</table>

**Module examination**

**Prerequisite(s) for examination**
Regular and active participation in laboratories; submission of a scientific report

**Form(s) of assessment (scope)**
Technical discussion 15 minutes

**Contribution to final mark**
Lecture 50% laboratory 25% scientific report 25%

**Form of module-component retake examination**
Retake of scientific report on modified topic

**Form of module retake examination**
Retake examination: oral examination with a duration of 30 minutes, examining all module content

**Frequency**
Every year duration: 1 year
winter semester: L and P
summer semester: L and P

**Intake capacity**
15

**Language of instruction**
German and English

**Additional information**
Guidance on module and required literature: see notice board / Date: see course catalogue
<table>
<thead>
<tr>
<th>MA-BMB-13c</th>
<th>Ergonomics</th>
<th>3rd sem.</th>
<th>3 CP</th>
</tr>
</thead>
</table>

**Module**

- **Module code**: Ma-BMB-13c
- **Faculty/Subject/Department**: FH Gi-Fb FB 21 SuK
- **Associated degree course/semester taken**: Master BMB/3rd semester
- **Module coordinator**: Cf. German version
- **Prerequisites**: None

**Learning outcomes**

The students understand the significance of human beings as factors of production in modern work systems. They shall have the ability to evaluate and design both production-based and administration workplaces with respect to ergonomic aspects.

**Module content**

- Fundamentals of occupational physiology, work psychology and organisational psychology
- Dimensions and motion technology of work design
- Physical work environment and its design
- (Acoustics, lighting, colour, room temperature)
- Information input media
- Information output media
- Software ergonomics
- Legal requirements

**Percentage share of instruction form(s)**

- Lecture 100%

**Workload in hours**

<table>
<thead>
<tr>
<th>Course type and title</th>
<th>A courses</th>
<th>B autonomous work</th>
<th>C examination incl. preparation</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture Ergonomics</td>
<td>30</td>
<td>15</td>
<td>30</td>
<td>90</td>
</tr>
</tbody>
</table>

**Module examination**

- **Prerequisite(s) for examination**: None
- **Form(s) of assessment (scope)**: Examination 90 minutes
- **Contribution to final mark**: Examination: 100%
- **Form of module retake examination**: Retake of examination
- **Frequency**: Every year, duration: 1 semester, winter semester: lecture
- **Intake capacity**: Unlimited (capacity of lecture hall)
- **Language of instruction**: German
- **Additional information**: Guidance on module and required literature: see notice board / Date: see course catalogue
<table>
<thead>
<tr>
<th>MA-BMB-14</th>
<th>Thesis</th>
<th>4th sem.</th>
<th>30 CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module</td>
<td>Thesis</td>
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</tr>
<tr>
<td>Module code</td>
<td>MA-BMB-14; KMUB-12920</td>
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<tr>
<td>Faculty/Subject/Department</td>
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<td></td>
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<tr>
<td>Associated degree course/semester taken</td>
<td>Master Biomechanics-Motor Skills-Motion Analysis/4th semester</td>
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</tr>
<tr>
<td>Module coordinator</td>
<td>Cf. German version</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prerequisites</td>
<td>Successful completion of 1st year of study, successful completion of all projects, plus 15 ECTS credits from 3rd semester</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning outcomes</td>
<td>Ability to work on an autonomously composed project plan which treats a current scientific problem; effective academic working in a project group, defending of own strategies both internally and externally; acquisition of the necessary endurance in order not to let oneself get discouraged in case of unexpected problems and setbacks in scientific projects and in order to come to a solution by considering alternative approaches to the problem; acquisition of the ability to discuss own research results comprehensively in an environment of current international research and to present results in written/oral form.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module content</td>
<td>Corresponding to the topic of the master’s dissertation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage share of instruction form(s)</td>
<td>Project 100%; Tutorial on principles of academic research work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workload in hours</td>
<td>Total workload: 900 hours = 30 ECTS credits; 6 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course type and title</td>
<td></td>
<td>A courses</td>
<td>B autonomous work</td>
</tr>
<tr>
<td>Project</td>
<td></td>
<td>a contact hours</td>
<td>b preparation/revision</td>
</tr>
<tr>
<td></td>
<td></td>
<td>850</td>
<td>50</td>
</tr>
<tr>
<td>Sum</td>
<td>850</td>
<td>50</td>
<td>900</td>
</tr>
<tr>
<td>Prerequisite(s) for examination</td>
<td>A table of contents of between 50 and 100 words must be submitted in German and English prior to the oral examination of the master’s dissertation for the preparation of the transcript of records. This table of contents must be approved by the examining committee.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Form(s) of assessment (scope)</td>
<td>Writing of a master’s dissertation and an oral examination (defence of the dissertation) with duration of between 20 and 30 minutes; the regulations for the master’s dissertation of the general conditions (part I of the examination regulations) must be considered.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contribution to final mark</td>
<td>Weighting: written dissertation (master’s dissertation): 75%; oral examination (defence): 25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Form of module-component retake examination</td>
<td>If the master’s dissertation is not passed: the student will be given four weeks for the resubmission of the dissertation. If the oral examination is not passed: the oral examination has to be retaken.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Form of module retake examination</td>
<td>A master’s dissertation on a new topic must be submitted within 6 months. The dissertation will again be examined with an oral examination.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>Every semester</td>
<td>duration: 6 months</td>
<td></td>
</tr>
<tr>
<td>Intake capacity</td>
<td>Unlimited</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language of instruction</td>
<td>German; upon application, the board of examiners can allow the writing of the master’s dissertation in a foreign language after consulting with the examiners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional information</td>
<td>With approval of the board of examiners, the practical aspect of the master’s dissertation can also be conducted in an appropriate external institution (“external dissertation”)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Literature</td>
<td>current academic literature regarding the scientific topic</td>
<td></td>
<td></td>
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</tbody>
</table>