

Exclosure to Subject Specific Regulations from 27.05.2015  
for Master-Programme Mechatronics  
at TUHH  
Programme Director: Prof. Uwe Weltin  
Total: 120 CP  
Number of Specialisations to choose: 1

# Course Scheme Master Mechatronics (IMPMEC)

Consolidated Version  
for Study Cohort: WiSe 16/17  
according to Decision of Academic Senate: 27.04.2016  
and Approval of Chair from: 29.04.2016  
In Force on: 01.10.2016  
Out of Force on: 30.09.2019

The elective compulsory optional defined module "Selected Topics of Mechatronics" can only be selected once with either 6 CPs (Alternative B) or 12 CPs (Alternative A) which cannot be combined. The elective compulsory modules "Control Lab A", "Control Lab B" and "Control Lab C" must not be combined to more than 6 CPs.

| Re com. Term   | Module Name (German)                              | Modul Name (English)                          | Institute | C/EC (1) | CM/OM (2) | Grade | Examination Form(3) | CP (4) | Course Name (German)                              | Course Name (English)                         | Course Form LV(5) | Language (6) | SWS (7) | Sem. LV |
|--|---|---|-----------|----------|-----------|-------|---------------------|--------|---|---|-------------------|--------------|---------|---------|
| <b>Core qualification</b> Compulsory Courses: 60 LP Optional Courses: 0 LP |   |   |           |          |           |       |                     |        |   |   |                   |              |         |         |
| 1  | Entwurf und Implementierung von Software-Systemen | Design and Implementation of Software Systems | E-16      | C        | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Entwurf und Implementierung von Software-Systemen | Design and Implementation of Software Systems | VL                | EN           | 2       | 1       |
|  |   |   |           |          |           |       |                     |        | Entwurf und Implementierung von Software-Systemen | Design and Implementation of Software Systems | PR                | EN           | 2       | 1       |
| 1  | Finite-Elemente-Methoden                          | Finite Elements Methods                       | M-16      | C        | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Finite-Elemente-Methoden                          | Finite Element Methods                        | VL                | EN           | 2       | 1       |
|  |   |   |           |          |           |       |                     |        | Finite-Elemente-Methoden                          | Finite Element Methods                        | HÜ                | EN           | 2       | 1       |
| 1  | Robotik   | Robotics                                      | M-24      | C        | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Robotik: Modellierung und Regelung                | Robotics: Modelling and Control               | VL                | EN           | 3       | 1       |
|  |   |   |           |          |           |       |                     |        | Robotik: Modellierung und Regelung                | Robotics: Modelling and Control               | UE                | EN           | 2       | 1       |
| 1  | Technische Schwingungslehre (GES)                 | Vibration Theory (GES)                        | M-13      | C        | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Technische Schwingungslehre (GES)                 | Vibration Theory (GES)                        | VL                | EN           | 2       | 1       |
|  |   |   |           |          |           |       |                     |        | Technische Schwingungslehre (GES)                 | Vibration Theory (GES)                        | HÜ                | EN           | 1       | 1       |
| 1  | Theorie und Entwurf regelungstechnischer Systeme  | Control Systems Theory and Design             | E-14      | C        | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Theorie und Entwurf regelungstechnischer Systeme  | Control Systems Theory and Design             | VL                | EN           | 2       | 1       |
|  |   |   |           |          |           |       |                     |        | Theorie und Entwurf regelungstechnischer Systeme  | Control Systems Theory and Design             | UE                | EN           | 2       | 1       |
| 2  | Mechatronische Systeme                            | Mechatronic Systems                           | M-24      | C        | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Elektro- und Kontromechanik                       | Electro- and Contromechanics                  | VL                | EN           | 2       | 2       |
|  |   |   |           |          |           |       |                     |        | Elektro- und Kontromechanik                       | Electro- and Contromechanics                  | UE                | EN           | 1       | 2       |
|  |   |   |           |          |           |       |                     |        | Fachlabor Mechatronik                             | Mechatronics Laboratory                       | FL                | DE/EN        | 2       | 2       |
| 3  | Projektarbeit Mechatronics                        | Research Project Mechatronics                 | M-24      | C        | CM        | Yes   | PA lt. FSPO         | 12     |   |   |                   |              |         |         |

