

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)
- 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)
- 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)
- 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)
- 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)
- 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)

Module MV-BioVT-299-M-7

Electrochemical Bioprocess Engineering (M, 3.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
MV-BioVT-299-M-7	<i>Electrochemical Bioprocess Engineering</i>	3.0 CP (90 h)

Basedata

CP, Effort	3.0 CP = 90 h
Position of the semester	1 Sem. irreg.
Level	[7] Master (Advanced)
Language	[DE] German
Module Manager	Ulber, Roland, Prof. Dr. (PROF DEPT: MV) (/staff/297/)
Lecturers	Ulber, Roland, Prof. Dr. (PROF DEPT: MV) (/staff/297/)
Area of study	[MV-BioVT] Bioprocess Engineering
Reference course of study	[MV-88.805-SG] M.Sc. Biological Process Engineering (/mhb/FB-MV/cos-558/)
Lifecycle-State	[NORM] Active

Notice

The module is currently not offered!

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V	MV-BioVT-86443-K-7	P	-	PL1	3.0	irreg.

- About [\[MV-BioVT-86443-K-7\]](/mhb/courses/MV-BioVT-86443-K-7/): Title: "Electrochemical Bioprocess Engineering"; Presence-Time: 28 h; Self-Study: 62 h

Examination achievement PL1

- Form of examination: **written or oral examination**
- Examination Frequency: irregular (only in semesters, in which the courses are offered)
- Examination number: 10420 ("Bioprocess Engineering I")

Written examination (120 minutes) or oral examination (30 minutes)

Evaluation of grades

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

Contents

From [\[MV-BioVT-86443-K-7\] Electrochemical Bioprocess Engineering](/mhb/courses/MV-BioVT-86443-K-7/):

Both biotransformation and electrochemical processes play an important role in the development of sustainable and efficient production processes. Nature provides an almost inexhaustible number of biocatalysts that can be used to optimize existing production processes or to develop completely new biotechnological processes and products. In addition to the special importance of electrochemistry in the field of energy conversion and storage, electrochemical processes can also be used in biochemical synthesis processes, for example for the environmentally friendly production of reagents. The combination of electrochemistry and biotransformation into bioelectrochemical synthesis processes enables a wide range of future-oriented production systems.

In the first part of the lecture the basic aspects of electrochemical process and reaction engineering are presented. The second part focuses on the corresponding applications in bioelectrochemical processes.

Contents:

Definitions and basic terms

- Components of a reactor
- Electrolytes
- Important regularities

Fundamentals of technical electrochemistry

- Electrochemical Thermodynamics
- Electrochemical Kinetics
- Transport processes in electrochemistry
- Electrochemical Reaction Engineering
- Electrochemical process engineering
- Measurement methods

Bioelectrochemical processes

- Fuel Cells
- Microbial electrolysis
- Microbial electrosyntheses
- Electroenzymatic processes
- Bio-Electrochemical remediation processes
- Electrochemical Bio-Mining
- Electrochemical processes in the processing of organic products

In the laboratory part, for example, cyclic voltammograms of mediators and biofilms are measured, electrochemical reactants for enzymatic reactions are produced or operated by biofuel cells.

Competencies / intended learning achievements

From [MV-BioVT-86443-K-7] **Electrochemical Bioprocess Engineering** (/mhb/courses/MV-BioVT-86443-K-7/):

The students

- know the principles of electrochemistry
- know the basics of electrochemical process engineering
- understand bioelectrochemical processes
- can plan and evaluate their own experiments

Literature

From [MV-BioVT-86443-K-7] **Electrochemical Bioprocess Engineering** (/mhb/courses/MV-BioVT-86443-K-7/):

- Hamann, Carl H. / Vielstich, Wolf: Elektrochemie, Wiley-VCH, Weinheim
- Volkmar M. Schmidt : Elektrochemische Verfahrenstechnik: Grundlagen, Reaktionstechnik, Prozessoptimierung, Wiley-VCH, Weinheim

Requirements for attendance (informal)

Basic knowledge of process engineering

Requirements for attendance (formal)

None

References to Module / Module Number [MV-BioVT-299-M-7]

Course of Study	Section	Choice/Obligation
[MV-88.A29-SG] M.Sc. Biological and Chemical Engineering (/mhb/FB-MV/cos-567/)	Studienschwerpunkt I	[WP] Compulsory Elective
Module-Pool	Name	
[MV-ALL-MPOOL-6 (/mhb/modulepools/MV-ALL-MPOOL-6/)]	Wahlpflichtmodule allgemein	
[MV-BioVT-MPOOL-6 (/mhb/modulepools/MV-BioVT-MPOOL-6/)]	Wahlpflichtmodule Bioverfahrenstechnik	