Karlsruher Institut für Technologie

Module Handbook
Chemical and Process Engineering Bachelor 2015 (Bachelor of Science (B.Sc.))

SPO 2015

Summer semester 2026

Date: 24/02/2026

KIT DEPARTMENT OF CHEMICAL AND PROCESS ENGINEERING

Table Of Contents

1. General Information 5
1.1. Study program details 5
1.2. Qualification Goals 5
1.3. Studies and Examination Regulations 5
1.4. Organizational issues 6
2. Curriculum 7
3. Study Program Structure 10
3.1. Orientation Exam 10
3.2. Bachelor's Thesis 11
3.3. Fundamentals of Mathematics and Natural Sciences 11
3.4. Fundamentals of Scientific Engineering 11
3.5. Thermodynamics and Transport Processes 12
3.6. Fundamentals of Process Engineering 12
3.7. Mandatory Elective Courses 12
3.8. Laboratories 13
3.9. Specialization/ Project Work 14
3.10. Interdisciplinary Qualifications 15
3.11. Master's Transfer Account 16
4. Modules 17
4.1. Automation and Control Systems Engineering - M-CIWVT-106477 17
4.2. Advanced Mathematics I - M-MATH-100280 18
4.3. Advanced Mathematics II - M-MATH-100281 19
4.4. Advanced Mathematics III - M-MATH-100282 20
4.5. Advanced Methods in Linear Control - M-CIWVT-106880 21
4.6. Air Pollution Control - M-CIWVT-106448 22
4.7. Applied Apparatus Engineering - M-CIWVT-103297 23
4.8. Applied Thermal Process Engineering - M-CIWVT-104458 24
4.9. Bachelor's Thesis - M-CIWVT-103204 26
4.10. Basic Practical Course - M-CIWVT-106500 27
4.11. Biopharmaceutical Process Engineering - M-CIWVT-106475 28
4.12. Bioprocess Development - M-CIWVT-107403 29
4.13. Bioprocess Engineering - M-CIWVT-106434 31
4.14. Biotechnology - M-CIWVT-101143 33
4.15. Catalysts for the Energy Transition - M-CIWVT-106030 35
4.16. Chemical Process Engineering - M-CIWVT-101133 36
4.17. Chemical Reaction Engineering - M-CIWVT-106825 37
4.18. Circular Economy - M-CIWVT-105995 38
4.19. Computational Methods - M-CIWVT-101956 39
4.20. Control Engineering and System Dynamics - M-CIWVT-106308 40
4.21. Data-Driven Modeling with Python - M-CIWVT-106534 41
4.22. Electrochemical Energy Technologies and Materials - M-CIWVT-107651 42
4.23. Elementary Physics - M-PHYS-100993 44
4.24. Energy and Environmental Engineering - M-CIWVT-101145 45
4.25. Energy Process Engineering - M-CIWVT-101136 46
4.26. Engineering Mechanics: Dynamics - M-CIWVT-101128 47
4.27. Engineering Mechanics: Statics and Strength of Materials - M-CIWVT-104006 48
4.28. Ethics and Global Material Cycles - M-CIWVT-101149 49
4.29. Fluiddynamics - M-CIWVT-101131 50
4.30. Food Bioprocess Engineering - M-CIWVT-106476 51
4.31. Food Technology - M-CIWVT-101148 52
4.32. Formulation and Characterisation of Energy Materials - M-CIWVT-106700 53
4.33. Fundamentals of Refrigeration - M-CIWVT-104457 54
4.34. General and Inorganic Chemistry - M-CHEMBIO-101117 56
4.35. Heat and Mass Transfer - M-CIWVT-107675 57
4.36. Industrial Business Administration - M-WIWI-100528 58
4.37. Industrial Organic Chemistry - M-CIWVT-101137 59
4.38. Intensification of Bioprocesses - M-CIWVT-106444 60