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|---|---|--|-----------|----------|-----------|-------|---------------------|--------|---|--|-------------------|--------------|---------|---------|
| 1-3   | Betrieb & Management                          | Business & Management                                  | W-1       | C        | OM        |       |                     | 6      | Selection out of Catalogue                    |  |                   |              |         |         |
| 1-3   | Nichttechnische Ergänzungskurse im Master     | Nontechnical Elective Complementary Courses for Master | 0-TUHH    | C        | OM        |       |                     | 6      | Selection out of Catalogue                    |  |                   |              |         |         |
| <b>Specialisation Intelligent Systems and Robotics</b> Compulsory Courses: 0 LP Optional Courses: 30 LP |   |  |           |          |           |       |                     |        |   |  |                   |              |         |         |
| 2   | Angewandte Humanoide Robotik                  | Applied Humanoid Robotics                              | E-14      | EC       | CM        | No    | Ko                  | 6      |   |  |                   |              |         |         |
|   |   |  |           |          |           |       |                     |        | Humanoide Robotik                             | Humanoid Robotics                                      | POL               | DE/EN        | 6       | 2       |
| 2   | Approximation und Stabilität                  | Approximation and Stability                            | E-10      | EC       | CM        | Yes   | MdIP                | 6      |   |  |                   |              |         |         |
|   |   |  |           |          |           |       |                     |        | Approximation und Stabilität                  | Approximation and Stability                            | VL                | DE/EN        | 2       | 2       |
|   |   |  |           |          |           |       |                     |        | Approximation und Stabilität                  | Approximation and Stability                            | UE                | DE/EN        | 1       | 2       |
|   |   |  |           |          |           |       |                     |        | Approximation und Stabilität                  | Approximation and Stability                            | SE                | DE/EN        | 1       | 2       |
| 2   | Ausgewählte Themen der Schwingungslehre       | Advanced Topics in Vibration                           | M-14      | EC       | CM        | Yes   | KI                  | 6      |   |  |                   |              |         |         |
|   |   |  |           |          |           |       |                     |        | Ausgewählte Themen der Schwingungslehre       | Advanced Topics in Vibration                           | POL               | DE/EN        | 4       | 2       |
| 2   | Automation und Simulation                     | Automation and Simulation                              | M-4       | EC       | CM        | Yes   | MdIP                | 6      |   |  |                   |              |         |         |
|   |   |  |           |          |           |       |                     |        | Automation und Simulation                     | Automation and Simulation                              | VL                | DE           | 3       | 2       |
|   |   |  |           |          |           |       |                     |        | Automation und Simulation                     | Automation and Simulation                              | HÜ                | DE           | 2       | 2       |
| 2   | Eingebettete Systeme                          | Embedded Systems                                       | E-13      | EC       | CM        | Yes   | KI                  | 6      |   |  |                   |              |         |         |
|   |   |  |           |          |           |       |                     |        | Eingebettete Systeme                          | Embedded Systems                                       | VL                | DE/EN        | 3       | 2       |
|   |   |  |           |          |           |       |                     |        | Eingebettete Systeme                          | Embedded Systems                                       | UE                | DE/EN        | 1       | 2       |
| 2   | Humanoide Robotik                             | Humanoid Robotics                                      | E-14      | EC       | CM        | Yes   | Re                  | 2      |   |  |                   |              |         |         |
|   |   |  |           |          |           |       |                     |        | Humanoide Robotik                             | Humanoid Robotics                                      | SE                | DE           | 2       | 2       |
| 2   | Labor Cyber-Physical Systems                  | Lab Cyber-Physical Systems                             | E-13      | EC       | CM        | Yes   | PA                  | 6      |   |  |                   |              |         |         |
|   |   |  |           |          |           |       |                     |        | Labor Cyber-Physical Systems                  | Lab Cyber-Physical Systems                             | POL               | DE/EN        | 4       | 2       |
| 2   | Lineare und Nichtlineare Systemidentifikation | Linear and Nonlinear System Identifikation             | E-14      | EC       | CM        | Yes   | MdIP                | 3      |   |  |                   |              |         |         |
|   |   |  |           |          |           |       |                     |        | Lineare und Nichtlineare Systemidentifikation | Linear and Nonlinear System Identification             | VL                | EN           | 2       | 2       |
| 2   | Nichtlineare Dynamik                          | Nonlinear Dynamics                                     | M-14      | EC       | CM        | Yes   | KI                  | 6      |   |  |                   |              |         |         |
|   |   |  |           |          |           |       |                     |        | Nichtlineare Dynamik                          | Nonlinear Dynamics                                     | VL                | DE/EN        | 4       | 2       |
| 2   | Numerik gewöhnlicher Differentialgleichungen  | Numerical Treatment of Ordinary Differential Equations | E-10      | EC       | CM        | Yes   | KI                  | 6      |   |  |                   |              |         |         |
|   |   |  |           |          |           |       |                     |        | Numerik gewöhnlicher Differentialgleichungen  | Numerical Treatment of Ordinary Differential Equations | VL                | DE/EN        | 2       | 2       |
|   |   |  |           |          |           |       |                     |        | Numerik gewöhnlicher Differentialgleichungen  | Numerical Treatment of Ordinary Differential Equations | UE                | DE/EN        | 2       | 2       |
| 2   | Optimale und robuste Regelung                 | Optimal and Robust Control                             | E-14      | EC       | CM        | Yes   | MdIP                | 6      |   |  |                   |              |         |         |
|   |   |  |           |          |           |       |                     |        | Optimale und robuste Regelung                 | Optimal and Robust Control                             | VL                | EN           | 2       | 2       |

