

## Module Handbook (<https://modhb.uni-kl.de/>)

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### Notes on the module handbook of the department Mechanical and Process Engineering

Die hier dargestellten veröffentlichten Studiengang-, Modul- und Kursdaten des Fachbereichs Maschinenbau und Verfahrenstechnik ersetzen die Modulbeschreibungen im KIS und wurden mit Ausnahme folgender Studiengänge am 28.10.2020 verabschiedet.

Ausnahmen:

- BSc. Bio- und Chemieingenieurwissenschaften (Stand WS 20/21): [https://www.mv.uni-kl.de/fileadmin/mv/Studium\\_Lehre/Modulhandbuecher/MH\\_BSc\\_BCI.pdf](https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MH_BSc_BCI.pdf) ([https://www.mv.uni-kl.de/fileadmin/mv/Studium\\_Lehre/Modulhandbuecher/MH\\_BSc\\_BCI.pdf](https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MH_BSc_BCI.pdf))
- BEd. Lehramt Metalltechnik (Stand WS 19/20): [https://www.mv.uni-kl.de/fileadmin/mv/Studium\\_Lehre/Modulhandbuecher/MHB\\_Bachelor\\_Lehramt\\_Metalltechnik.pdf](https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Bachelor_Lehramt_Metalltechnik.pdf) ([https://www.mv.uni-kl.de/fileadmin/mv/Studium\\_Lehre/Modulhandbuecher/MHB\\_Bachelor\\_Lehramt\\_Metalltechnik.pdf](https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Bachelor_Lehramt_Metalltechnik.pdf))
- MSc. Bio- und Chemieingenieurwissenschaften (Stand WS 20/21): [https://www.mv.uni-kl.de/fileadmin/mv/Studium\\_Lehre/Modulhandbuecher/MH\\_Msc\\_BCI.pdf](https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MH_Msc_BCI.pdf) ([https://www.mv.uni-kl.de/fileadmin/mv/Studium\\_Lehre/Modulhandbuecher/MH\\_Msc\\_BCI.pdf](https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MH_Msc_BCI.pdf))
- MEd. Lehramt Metalltechnik Werkstoffe und Fertigung (Stand WS 19/20): [https://www.mv.uni-kl.de/fileadmin/mv/Studium\\_Lehre/Modulhandbuecher/MHB\\_Master\\_Lehramt\\_Metalltechnik\\_-\\_Werkstoffe\\_und\\_Fertigung.pdf](https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Master_Lehramt_Metalltechnik_-_Werkstoffe_und_Fertigung.pdf) ([https://www.mv.uni-kl.de/fileadmin/mv/Studium\\_Lehre/Modulhandbuecher/MHB\\_Master\\_Lehramt\\_Metalltechnik\\_-\\_Werkstoffe\\_und\\_Fertigung.pdf](https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Master_Lehramt_Metalltechnik_-_Werkstoffe_und_Fertigung.pdf))
- MEd. Lehramt Metalltechnik Maschinen- und Fahrzeugtechnik (Stand WS 19/20): [https://www.mv.uni-kl.de/fileadmin/mv/Studium\\_Lehre/Modulhandbuecher/MHB\\_Master\\_Lehramt\\_Metalltechnik\\_-\\_Fahrzeugtechnik.pdf](https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Master_Lehramt_Metalltechnik_-_Fahrzeugtechnik.pdf) ([https://www.mv.uni-kl.de/fileadmin/mv/Studium\\_Lehre/Modulhandbuecher/MHB\\_Master\\_Lehramt\\_Metalltechnik\\_-\\_Fahrzeugtechnik.pdf](https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Master_Lehramt_Metalltechnik_-_Fahrzeugtechnik.pdf))
- MEd. Lehramt Metalltechnik Verfahrenstechnik (Stand WS 19/20): [https://www.mv.uni-kl.de/fileadmin/mv/Studium\\_Lehre/Modulhandbuecher/MHB\\_Master\\_Lehramt\\_Metalltechnik\\_-\\_Verfahrenstechnik.pdf](https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Master_Lehramt_Metalltechnik_-_Verfahrenstechnik.pdf) ([https://www.mv.uni-kl.de/fileadmin/mv/Studium\\_Lehre/Modulhandbuecher/MHB\\_Master\\_Lehramt\\_Metalltechnik\\_-\\_Verfahrenstechnik.pdf](https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Master_Lehramt_Metalltechnik_-_Verfahrenstechnik.pdf))

## Module MV-IVW-M158-M-4

Integrated product development with composites (M, 6.0 LP)

### Module Identification

| Module Number   | Module Name   | CP (Effort)    |
|-----------------|---|----------------|
| MV-IVW-M158-M-4 | <i>Integrated product development with composites</i> | 6.0 CP (180 h) |

### Basedata

|                           |  |
|---------------------------|--|
| CP, Effort                | 6.0 CP = 180 h   |
| Position of the semester  | 1 Sem. in WiSe   |
| Level                     | [4] Bachelor (Specialization)  |
| Language                  | [DE] German  |
| Module Manager            | Mitschang, Peter, Prof. Dr.-Ing. (EXT   DEPT: MV) (/staff/320/)  |
| Lecturers                 | May, David, Dr.-Ing. (EXT   DEPT: MV) (/staff/610/)<br>Mitschang, Peter, Prof. Dr.-Ing. (EXT   DEPT: MV) (/staff/320/) |
| Area of study             | [MV-IVW] Composite Materials   |
| Reference course of study | [MV-88.B78-SG] M.Sc. Production Engineering in Mechanical Engineering (/mhb/FB-MV/cos-578/)                            |
| Lifecycle-State           | [NORM] Active  |