4.39. Introduction into Bioengineering - M-CIWVT-106433 62
4.40. Introduction to Thin Film Technology - M-CIWVT-107495 63
4.41. Laboratory Course: Electrochemical Energy Technologies - M-ETIT-105703 64
4.42. Material Science and Engineering - M-MACH-102567 65
4.43. Mechanical Design A - M-MACH-106527 67
4.44. Mechanical Design B-C - M-MACH-106528 69
4.45. Mechanical Processing - M-CIWVT-101135 71
4.46. Mechanical Separation Technology - M-CIWVT-101147 72
4.47. Micro Process Engineering - M-CIWVT-101154 73
4.48. Organic Chemistry for Engineers - M-CHEMBIO-101115 75
4.49. Orientation Exam - M-CIWVT-100874 76
4.50. Practical Course in Organic Chemistry for Chemical Engineers - M-CHEMBIO-101116 77
4.51. Process Development and Scale-up - M-CIWVT-101153 78
4.52. Process Engineering in Excel - M-CIWVT-107654 80
4.53. Process Machines - M-CIWVT-101139 82
4.54. Single Results - M-CIWVT-101992 83
4.55. SmartMentoring - M-CIWVT-105848 84
4.56. Thermal Process Engineering - M-CIWVT-101134 85
4.57. Thermodynamics I - M-CIWVT-101129 86
4.58. Thermodynamics II - M-CIWVT-101130 87
5. Module components 88
5.1. Automation and Control Systems Engineering - Exam - T-CIWVT-113088 88
5.2. Advanced Mathematics I - T-MATH-100275 89
5.3. Advanced Mathematics II - T-MATH-100276 90
5.4. Advanced Mathematics III - T-MATH-100277 91
5.5. Air Pollution Control - T-CIWVT-113046 92
5.6. Air Pollution Control - Project Work - T-CIWVT-113047 93
5.7. Application of Numerics in Engineering - T-CIWVT-101876 94
5.8. Applied Apparatus Engineering - T-CIWVT-106562 95
5.9. Applied Thermal Process Engineering - Exercises - T-CIWVT-110803 96
5.10. Applied Thermal Process Engineering - Project Work - T-CIWVT-109120 97
5.11. Automation and Control Systems Engineering - Project Work - T-CIWVT-113089 98
5.12. Bachelor's Thesis - T-CIWVT-106365 99
5.13. Biopharmaceutical Process Engineering - T-CIWVT-113023 100
5.14. Biopharmaceutical Purification Processes - T-CIWVT-106029 101
5.15. Bioprocess Development - T-CIWVT-114538 102
5.16. Bioprocess Engineering - T-CIWVT-113019 103
5.17. Biotechnology - T-CIWVT-103669 104
5.18. Biotechnology - T-CIWVT-103668 105
5.19. Catalysts for the Energy Transition - T-CIWVT-112214 106
5.20. Chemical Process Engineering - T-CIWVT-101884 107
5.21. Chemical Reaction Engineering - Exam - T-CIWVT-113695 108
5.22. Chemical Reaction Engineering - Project Work - T-CIWVT-113696 109
5.23. Circular Economy - Oral Exam - T-CIWVT-112172 110
5.24. Circular Economy - Project Work - T-CIWVT-112173 111
5.25. Computational Fluid Dynamics - T-CIWVT-106035 112
5.26. Control Engineering and System Dynamics - T-CIWVT-112787 113
5.27. Data-Driven Modeling with Python - T-CIWVT-113190 114
5.28. Electrochemical Energy Technologies - T-ETIT-114245 115
5.29. Elementary Physics - T-PHYS-101577 116
5.30. Energy and Environmental Engineering - T-CIWVT-108254 117
5.31. Energy and Environmental Engineering Project Work - T-CIWVT-103527 118
5.32. Energy Process Engineering - T-CIWVT-101889 119
5.33. Engineering Mechanics: Dynamics - T-CIWVT-106290 120
5.34. Engineering Mechanics: Dynamics, Exam - T-CIWVT-101877 121
5.35. Engineering Mechanics: Statics and Strength of Materials - T-CIWVT-103687 122
5.36. Ethics - T-CIWVT-112373 123
5.37. Examination Material Science I & II - T-MACH-105148 124
5.38. Exercises Process Development and Scale-up - T-CIWVT-111005 125
5.39. Exercises: Membrane Technologies - T-CIWVT-113235 126