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|--------------|---|---|-----------|----------|-----------|-------|---------------------|--------|---|---|-------------------|--------------|---------|---------|
|              |   |   |           |          |           |       |                     |        | Optimale und robuste Regelung                                   | Optimal and Robust Control  | UE                | EN           | 2       | 2       |
| 2            | Regelungstechnisches Praktikum A                          | Control Lab A   | E-14      | EC       | CM        | No    | Ko                  | 4      | Praktikum Regelungstechnik I                                    | Control Lab I   | PR                | EN           | 1       | 2       |
|              |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik II                                   | Control Lab II  | PR                | EN           | 1       | 2       |
|              |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik III                                  | Control Lab III   | PR                | EN           | 1       | 2       |
|              |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik IV                                   | Control Lab IV  | PR                | EN           | 1       | 2       |
| 2            | Regelungstechnisches Praktikum C                          | Control Lab C   | E-14      | EC       | CM        | No    | Ko                  | 3      |   |   |                   |              |         |         |
|              |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik IX                                   | Control Lab IX  | PR                | EN           | 1       | 2       |
|              |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik VII                                  | Control Lab VII   | PR                | EN           | 1       | 2       |
|              |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik VIII                                 | Control Lab VIII  | PR                | EN           | 1       | 2       |
| 2            | Robotik und Navigation in der Medizin                     | Robotics and Navigation in Medicine   | E-1       | EC       | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|              |   |   |           |          |           |       |                     |        | Robotik und Navigation in der Medizin                           | Robotics and Navigation in Medicine                               | VL                | EN           | 2       | 2       |
|              |   |   |           |          |           |       |                     |        | Robotik und Navigation in der Medizin                           | Robotics and Navigation in Medicine                               | UE                | EN           | 1       | 2       |
|              |   |   |           |          |           |       |                     |        | Robotik und Navigation in der Medizin                           | Robotics and Navigation in Medicine                               | PS                | EN           | 2       | 2       |
| 2            | Systems Engineering                                       | Systems Engineering   | M-25      | EC       | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|              |   |   |           |          |           |       |                     |        | Systems Engineering   | Systems Engineering   | VL                | DE           | 3       | 2       |
|              |   |   |           |          |           |       |                     |        | Systems Engineering   | Systems Engineering   | HÜ                | DE           | 1       | 2       |
| 2            | Technischer Ergänzungskurs für IMPMEC (laut FSPO)         | Technical Complementary Course for IMPMEC (according to Subject Specific Regulations) | M-24      | EC       | CM        | Yes   | It. FSPO            | 6      |   |   |                   |              |         |         |
| 2-3          | Ausgewählte Themen der Mechatronik (Alternative A: 12 LP) | Selected Topics of Mechatronics (Alternative A: 12 LP)                                | M-24      | EC       | OM        |       |                     | 12     |   |   |                   |              |         |         |
|              |   |   |           |          |           | Yes   | MdIP                | 3      | Entwicklungsmanagement Mechatronik                              | Development Management for Mechatronics                           | VL                | DE           | 2       | 2       |
|              |   |   |           |          |           | Yes   | SA                  | 2      | Mikrocontrollerschaltungen - Realisierung in Hard- und Software | Microcontroller Circuits: Implementation in Hardware and Software | SE                | DE           | 2       | 2,3     |
|              |   |   |           |          |           | Yes   | PA                  | 3      | Model-Based Systems Engineering (MBSE) mit SysML/UML            | Model-Based Systems Engineering (MBSE) with SysML/UML             | POL               | DE           | 3       | 2       |
|              |   |   |           |          |           | Yes   | MdIP                | 4      | Prozessmesstechnik  | Process Measurement Engineering                                   | VL                | DE/EN        | 2       | 2       |
|              |   |   |           |          |           |       |                     |        |   |   | HÜ                | DE/EN        | 1       | 2       |
|              |   |   |           |          |           | Yes   | MdIP                | 3      | Regelungstechnische Methoden für die Medizintechnik             | Feedback Control in Medical Technology                            | VL                | DE           | 2       | 2       |
|              |   |   |           |          |           | Yes   | KI                  | 4      | Zuverlässigkeit in der Maschinendynamik                         | Reliability in Engineering Dynamics                               | VL                | EN           | 2       | 2       |
|              |   |   |           |          |           |       |                     |        |   |   | UE                | EN           | 1       | 2       |
|              |   |   |           |          |           | Yes   | MdIP                | 2      | Einführung in elektromagnetische Wellenleiter und Antennen      | Introduction to Electromagnetic Waveguides and Antennas           | VL                | DE/EN        | 2       | 3       |
|              |   |   |           |          |           | Yes   | MdIP                | 3      | Ermüdung und Schadenstoleranz                                   | Fatigue & Damage Tolerance  | VL                | EN           | 2       | 3       |
|              |   |   |           |          |           | Yes   | MdIP                | 4      | Mikrosystemtechnologie  | Microsystems Technology   | VL                | EN           | 2       | 3       |