## Courses

| Type/SWS | Course Number  | Choice in Module-Part | SL | PL  | CP  | Sem. |
|----------|--|-----------------------|----|-----|-----|------|
| 2V+2U    | <b>MV-IVW-86965-K-4</b> (/mhb/courses/MV-IVW-86965-K-4/) | P                     | -  | PL1 | 6.0 | WiSe |

- About **[MV-IVW-86965-K-4]**: Title: "Integrated product development with composites"; Presence-Time: 56 h; Self-Study: 124 h

## Examination achievement PL1

- Form of examination: **written exam (Klausur) (60-90 Min.)**
- Examination Frequency: each semester
- Examination number: 10132 ("Integrated product development with composites")

## Evaluation of grades

The grade of the module examination is also the module grade.

### Contents

From **[MV-IVW-86965-K-4] Integrated product development with composites** (/mhb/courses/MV-IVW-86965-K-4/):

The basic knowledge required for integrated development of a fiber reinforced polymer (FRP) component is mediated, explicitly taking into account the entire product life cycle, including production and utilization phase up as well as end of life and recycling:

- Characteristics and suitable fields of application for FRP
- Basic terms in product design with FRP
- Systematic design process for FRP components
- Requirements catalog for a FRP component
- FRP design methods
- Procedures for selection of fiber materials, reinforcement structures, manufacturing processes and semi-finished products
- Design to manufacture, join and recycling
- Design of a manufacturing process
- Material testing

- Techno-economic evaluation of FRP product concepts

## Competencies / intended learning achievements

From [MV-IVW-86965-K-4] Integrated product development with composites (/mhb/courses/MV-IVW-86965-K-4/):

### 1. Lecture

The students can

- show suitable fields of application for FRP
- explain basic terms in product design with FRP
- structure the systematic design process for FRP components and describe the individual steps
- reflect on criteria and methods for the selection/design of design methods, fiber materials, reinforcement structures, manufacturing processes and semi-finished products
- describe points of attention with regard to design to manufacture, join and recycling
- describe the methodology for techno-economic evaluation of FRP product concepts

### 2. Tutorials

The students can

- identify relevant requirements for a FRP product
- elaborate a requirements catalog
- analyze the requirements catalog and derive a suitable design methods, fiber materials reinforcement structures, manufacturing processes and semi-finished products
- develop a (rough) concept / draft for a FRP product
- evaluate an elaborated draft in term of technical and economical target achievement
- present and discuss the results in an exercise group

## Literature

From [MV-IVW-86965-K-4] Integrated product development with composites (/mhb/courses/MV-IVW-86965-K-4/):

- May, D.: Integrierte Produktentwicklung mit Faser-Kunststoff-Verbunden, Springer, 2020
- Neitzel, M., Mitschang, P., Breuer, U.: Handbuch Verbundwerkstoffe. München: Carl Hanser Verlag 2014
- Aström, B.: Manufacturing of Polymer Composites, Chapman and Hall, London, 1997
- Dominighaus: H.: Die Kunststoffe und ihre Eigenschaften, 5. Auflage, Springer, Berlin-Heidelberg, 1998
- Ehrenstein, G.: Faserverbund-Kunststoffe, Hanser, München, 2006
- Michaeli, W.: Einführung in die Technologie der Faserverbundwerkstoffe, Hanser, München, 1990

## Requirements for attendance (informal)

Recommended:

### Modules:

- [MV-FBK-104-M-4] Manufacturing Systems Engineering I (M, 3.0 LP) (/mhb/modules/MV-FBK-104-M-4/)
- [MV-FBK-112-M-4] Manufacturing Systems Engineering II (M, 3.0 LP) (/mhb/modules/MV-FBK-112-M-4/)
- [MV-IVW-177-M-4] Processing of Composite Materials (M, 3.0 LP) (/mhb/modules/MV-IVW-177-M-4/)
- [MV-IVW-235-M-7] Design and Analysis of Composite Materials (M, 3.0 LP) (/mhb/modules/MV-IVW-235-M-7/)
- [MV-WKK-231-M-7] Materials selection in Mechanical Engineering (M, 3.0 LP) (/mhb/modules/MV-WKK-231-M-7/)

## Requirements for attendance (formal)

None

References to Module / Module Number [MV-IVW-M158-M-4]

| <b>Module-Pool</b>  | <b>Name</b>   |
|---|---|
| [MV-ALL-MPOOL-6 (/mhb/modulepools/MV-ALL-MPOOL-6/)]         | Wahlpflichtmodule allgemein                                   |
| [MV-MatWerk-MPOOL-6 (/mhb/modulepools/MV-MatWerk-MPOOL-6/)] | Wahlpflichtmodule Materialwissenschaften und Werkstofftechnik |
| [MV-PE-MPOOL-6 (/mhb/modulepools/MV-PE-MPOOL-6/)]           | Wahlpflichtmodule Produktentwicklung im Maschinenbau          |