TECHNISCHE HOCHSCHULE LÜBECK

## Module: Data Science for Predictive Maintenance

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| **Level** | Master | **Short Name** | DatSc |
| **Responsible Lecturers** | Huhn, Martin, Prof. Dr.-Ing. | | |
| **Department, Facility** | Mechanical Engineering and Business Administration | | |
| **Course of Studies** | Mechanical Engineering, Master | | |
| **Compulsory/elective** | Elective | **ECTS Credit Points** | 5 |
| **Semester of Studies** | (Unspecified) | **Semester Hours per Week** | 4 |
| **Length (semesters)** | 1 | **Workload (hours)** | 150 |
| **Frequency** | WiSe | **Presence Hours** | 60 |
| **Teaching Language** | English | **Self-Study Hours** | 90 |

The following section is filled only if there is **exactly one** module-concluding exam.

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| **Exam Type** | Portfolio Exam | **Exam Language** | English |
| **Exam Length (minutes)** | | **Exam Grading System** | One-third Grades |
| **Learning Outcomes** | • The students know the basics and practical applications of condition monitoring/machine diagnostics, data science and predictive maintenance.<br>• The students can independently measure and analyze machine vibrations.<br>• The students can process the signals/data in Python using various methods of data science and pattern recognition.<br>• The students can apply machine learning methods up to deep learning in Python and use them for condition monitoring/ predictive maintenance. | | |
| **Participation Prerequisites** | | | |

The previous section is filled only if there is **exactly one** module-concluding exam.

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| **Consideration of Gender and Diversity Issues** | ✔ Use of gender-neutral language (THL standard)<br>✘ Target group specific adjustment of didactic methods<br>✘ Making subject diversity visible (female researchers, cultures etc.) |
| **Applicability** | |
| **Remarks** | |

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## Module Course: Data Science for Predictive Maintenance (Lecture)

(of Module: Data Science for Predictive Maintenance)

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| **Course Type** | Lecture | **Form of Learning** | Presence |
| **Mandatory Attendance** | no | **ECTS Credit Points** | 3 |
| **Participation Limit** | | **Semester Hours per Week** | 3 |
| **Group Size** | | **Workload (hours)** | 90 |
| **Teaching Language** | English | **Presence Hours** | 45 |
| **Study Achievements ("Studienleistung", SL)** | | **Self-Study Hours** | 45 |
| **SL Length (minutes)** | | **SL Grading System** | |

The following section is filled only if there is a course-specific exam.

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| **Exam Type** | | **Exam Language** | |
| **Exam Length (minutes)** | | **Exam Grading System** | |
| **Learning Outcomes** | | | |
| **Participation Prerequisites** | | | |

The previous section is filled only if there is a course-specific exam.

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| **Contents** | • Basics of Condition Monitoring, Predictive Maintenance and Data Science<br>• Vibration measurement and analysis<br>• Methods and application of data science, machine learning and deep learning in Python for pattern recognition and prediction<br>• Practical application of Condition Monitoring, Predictive Maintenance and Data Science |
| **Literature** | Literature list will be presented in the lecture. |
| **Remarks** | |

## Module Course: Data Science for Predictive Maintenance (Practical Training)

(of Module: Data Science for Predictive Maintenance)

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| **Course Type** | Practical Training | **Form of Learning** | Presence |
| **Mandatory Attendance** | yes | **ECTS Credit Points** | 2 |
| **Participation Limit** | | **Semester Hours per Week** | 1 |
| **Group Size** | | **Workload (hours)** | 60 |
| **Teaching Language** | English | **Presence Hours** | 15 |
| **Study Achievements ("Studienleistung", SL)** | Practical Training | **Self-Study Hours** | 45 |
| **SL Length (minutes)** | | **SL Grading System** | |
| The following section is filled only if there is a course-specific exam. | | | |
| **Exam Type** | | **Exam Language** | |
| **Exam Length (minutes)** | | **Exam Grading System** | |
| **Learning Outcomes** | | | |
| **Participation Prerequisites** | | | |
| The previous section is filled only if there is a course-specific exam. | | | |
| **Contents** | • Measuring vibrations on various machines with mobile measuring devices<br>• Processing the signals by means of data science with Python<br>• Application of machine learning and deep learning in Python for pattern recognition and prediction | | |
| **Literature** | Literature list will be presented in the practical training. | | |
| **Remarks** | | | |