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|--------------|--|---|-----------|----------|-----------|-------|---------------------|--------|---|---|-------------------|--------------|---------|---------|
|              |  |   |           |          |           | Yes   | KI                  | 3      | Six Sigma Methodik im Qualitätsmanagement                       | Six Sigma   | VL                | DE           | 2       | 3       |
| 2-3          | Ausgewählte Themen der Mechatronik (Alternative B: 6 LP) | Selected Topics of Mechatronics (Alternative B: 6 LP) | M-24      | EC       | OM        |       |                     | 6      |   |   |                   |              |         |         |
|              |  |   |           |          |           | Yes   | MdIP                | 3      | Entwicklungsmanagement Mechatronik                              | Development Management for Mechatronics                           | VL                | DE           | 2       | 2       |
|              |  |   |           |          |           | Yes   | SA                  | 2      | Mikrocontrollerschaltungen - Realisierung in Hard- und Software | Microcontroller Circuits: Implementation in Hardware and Software | SE                | DE           | 2       | 2,3     |
|              |  |   |           |          |           | Yes   | PA                  | 3      | Model-Based Systems Engineering (MBSE) mit SysML/UML            | Model-Based Systems Engineering (MBSE) with SysML/UML             | POL               | DE           | 3       | 2       |
|              |  |   |           |          |           | Yes   | MdIP                | 4      | Prozessmesstechnik  | Process Measurement Engineering                                   | VL                | DE/EN        | 2       | 2       |
|              |  |   |           |          |           |       |                     |        |   | HÜ  | DE/EN             | 1            | 2       |         |
|              |  |   |           |          |           | Yes   | MdIP                | 3      | Regelungstechnische Methoden für die Medizintechnik             | Feedback Control in Medical Technology                            | VL                | DE           | 2       | 2       |
|              |  |   |           |          |           | Yes   | KI                  | 4      | Zuverlässigkeit in der Maschinendynamik                         | Reliability in Engineering Dynamics                               | VL                | EN           | 2       | 2       |
|              |  |   |           |          |           |       |                     |        |   | UE  | EN                | 1            | 2       |         |
|              |  |   |           |          |           | Yes   | MdIP                | 2      | Einführung in elektromagnetische Wellenleiter und Antennen      | Introduction to Electromagnetic Waveguides and Antennas           | VL                | DE/EN        | 2       | 3       |
|              |  |   |           |          |           | Yes   | MdIP                | 3      | Ermüdung und Schadenstoleranz                                   | Fatigue & Damage Tolerance  | VL                | EN           | 2       | 3       |
|              |  |   |           |          |           | Yes   | MdIP                | 4      | Mikrosystemtechnologie  | Microsystems Technology   | VL                | EN           | 2       | 3       |
|              |  |   |           |          |           | Yes   | KI                  | 3      | Six Sigma Methodik im Qualitätsmanagement                       | Six Sigma   | VL                | DE           | 2       | 3       |
| 3            | 3D Computer Vision                                       | 3D Computer Vision                                    | E-2       | EC       | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|              |  |   |           |          |           |       |                     |        | 3D Computer Vision  | 3D Computer Vision  | VL                | EN           | 2       | 3       |
|              |  |   |           |          |           |       |                     |        | 3D Computer Vision  | 3D Computer Vision  | UE                | EN           | 2       | 3       |
| 3            | Angewandte Statistik für Ingenieure                      | Applied Statistics                                    | M-3       | EC       | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|              |  |   |           |          |           |       |                     |        | Angewandte Statistik für Ingenieure                             | Applied Statistics  | VL                | DE/EN        | 2       | 3       |
|              |  |   |           |          |           |       |                     |        | Angewandte Statistik für Ingenieure                             | Applied Statistics  | UE                | DE/EN        | 1       | 3       |
|              |  |   |           |          |           |       |                     |        | Angewandte Statistik für Ingenieure                             | Applied Statistics  | POL               | DE/EN        | 2       | 3       |
| 3            | Ausgewählte Themen der Regelungstechnik                  | Advanced Topics in Control                            | E-14      | EC       | CM        | Yes   | MdIP                | 6      |   |   |                   |              |         |         |
|              |  |   |           |          |           |       |                     |        | Ausgewählte Themen der Regelungstechnik                         | Advanced Topics in Control  | VL                | EN           | 2       | 3       |
|              |  |   |           |          |           |       |                     |        | Ausgewählte Themen der Regelungstechnik                         | Advanced Topics in Control  | UE                | EN           | 2       | 3       |
| 3            | Digitale Bildanalyse                                     | Digital Image Analysis                                | E-2       | EC       | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|              |  |   |           |          |           |       |                     |        | Digitale Bildanalyse  | Digital Image Analysis  | VL                | EN           | 4       | 3       |

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|--|---|---|-----------|----------|-----------|-------|---------------------|--------|---|---|-------------------|--------------|---------|---------|
| 3  | Digitale Signalverarbeitung und Digitale Filter | Digital Signal Processing and Digital Filters | E-8       | EC       | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Digitale Signalverarbeitung und Digitale Filter | Digital Signal Processing and Digital Filters | VL                | EN           | 3       | 3       |
|  |   |   |           |          |           |       |                     |        | Digitale Signalverarbeitung und Digitale Filter | Digital Signal Processing and Digital Filters | HÜ                | EN           | 1       | 3       |
| 3  | Intelligente Systeme in der Medizin             | Intelligent Systems in Medicine               | E-1       | EC       | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Intelligente Systeme in der Medizin             | Intelligent Systems in Medicine               | VL                | EN           | 2       | 3       |
|  |   |   |           |          |           |       |                     |        | Intelligente Systeme in der Medizin             | Intelligent Systems in Medicine               | UE                | EN           | 1       | 3       |
|  |   |   |           |          |           |       |                     |        | Intelligente Systeme in der Medizin             | Intelligent Systems in Medicine               | PS                | EN           | 2       | 3       |
| 3  | Modellierung und Optimierung in der Dynamik     | Modelling and Optimization in Dynamics        | M-13      | EC       | CM        | Yes   | MdIP                | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Flexible Mehrkörpersysteme                      | Flexible Multibody Systems                    | VL                | DE           | 2       | 3       |
|  |   |   |           |          |           |       |                     |        | Optimierung dynamischer Systeme                 | Optimization of dynamical systems             | VL                | DE           | 2       | 3       |
| 3  | Prozessautomatisierungstechnik                  | Industrial Process Automation                 | E-1       | EC       | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Prozessautomatisierungstechnik                  | Industrial Process Automation                 | VL                | EN           | 2       | 3       |
|  |   |   |           |          |           |       |                     |        | Prozessautomatisierungstechnik                  | Industrial Process Automation                 | UE                | EN           | 2       | 3       |
| 3  | Regelungstechnisches Praktikum B                | Control Lab B                                 | E-14      | EC       | CM        | No    | Ko                  | 2      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik V                    | Control Lab V                                 | PR                | EN           | 1       | 3       |
|  |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik VI                   | Control Lab VI                                | PR                | EN           | 1       | 3       |
| 3  | Seminar Ausgewählte Themen der Regelungstechnik | Seminar Advanced Topics in Control            | E-14      | EC       | CM        | Yes   | Re                  | 2      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Ausgewählte Themen der Regelungstechnik         | Advanced Topics in Control                    | SE                | EN           | 2       | 3       |
| <b>Specialisation System Design</b> Compulsory Courses: 0 LP Optional Courses: 30 LP |   |   |           |          |           |       |                     |        |   |   |                   |              |         |         |
| 2  | Ausgewählte Themen der Schwingungslehre         | Advanced Topics in Vibration                  | M-14      | EC       | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Ausgewählte Themen der Schwingungslehre         | Advanced Topics in Vibration                  | POL               | DE/EN        | 4       | 2       |
| 2  | Automation und Simulation                       | Automation and Simulation                     | M-4       | EC       | CM        | Yes   | MdIP                | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Automation und Simulation                       | Automation and Simulation                     | VL                | DE           | 3       | 2       |
|  |   |   |           |          |           |       |                     |        | Automation und Simulation                       | Automation and Simulation                     | HÜ                | DE           | 2       | 2       |
| 2  | Boundary-Elemente-Methoden                      | Boundary Element Methods                      | M-16      | EC       | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Boundary-Elemente-Methoden                      | Boundary Element Methods                      | VL                | EN           | 2       | 2       |
|  |   |   |           |          |           |       |                     |        | Boundary-Elemente-Methoden                      | Boundary Element Methods                      | HÜ                | EN           | 2       | 2       |
| 2  | Eingebettete Systeme                            | Embedded Systems                              | E-13      | EC       | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|  |   |   |           |          |           |       |                     |        | Eingebettete Systeme                            | Embedded Systems                              | VL                | DE/EN        | 3       | 2       |
|  |   |   |           |          |           |       |                     |        | Eingebettete Systeme                            | Embedded Systems                              | UE                | DE/EN        | 1       | 2       |

