

# Course Package

## Neural & Motor Systems

Name module	Neural & Motor Systems
Educational programme	MSc Biomedical Engineering
Period	First quartile of the first semester (Quarter 1A)
Study load	15 ECTS

Neural & Motor Systems			
Quarter 1A	Quarter 1B	Quarter 2A	Quarter 2B
<b>Integrative Design of Biomedical Products</b> (5 EC)			
<b>Clinical Research Methods</b> (5 EC)			
<b>Biostatistics</b> (5 EC)			

Required preliminary knowledge: Design methodology, Basic knowledge of sickness/health.

### [191150700](#) **Integrative Design of Biomedical Products**

During this course strategies are presented as an addition to the methodical design process. Subjects that will be discussed are project management, teamwork, communication methods for a good co-operation between medical and technical experts, application of selection processes, specific design aspects of implants, test of prototypes, including FMEA-analysis, METC-protocol and CE-certification. During the course an project assignment will be worked out by a multidisciplinary group of students.

### [201400286](#) **Clinical Research Methods**

Clinical research is the systematic process of examining clinical conditions and outcomes, in order to establish relationships among clinical phenomena and to generate evidence for decision making toward improved clinical practice. As a Biomedical Engineer, you will continuously encounter clinical research, either by performing a clinical study yourself or by using the results of clinical research for development or validation of new technologies or medical devices. Furthermore, you will frequently be working with professionals for whom clinical research is a main source of knowledge toward theory building and clinical innovation - c.f., evidence based medicine. This course will provide the foundations of clinical research by addressing key aspects of theory building, concepts of measurements, study design, interpretation of data. Students will assess and interpret clinical methods and results and use clinical results for developing

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new concepts or for assessment or validation of new technology. The course consists of lectures disclosing the structure of the subject material, explaining approaches and concepts and providing illustrative examples from the clinical research practice. During the course, students will build a portfolio based on assignments for application of the theory on a specific clinical research topic of interest and participate in peer groups for providing mutual feedback and receiving feedback from a tutor. This feedback is processed into the final version of the portfolio, which is graded at the end of the course. The final assignment in the portfolio will be a brief research proposal, to be presented to fellow students.

### 201400285 **Biostatistics**

Central concepts of probability theory like (conditional) probability, expectation and variance are treated. Also, the calculation of expectations and variances of linear functions of the observations is a topic of the course and this topic ends with principal components. The principles of statistical testing theory are explained considering the case of one sample (discrete and continuous data). Statistical tests are focused towards: the comparison of two samples, regression, analysis of variances (including repeated measures) and logistic regression. Within analysis of variance we spend some time on multiple comparison / post hoc analysis / simultaneous confidence intervals.

Each week you have to do an assignment. You have to deliver a written report for the first three assignments and the last assignment. You need to use SPSS (or another statistical package if the student prefers that) for the last 5 assignments and these last 5 assignments have to be discussed individually, except for the last one.