



**Ruhr Master School**  
of Applied Sciences

Dieses Wahlpflichtmodul ist ein Angebot der:

**Fachhochschule  
Dortmund**

University of Applied Sciences and Arts

**Master Embedded Systems for  
Mechatronics**

## **R&D Project Management**

masteresm@fh-dortmund.de  
+49 (0)231 9112-7991

Prof. Dr. Carsten Wolff  
carsten.wolff@fh-dortmund.de

Hochschule Bochum  
Bochum University  
of Applied Sciences



Fachhochschule  
Dortmund  
University of Applied Sciences and Arts



Westfälische  
Hochschule  
Gelsenkirchen Bocholt Recklinghausen  
University of Applied Sciences

STIFTUNG  
**MERCATOR**



| <b>R&amp;D Project Management (MOD2-03)</b> |  |                                      |                            |  |                 |
|---|--|--------------------------------------|----------------------------|--|-----------------|
| <b>Code Number</b>                          | <b>Workload</b>  | <b>Credits</b>                       | <b>Semester</b>            | <b>Frequency</b>                         | <b>Duration</b> |
| 10230/31                                    | 180 h  | 6                                    | Sem. 2                     | annually                                 | 1 Semester      |
| <b>1</b>                                    | <b>Course Title</b><br>R&D Project Management  | <b>Contact hours</b><br>4 SWS / 60 h | <b>Self-Study</b><br>120 h | <b>Planned Group Size</b><br>25 students |                 |
| <b>2</b>                                    | <b>Course Description</b><br><br>The course R&D project management is focusing on processes, methods and tools for the management of innovative research and development projects in engineering. R&D projects are characterized by creativity and a high degree of innovation and uncertainty. Advanced project management methodology has to deal with the uncertainty and has to foster creativity. Apart from this general problem, R&D project methodology has to be aligned with the engineering processes and with the different engineering domains. Topics like quality management, configuration management and specific tools for risk management are part of the methodology, too. The course enables students to understand and structure R&D projects and to choose appropriate tools and methods based on a proper analysis of the project characteristics. The students are able to tailor the methodology and they understand the remaining gaps in the methodology. They can develop new project management methods and tools to fill the gaps and they can do research to assess the effectiveness and efficiency of project management methodology in R&D. The course is based on one main project case study and several small cases for specific topics. |                                      |                            |  |                 |
| <b>3</b>                                    | <b>Course Structure</b><br><br>1. Characteristics of R&D projects<br>2. Project Management Fundamentals <ol style="list-style-type: none"> <li>Project Management Lifecycle / Project Lifecycle</li> <li>Roles and Structures</li> <li>Planning and Monitoring / Cost, Time, Scope, Quality</li> </ol> 3. Integration Management<br>4. Scope Management<br>5. Schedule Management<br>6. Cost Management including Earned Value Analysis<br>7. Risk Management for R&D Projects<br>8. Project Resource Management<br>9. Stakeholder and Communication Management<br>10. Quality Management<br>11. Development Models and Special Approaches <ol style="list-style-type: none"> <li>V-Model</li> <li>Agile Development</li> <li>Lean Management</li> </ol> 12. Change and Configuration Management   |                                      |                            |  |                 |
| <b>4</b>                                    | <b>Parameters</b> <ul style="list-style-type: none"> <li>Course characteristics: compulsory</li> <li>Course frequency: every year - summer semester</li> <li>Capacity: 25 students</li> <li>Course admittance prerequisites: none</li> <li>Skills trained in this course: methodological and personal skills</li> <li>Assessment of the course: Oral Exam (30 min) at the end of the course (50%) and group work as homework (50%): project kickoff/release report and presentation</li> <li>Teaching staff: Prof. Dr. Carsten Wolff, (Dr. Oliver Hempel)</li> </ul>   |                                      |                            |  |                 |

|          |  |
|----------|--|
| <b>5</b> | <p><b>Learning outcomes</b></p> <p>5.1 Knowledge</p> <ul style="list-style-type: none"> <li>• Students know the basic body of knowledge for project management</li> <li>• Students know processes, methods and tools for risk management for R&amp;D projects (e.g. risk register, risk mitigation)</li> <li>• Students know processes, methods and tools for configuration management (esp. from SW engineering)</li> <li>• Students know processes, methods and tools for change management</li> <li>• Students know processes, methods and tools for quality management according to ISO9001 and TS16949</li> <li>• Students understand the importance of Reviews in R&amp;D projects</li> <li>• Students understand the main challenges of large R&amp;D projects</li> </ul> <p>5.2 Skills</p> <ul style="list-style-type: none"> <li>• Students can tailor processes and methods to the respective projects</li> <li>• Students can apply the respective project management methodology</li> <li>• Students can assess R&amp;D projects and can extract relevant characteristics</li> <li>• Students can develop new methods according to gaps in the existing methodology</li> <li>• Students can do the complete planning and preparation of a real project case</li> <li>• Students can develop relevant KPIs and scorecards for measuring effectiveness and efficiency</li> </ul> <p>5.3 Competence - attitude</p> <ul style="list-style-type: none"> <li>• Students develop an attitude to project management according to engineering standards</li> <li>• Students show a quality attitude according to engineering standards</li> <li>• Students manage projects based on structured and well defined processes and in depth analysis</li> <li>• Students can achieve high effectiveness and efficiency in running complex and innovative R&amp;D projects</li> <li>• Students understand the differences between small and large projects and act accordingly</li> </ul> |
| <b>6</b> | <p><b>Teaching and training methods</b></p> <ul style="list-style-type: none"> <li>• Lectures introducing concepts, methods and tools</li> <li>• Group work to train concepts and methods, to develop skills and to work on case studies</li> <li>• Home work to add contributions on a case study as group work</li> <li>• Presentations to communicate results</li> <li>• Presentation and discussion of an industry case by a partner company</li> </ul>  |
| <b>7</b> | <p><b>Course mapping</b></p> <p>Input for:</p> <ul style="list-style-type: none"> <li>• MOD-E10 – Automotive Systems</li> </ul> <p>Requires:</p> <ul style="list-style-type: none"> <li>• MOD1-03 - Embedded Software Engineering</li> </ul> <p>Connects to:</p> <ul style="list-style-type: none"> <li>• MOD1-04 – Requirements Engineering</li> <li>• MOD2-01 – Mechatronic Systems Engineering</li> <li>• MOD2-02 – Microelectronics &amp; HW/SW Codesign</li> </ul>  |
| <b>8</b> | <p><b>References</b></p> <p>PMBOK® - 6th edition, PMI® 2017.</p> <p>Tonchia, Stefano: Industrial Project Management – Planning, Design, and Construction, Springer-Verlag, 2008</p>  |

|  |   |
|--|---|
|  | <p>DING, Ronggui: Key Project Management Based on Effective Project Thinking, Springer-Verlag, 2016</p> <p>Gerardi, Bart: No-Drama Project Management – Avoiding Predictable Problems for Project Success, Apress, 2011</p> |
|--|---|