5.40. Fluiddynamics, Exam - T-CIWVT-101882 ... 127
5.41. Fluiddynamics, Tutorial - T-CIWVT-101904 ... 128
5.42. Food Bioprocess Engineering - T-CIWVT-113021 ... 129
5.43. Food Technology - T-CIWVT-103528 ... 130
5.44. Food Technology Project Work - T-CIWVT-103529 ... 131
5.45. Formulation and Characterisation of Energy Materials - Exam - T-CIWVT-113478 ... 132
5.46. Formulation and Characterisation of Energy Materials - Project Work - T-CIWVT-113479 ... 133
5.47. Fundamentals of Refrigeration, Oral Examination - T-CIWVT-109117 ... 134
5.48. Fundamentals of Refrigeration, Project Work - T-CIWVT-109118 ... 135
5.49. General and Inorganic Chemistry - T-CHEMBIO-101866 ... 136
5.50. Global Material Cycles - T-CIWVT-112372 ... 137
5.51. Heat and Mass Transfer - T-CIWVT-115040 ... 138
5.52. Industrial Business Administration - T-WIWI-100796 ... 139
5.53. Industrial Organic Chemistry - T-CIWVT-101890 ... 140
5.54. Initial Exam Process Technology and Plant Design - T-CIWVT-106149 ... 141
5.55. Intensification of Bioprocesses - Written Exam - T-CIWVT-112998 ... 142
5.56. Internship - T-CIWVT-106036 ... 143
5.57. Introduction into Bioengineering - T-CIWVT-113018 ... 144
5.58. Introduction to Informatics and Algorithmic Mathematics - Exam - T-MATH-102250 ... 145
5.59. Introduction to Thin Film Technology - Exercises and Lab - T-CIWVT-114693 ... 146
5.60. Introduction to Thin Film Technology - Project Work - T-CIWVT-114692 ... 147
5.61. Kinetics and Catalysis - T-CIWVT-106032 ... 148
5.62. Laboratory Course: Electrochemical Energy Technologies - T-ETIT-111376 ... 149
5.63. Laboratory Work Process Machines - T-CIWVT-101903 ... 150
5.64. Laboratory Work: General Chemistry - T-CIWVT-113117 ... 151
5.65. Mechanical Design A - T-MACH-112984 ... 152
5.66. Mechanical Design A, Workshop - T-MACH-112981 ... 153
5.67. Mechanical Design B and C - T-MACH-112985 ... 154
5.68. Mechanical Design B, Workshop - T-MACH-112982 ... 155
5.69. Mechanical Design C, Workshop - T-MACH-112983 ... 156
5.70. Mechanical Processing - T-CIWVT-101886 ... 157
5.71. Mechanical Separation Technology Exam - T-CIWVT-103448 ... 158
5.72. Mechanical Separation Technology Project Work - T-CIWVT-103452 ... 159
5.73. Membrane Technologies in Water Treatment - T-CIWVT-113236 ... 160
5.74. Micro Process Engineering - T-CIWVT-103666 ... 161
5.75. Micro Process Engineering - T-CIWVT-103667 ... 162
5.76. Organic Chemistry for Engineers - T-CHEMBIO-101865 ... 163
5.77. Particle Technology Exam - T-CIWVT-106028 ... 164
5.78. Practical Course in Organic Chemistry for Chemical Engineers - T-CHEMBIO-101868 ... 165
5.79. Practical Course Process Technology and Plant Design - T-CIWVT-106148 ... 166
5.80. Practical Course: Process Engineering - T-CIWVT-113118 ... 167
5.81. Practical: Synthesis of electrochemical Materials - T-CIWVT-114998 ... 168
5.82. Process Development and Scale-up - T-CIWVT-103530 ... 169
5.83. Process Development and Scale-up Project Work - T-CIWVT-103556 ... 170
5.84. Process Engineering in Excel - T-CIWVT-115002 ... 171
5.85. Process Technology and Plant Design Written Exam - T-CIWVT-106150 ... 172
5.86. SmartMentoring - Group Management - T-CIWVT-111761 ... 173
5.87. Thermal Process Engineering - T-CIWVT-101885 ... 174
5.88. Thermal Process Engineering II - T-CIWVT-114107 ... 175
5.89. Thermodynamics I, Exam - T-CIWVT-101879 ... 176
5.90. Thermodynamics I, Tutorial - T-CIWVT-101878 ... 177
5.91. Thermodynamics II, Exam - T-CIWVT-101881 ... 178
5.92. Thermodynamics II, Tutorial - T-CIWVT-101880 ... 179
5.93. Thermodynamics III - T-CIWVT-106033 ... 180
5.94. Tutorial Advanced Mathematics I - T-MATH-100525 ... 181
5.95. Tutorial Advanced Mathematics II - T-MATH-100526 ... 182
5.96. Tutorial Advanced Mathematics III - T-MATH-100527 ... 183

1 General Information

1.1 Study program details

KIT-Department	KIT Department of Chemical and Process Engineering
Academic Degree	Bachelor of Science (B.Sc.)
Examination Regulations Version	2015
Regular semesters	6 semesters
Maximum semesters	12 semesters
Credits	180
Language	German
Grade calculation	Weighted by (Weight * CP)
Additional Information	Link to study program www.ciw.kit.edu Department https://www.ciw.kit.edu/1627.php Business unit Studium und Lehre https://www.sle.kit.edu/vorstudium/bachelor-chemieingenieurwesen-verfahrenstechnik.php

1.2 Qualification Goals

The Bachelor's program provides knowledge on scientific fundamentals and methodical expertise in the area of Chemical and Process Engineering. The Bachelor degree qualifies students to enroll for a Master's program. Furthermore, it enables students to apply the acquired theoretical knowledge to a concrete professional field.

