Modulbezeichnung:	**Machine Learning for Engineers II: Advanced Methods (MLE2)** (Machine Learning for Engineers II: Advanced Methods)	**2.5 ECTS**
Modulverantwortliche/r:	Björn Eskofier	
Lehrende:	Björn Eskofier, Jörg Franke, Nico Hanenkamp	

Startsemester: WS 2022/2023	Dauer: 1 Semester	Turnus: halbjährlich (WS+SS)
Präsenzzeit: k.A. Std.	Eigenstudium: 75 Std.	Sprache: Englisch

Lehrveranstaltungen:

Machine Learning for Engineers II: Advanced Methods (WS 2022/2023, Vorlesung, Björn Eskofier et al.)

Machine Learning for Engineers; Advanced Methods and Tools (Vorlesung mit Übung, Online)

Advanced Methods and Tools

Es wird empfohlen, folgende Module zu absolvieren, bevor dieses Modul belegt wird:

Machine Learning for Engineers I: Introduction to Methods and Tools

Inhalt:

This course focuses on various aspects of Deep Learning. Theoretical foundations and general concepts are introduced in the first part, while the second part focuses on specific networks used in image analysis as well as time-series analysis, two common tasks in engineering applications. The list of topics covered includes:

- Network optimization
- Regularization
- Convolutional neural networks
- Reccurent neural networks

In the integrated lab sessions, the students will tackle an image classification problem as well as a time-series regression problem using industrial datasets.

Lernziele und Kompetenzen:

Fachkompetenz

Wissen

Students are able to recapitulate different machine learning methods and algorithms.

Anwenden

Students are able to choose and implement a suited deep learning algorithm for a given problem based on the type of data and the general learning task.

Literatur:

The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Trevor Hastie, Robert Tibshirani, Jerome Friedman, Springer, 2009

Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

Das Modul ist im Kontext der folgenden Studienfächer/Vertiefungsrichtungen verwendbar:

[1] **International Production Engineering and Management (Bachelor of Science)**
(Po-Vers. 2022w | TechFak | International Production Engineering and Management (Bachelor of Science) | International Production Engineering and Management (Studienbeginn WS 2021/22) | Gesamtkonto | International Elective Modules | Machine Learning for Engineers II: Advanced Methods)

[2] **International Production Engineering and Management (Bachelor of Science)**
(Po-Vers. 2022w | TechFak | International Production Engineering and Management (Bachelor of Science) | International Production Engineering and Management (Studienbeginn WS 2021/22) | Gesamtkonto | Wahlmodule | Machine Learning for Engineers II: Advanced Methods)

Dieses Modul ist daneben auch in den Studienfächern "Elektromobilität-ACES (Bachelor of Science)", "Elektromobilität-ACES (Master of Science)", "Energietechnik (Master of Science)", "Information and Communication Technology (Master of Science)", "Maschinenbau (Bachelor of Science)", "Maschinenbau (Master of Science)",

"Mechatronik (Master of Science)", "Wirtschaftsingenieurwesen (Bachelor of Science)", "Wirtschaftsingenieurwesen (Master of Science)" verwendbar.

Studien-/Prüfungsleistungen:

Machine Learning for Engineers II: Advanced Methods (Prüfungsnummer: 50681)
(englische Bezeichnung: Machine Learning for Engineers II: Advanced Methods)

Prüfungsleistung, elektronische Prüfung, Dauer (in Minuten): 60
Anteil an der Berechnung der Modulnote: 100%
weitere Erläuterungen:
Digital Open Book Exam via StudOn
Prüfungssprache: Englisch

Erstablegung: WS 2022/2023, 1. Wdh.: SS 2023
1. Prüfer: Björn Eskofier