| Re com. Term | Module Name (German)  | Modul Name (English)  | Institute | C/EC (1) | CM/OM (2) | Grade | Examination Form(3) | CP (4) | Course Name (German)  | Course Name (English)   | Course Form LV(5) | Language (6) | SWS (7) | Sem. LV |
|--------------|---|---|-----------|----------|-----------|-------|---------------------|--------|---|---|-------------------|--------------|---------|---------|
| 2            | Humanoide Robotik   | Humanoid Robotics   | E-14      | EC       | CM        | Yes   | Re                  | 2      |   |   |                   |              |         |         |
|              |   |   |           |          |           |       |                     |        | Humanoide Robotik   | Humanoid Robotics   | SE                | DE           | 2       | 2       |
| 2            | Labor Cyber-Physical Systems  | Lab Cyber-Physical Systems  | E-13      | EC       | CM        | Yes   | PA                  | 6      |   |   |                   |              |         |         |
|              |   |   |           |          |           |       |                     |        | Labor Cyber-Physical Systems  | Lab Cyber-Physical Systems  | POL               | DE/EN        | 4       | 2       |
| 2            | Lineare und Nichtlineare Systemidentifikation                       | Linear and Nonlinear System Identifikation                                  | E-14      | EC       | CM        | Yes   | MdIP                | 3      |   |   |                   |              |         |         |
|              |   |   |           |          |           |       |                     |        | Lineare und Nichtlineare Systemidentifikation                       | Linear and Nonlinear System Identification                                  | VL                | EN           | 2       | 2       |
| 2            | Methodisches Konstruieren   | Mechanical Design Methodology   | G-2       | EC       | CM        | Yes   | MdIP                | 6      |   |   |                   |              |         |         |
|              |   |   |           |          |           |       |                     |        | Methodisches Konstruieren   | Mechanical Design Methodology   | VL                | DE           | 3       | 2       |
|              |   |   |           |          |           |       |                     |        | Methodisches Konstruieren   | Mechanical Design Methodology   | UE                | DE           | 1       | 2       |
| 2            | Nichtlineare Dynamik  | Nonlinear Dynamics  | M-14      | EC       | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|              |   |   |           |          |           |       |                     |        | Nichtlineare Dynamik  | Nonlinear Dynamics  | VL                | DE/EN        | 4       | 2       |
| 2            | Optimale und robuste Regelung                                       | Optimal and Robust Control  | E-14      | EC       | CM        | Yes   | MdIP                | 6      |   |   |                   |              |         |         |
|              |   |   |           |          |           |       |                     |        | Optimale und robuste Regelung                                       | Optimal and Robust Control  | VL                | EN           | 2       | 2       |
|              |   |   |           |          |           |       |                     |        | Optimale und robuste Regelung                                       | Optimal and Robust Control  | UE                | EN           | 2       | 2       |
| 2            | Regelungstechnisches Praktikum A                                    | Control Lab A   | E-14      | EC       | CM        | No    | Ko                  | 4      |   |   |                   |              |         |         |
|              |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik I  | Control Lab I   | PR                | EN           | 1       | 2       |
|              |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik II                                       | Control Lab II  | PR                | EN           | 1       | 2       |
|              |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik III                                      | Control Lab III   | PR                | EN           | 1       | 2       |
|              |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik IV                                       | Control Lab IV  | PR                | EN           | 1       | 2       |
| 2            | Regelungstechnisches Praktikum C                                    | Control Lab C   | E-14      | EC       | CM        | No    | Ko                  | 3      |   |   |                   |              |         |         |
|              |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik IX                                       | Control Lab IX  | PR                | EN           | 1       | 2       |
|              |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik VII                                      | Control Lab VII   | PR                | EN           | 1       | 2       |
|              |   |   |           |          |           |       |                     |        | Praktikum Regelungstechnik VIII                                     | Control Lab VIII  | PR                | EN           | 1       | 2       |
| 2            | Systems Engineering   | Systems Engineering   | M-25      | EC       | CM        | Yes   | KI                  | 6      |   |   |                   |              |         |         |
|              |   |   |           |          |           |       |                     |        | Systems Engineering   | Systems Engineering   | VL                | DE           | 3       | 2       |
|              |   |   |           |          |           |       |                     |        | Systems Engineering   | Systems Engineering   | HÜ                | DE           | 1       | 2       |
| 2            | Technische Akustik I (Akustische Wellen, Lärmschutz, Psychoakustik) | Technical Acoustics I (Acoustic Waves, Noise Protection, Psycho Acoustics ) | M-16      | EC       | CM        | Yes   | MdIP                | 6      |   |   |                   |              |         |         |
|              |   |   |           |          |           |       |                     |        | Technische Akustik I (Akustische Wellen, Lärmschutz, Psychoakustik) | Technical Acoustics I (Acoustic Waves, Noise Protection, Psycho Acoustics ) | VL                | EN           | 2       | 2       |
|              |   |   |           |          |           |       |                     |        | Technische Akustik I (Akustische Wellen, Lärmschutz, Psychoakustik) | Technical Acoustics I (Acoustic Waves, Noise Protection, Psycho Acoustics ) | HÜ                | EN           | 2       | 2       |

| Re com. Term | Module Name (German)                                      | Modul Name (English)  | Institute | C/EC (1) | CM/OM (2) | Grade | Examination Form(3) | CP (4) | Course Name (German)  | Course Name (English)   | Course Form LV(5) | Language (6) | SWS (7) | Sem. LV |
|--------------|---|---|-----------|----------|-----------|-------|---------------------|--------|---|---|-------------------|--------------|---------|---------|
| 2            | Technischer Ergänzungskurs für IMPMEC (laut FSPO)         | Technical Complementary Course for IMPMEC (according to Subject Specific Regulations) | M-24      | EC       | CM        | Yes   | lt. FSPO            | 6      |   |   |                   |              |         |         |
| 2-3          | Ausgewählte Themen der Mechatronik (Alternative A: 12 LP) | Selected Topics of Mechatronics (Alternative A: 12 LP)                                | M-24      | EC       | OM        |       |                     | 12     |   |   |                   |              |         |         |
|              |   |   |           |          |           | Yes   | MdIP                | 3      | Entwicklungsmanagement Mechatronik                              | Development Management for Mechatronics                           | VL                | DE           | 2       | 2       |
|              |   |   |           |          |           | Yes   | SA                  | 2      | Mikrocontrollerschaltungen - Realisierung in Hard- und Software | Microcontroller Circuits: Implementation in Hardware and Software | SE                | DE           | 2       | 2,3     |
|              |   |   |           |          |           | Yes   | PA                  | 3      | Model-Based Systems Engineering (MBSE) mit SysML/UML            | Model-Based Systems Engineering (MBSE) with SysML/UML             | POL               | DE           | 3       | 2       |
|              |   |   |           |          |           | Yes   | MdIP                | 4      | Prozessmesstechnik  | Process Measurement Engineering                                   | VL                | DE/EN        | 2       | 2       |
|              |   |   |           |          |           |       |                     |        |   |   | HÜ                | DE/EN        | 1       | 2       |
|              |   |   |           |          |           | Yes   | MdIP                | 3      | Regelungstechnische Methoden für die Medizintechnik             | Feedback Control in Medical Technology                            | VL                | DE           | 2       | 2       |
|              |   |   |           |          |           | Yes   | KI                  | 4      | Zuverlässigkeit in der Maschinendynamik                         | Reliability in Engineering Dynamics                               | VL                | EN           | 2       | 2       |
|              |   |   |           |          |           |       |                     |        |   |   | UE                | EN           | 1       | 2       |
|              |   |   |           |          |           | Yes   | MdIP                | 2      | Einführung in elektromagnetische Wellenleiter und Antennen      | Introduction to Electromagnetic Waveguides and Antennas           | VL                | DE/EN        | 2       | 3       |
|              |   |   |           |          |           | Yes   | MdIP                | 3      | Ermüdung und Schadenstoleranz                                   | Fatigue & Damage Tolerance  | VL                | EN           | 2       | 3       |
|              |   |   |           |          |           | Yes   | MdIP                | 4      | Mikrosystemtechnologie  | Microsystems Technology   | VL                | EN           | 2       | 3       |
|              |   |   |           |          |           | Yes   | KI                  | 3      | Six Sigma Methodik im Qualitätsmanagement                       | Six Sigma   | VL                | DE           | 2       | 3       |
| 2-3          | Ausgewählte Themen der Mechatronik (Alternative B: 6 LP)  | Selected Topics of Mechatronics (Alternative B: 6 LP)                                 | M-24      | EC       | OM        |       |                     | 6      |   |   |                   |              |         |         |
|              |   |   |           |          |           | Yes   | MdIP                | 3      | Entwicklungsmanagement Mechatronik                              | Development Management for Mechatronics                           | VL                | DE           | 2       | 2       |
|              |   |   |           |          |           | Yes   | SA                  | 2      | Mikrocontrollerschaltungen - Realisierung in Hard- und Software | Microcontroller Circuits: Implementation in Hardware and Software | SE                | DE           | 2       | 2,3     |
|              |   |   |           |          |           | Yes   | PA                  | 3      | Model-Based Systems Engineering (MBSE) mit SysML/UML            | Model-Based Systems Engineering (MBSE) with SysML/UML             | POL               | DE           | 3       | 2       |
|              |   |   |           |          |           | Yes   | MdIP                | 4      | Prozessmesstechnik  | Process Measurement Engineering                                   | VL                | DE/EN        | 2       | 2       |
|              |   |   |           |          |           |       |                     |        |   |   | HÜ                | DE/EN        | 1       | 2       |
|              |   |   |           |          |           | Yes   | MdIP                | 3      | Regelungstechnische Methoden für die Medizintechnik             | Feedback Control in Medical Technology                            | VL                | DE           | 2       | 2       |
|              |   |   |           |          |           | Yes   | KI                  | 4      | Zuverlässigkeit in der Maschinendynamik                         | Reliability in Engineering Dynamics                               | VL                | EN           | 2       | 2       |
|              |   |   |           |          |           |       |                     |        |   |   | UE                | EN           | 1       | 2       |

| Re com. Term | Module Name (German)                         | Modul Name (English)                      | Institute | C/EC (1) | CM/OM (2) | Grade | Examination Form(3) | CP (4) | Course Name (German)                                       | Course Name (English)                                   | Course Form LV(5) | Language (6) | SWS (7) | Sem. LV |
|--------------|--|---|-----------|----------|-----------|-------|---------------------|--------|--|---|-------------------|--------------|---------|---------|
|              |  |   |           |          |           | Yes   | MdIP                | 2      | Einführung in elektromagnetische Wellenleiter und Antennen | Introduction to Electromagnetic Waveguides and Antennas | VL                | DE/EN        | 2       | 3       |
|              |  |   |           |          |           | Yes   | MdIP                | 3      | Ermüdung und Schadenstoleranz                              | Fatigue & Damage Tolerance                              | VL                | EN           | 2       | 3       |
|              |  |   |           |          |           | Yes   | MdIP                | 4      | Mikrosystemtechnologie                                     | Microsystems Technology                                 | VL                | EN           | 2       | 3       |
|              |  |   |           |          |           | Yes   | KI                  | 3      | Six Sigma Methodik im Qualitätsmanagement                  | Six Sigma   | VL                | DE           | 2       | 3       |
| 3            | Angewandte Statistik für Ingenieure          | Applied Statistics                        | M-3       | EC       | CM        | Yes   | KI                  | 6      |  |   |                   |              |         |         |
|              |  |   |           |          |           |       |                     |        | Angewandte Statistik für Ingenieure                        | Applied Statistics                                      | VL                | DE/EN        | 2       | 3       |
|              |  |   |           |          |           |       |                     |        | Angewandte Statistik für Ingenieure                        | Applied Statistics                                      | UE                | DE/EN        | 1       | 3       |
|              |  |   |           |          |           |       |                     |        | Angewandte Statistik für Ingenieure                        | Applied Statistics                                      | POL               | DE/EN        | 2       | 3       |
| 3            | Ausgewählte Themen der Regelungstechnik      | Advanced Topics in Control                | E-14      | EC       | CM        | Yes   | MdIP                | 6      |  |   |                   |              |         |         |
|              |  |   |           |          |           |       |                     |        | Ausgewählte Themen der Regelungstechnik                    | Advanced Topics in Control                              | VL                | EN           | 2       | 3       |
|              |  |   |           |          |           |       |                     |        | Ausgewählte Themen der Regelungstechnik                    | Advanced Topics in Control                              | UE                | EN           | 2       | 3       |
| 3            | CMOS-Nanoelektronik mit Praktikum            | CMOS Nanoelectronics with Practice        | E-9       | EC       | CM        | Yes   | KI                  | 6      |  |   |                   |              |         |         |
|              |  |   |           |          |           |       |                     |        | CMOS-Nanoelektronik  | CMOS Nanoelectronics                                    | VL                | EN           | 2       | 3       |
|              |  |   |           |          |           |       |                     |        | CMOS-Nanoelektronik  | CMOS Nanoelectronics                                    | UE                | EN           | 1       | 3       |
|              |  |   |           |          |           |       |                     |        | CMOS-Nanoelektronik  | CMOS Nanoelectronics                                    | PR                | EN           | 2       | 3       |
| 3            | Lineare und Nichtlineare Wellen              | Linear and Nonlinear Waves                | M-14      | EC       | CM        | Yes   | KI                  | 6      |  |   |                   |              |         |         |
|              |  |   |           |          |           |       |                     |        | Lineare und Nichtlineare Wellen                            | Linear and Nonlinear Waves                              | POL               | DE/EN        | 4       | 3       |
| 3            | Methoden der integrierten Produktentwicklung | Methods of Integrated Product Development | M-17      | EC       | CM        | Yes   | MdIP                | 6      |  |   |                   |              |         |         |
|              |  |   |           |          |           |       |                     |        | Integrierte Produktentwicklung II                          | Integrated Product Development II                       | VL                | DE           | 3       | 3       |
|              |  |   |           |          |           |       |                     |        | Integrierte Produktentwicklung II                          | Integrated Product Development II                       | POL               | DE           | 2       | 3       |
| 3            | Mikrosystemtechnik                           | Microsystem Engineering                   | E-7       | EC       | CM        | Yes   | KI                  | 6      |  |   |                   |              |         |         |
|              |  |   |           |          |           |       |                     |        | Mikrosystemtechnik   | Microsystem Engineering                                 | VL                | EN           | 2       | 3       |
|              |  |   |           |          |           |       |                     |        | Mikrosystemtechnik   | Microsystem Engineering                                 | UE                | EN           | 1       | 3       |
|              |  |   |           |          |           |       |                     |        | Mikrosystemtechnik   | Microsystem Engineering                                 | POL               | EN           | 1       | 3       |
| 3            | Modellierung und Optimierung in der Dynamik  | Modelling and Optimization in Dynamics    | M-13      | EC       | CM        | Yes   | MdIP                | 6      |  |   |                   |              |         |         |
|              |  |   |           |          |           |       |                     |        | Flexible Mehrkörpersysteme                                 | Flexible Multibody Systems                              | VL                | DE           | 2       | 3       |
|              |  |   |           |          |           |       |                     |        | Optimierung dynamischer Systeme                            | Optimization of dynamical systems                       | VL                | DE           | 2       | 3       |
| 3            | Nichtlineare Strukturanalyse                 | Nonlinear Structural Analysis             | M-10      | EC       | CM        | Yes   | KI                  | 6      |  |   |                   |              |         |         |
|              |  |   |           |          |           |       |                     |        | Nichtlineare Strukturanalyse                               | Nonlinear Structural Analysis                           | VL                | DE/EN        | 3       | 3       |
|              |  |   |           |          |           |       |                     |        | Nichtlineare Strukturanalyse                               | Nonlinear Structural Analysis                           | UE                | DE/EN        | 1       | 3       |
| 3            | Regelungstechnisches Praktikum B             | Control Lab B                             | E-14      | EC       | CM        | No    | Ko                  | 2      |  |   |                   |              |         |         |



| Re com. Term   | Module Name (German)                                      | Modul Name (English)   | Institute   | C/EC (1) | CM/OM (2) | Grade | Examination Form(3) | CP (4) | Course Name (German)                                      | Course Name (English)  | Course Form LV(5) | Language (6) | SWS (7) | Sem. LV |
|--|---|--|-------------|----------|-----------|-------|---------------------|--------|---|--|-------------------|--------------|---------|---------|
|  |   |  |             |          |           |       |                     |        | Praktikum Regelungstechnik V                              | Control Lab V  | PR                | EN           | 1       | 3       |
|  |   |  |             |          |           |       |                     |        | Praktikum Regelungstechnik VI                             | Control Lab VI   | PR                | EN           | 1       | 3       |
| 3  | Seminar Ausgewählte Themen der Regelungstechnik           | Seminar Advanced Topics in Control                             | E-14        | EC       | CM        | Yes   | Re                  | 2      |   |  |                   |              |         |         |
|  |   |  |             |          |           |       |                     |        | Ausgewählte Themen der Regelungstechnik                   | Advanced Topics in Control                                     | SE                | EN           | 2       | 3       |
| 3  | Technische Akustik II (Raumakustik, Berechnungsverfahren) | Technical Acoustics II (Room Acoustics, Computational Methods) | M-16        | EC       | CM        | Yes   | MdIP                | 6      |   |  |                   |              |         |         |
|  |   |  |             |          |           |       |                     |        | Technische Akustik II (Raumakustik, Berechnungsverfahren) | Technical Acoustics II (Room Acoustics, Computational Methods) | VL                | EN           | 2       | 3       |
|  |   |  |             |          |           |       |                     |        | Technische Akustik II (Raumakustik, Berechnungsverfahren) | Technical Acoustics II (Room Acoustics, Computational Methods) | HÜ                | EN           | 2       | 3       |
| 3-4  | Praktischer Schaltungsentwurf analog und digital          | Laboratory: Analog and Digital Circuit Design                  | E-9         | EC       | CM        | Yes   | KI                  | 6      |   |  |                   |              |         |         |
|  |   |  |             |          |           |       |                     |        | Praktischer Schaltungsentwurf analog                      | Laboratory: Analog Circuit Design                              | PR                | DE           | 2       | 3       |
|  |   |  |             |          |           |       |                     |        | Praktischer Schaltungsentwurf digital                     | Laboratory: Digital Circuit Design                             | PR                | DE           | 2       | 4       |
| <b>Thesis</b> Compulsory Courses: 30 LP Optional Courses: 0 LP |   |  |             |          |           |       |                     |        |   |  |                   |              |         |         |
| 4  | Masterarbeit  | Master Thesis  | not defined | C        | CM        | Yes   | lt. FSPO            | 30     |   |  |                   |              |         |         |

#### Explanation:

<sup>1</sup>C=Compulsory, EC=Elective Compulsory

<sup>2</sup>CM=Compulsory Defined Module, OM=Optional Defined Module

<sup>3</sup>KI=Written exam, PA=Project, MdIP=Oral exam, SA=Written elaboration, Re=Presentation, KI=Written exam, HA=Homework, MdIP=Oral exam, Re=Presentation, Ko=Colloquium, lt. FSPO=according to Subject Specific Regulations, PA=Project, PA lt. FSPO=Project (accord. to Subject Specific Regulations)

<sup>4</sup>CP=Credit Points

<sup>5</sup>VL=Lecture, SE=Seminar, UE=Recitation Section (small), POL=Problem-based Learning, PR=Laboratory Course, PS=Project Seminar, FL=Laboratory, HÜ=Recitation Section (large)

<sup>6</sup>DE=German, EN=English, DE/EN=German and English

<sup>7</sup>SWS=Contact hours