The compulsory program in the first and second year focuses on methodical and qualified fundamental knowledge of mathematics, natural sciences and engineering. This includes in particular the knowledge of heat and mass transfer and the most important unit operations in the field of thermal, chemical and mechanical process engineering. Graduates will be able to balance engineering processes appropriately.

The knowledge acquired in the first and second year is not only the basis for the third year of the Bachelor's program, but also for the following Master's studies. Mandatory elective courses in the third year of study offer the opportunity to gain in-depth knowledge in a specialist area for the first time. As part of the specialization, students will apply basic process engineering knowledge in a project work. In addition to technical aspects, working on a project in a team as well as preparing, interpreting and presenting the results are important parts of the specialization subject.

Within their Bachelor's thesis, students prove the ability to work on specialized problems in the field of chemical and process engineering independently and within a defined time frame using scientific methods.

Graduates are qualified to identify, abstract, and solve technical problems using the basic knowledge provided during the Bachelor's program. Furthermore, they can evaluate products and processes systematically as well as select and apply analyzing and simulation tools. They are able to combine theory and practice as well as to organize and implement projects independently. Graduates are able to collaborate with experts in other fields.

1.3 Studies and Examination Regulations

The legal basis for the study program and the examinations is the

Studien und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik
(Study and Examination Regulations of the Karlsruhe Institute of Technology (KIT) for the Bachelor Course of Studies in Chemical and Process Engineering)
of 05 August 2015 amended on 24 February 2020.

https://www.sle.kit.edu/downloads/AmtlicheBekanntmachungen/2015_AB_076.pdf

https://www.sle.kit.edu/downloads/AmtlicheBekanntmachungen/2020_AB_007.pdf

1.4 Organizational issues

General Information

Current information on degree programs and dates for information sessions can be found on the faculty web pages: **https://www.ciw.kit.edu/4102.php**
Exam dates can be found at **https://www.ciw.kit.edu/3338.php**

Recognition of achievements according to § 19 SPO

A request for recognition of services which

- At another university
- Abroad
- Outside the higher education system

can be submitted to the Bachelor Examination Board within one semester. There, if necessary after consultation with the subject representative, it will be determined whether the performance is equivalent to a performance envisaged in the curriculum of the course of study and can be recognised. Achievements completed as part of a semester abroad can also be recognized at a later date.

For forms, please refer to the website of the KIT Faculty of Chemical and Process Engineering **https://www.ciw.kit.edu/english/1167.php**

2 Curriculum Bachelor Chemical and Process Engineering

2.1 Semester overview

Semester CP	Fundamentals of Mathematics and Natural Sciences	Fundamentals of Scientific Engineering	Thermodynamics und Transport Processes	Fundamentals of Process Engineering	Lab Courses, Elective Courses, Thesis
1 **33**	Advanced Mathematics I (7) General and Inorganic Chemistry (6)	Engineering Mechanics: Statics (5) Mechanical Design (9) Material Science and Engineering (4)			Laboratory I Part I (2)
2 **31**	Advanced Mathematics II (7) Computational Methods (5) Organic Chemistry (5)	Engineering Mechanics: Strength of Material (5) Material Science and Engineering (5)			Basic Practical Course Part II (4)
3 **30**	Advanced Mathematics III (7) Computational Methods – Lab (3)	Engineering Mechanics: Dynamics (5)	Thermodynamics I (7)		Advanced Practical Course (5) Soft Skill Qualification (3)*
4 **29**			Thermodynamics II (7) Heat and Mass Transfer (7) Fluiddynamics (5) Control Engineering and System Dynamics (5)		Mandatory Elective Course I (5)*
5 **32**	Elementary Physics (7)			Chemical Process Engineering (6) Thermal Process Engineering (6) Mechanical Processing (6)	Mandatory Elective Course II (5)* Specialization/ Project Work (2)**
6 **25**					Specialization/ Project Work (10)** Soft Skill Qualification (3)* Bachelor Thesis (12)

Numbers in brackets: Credit points (CP)

* The distribution of the *Soft Skill Qualifications* and *Mandatory Elective Courses* over the semesters is a suggestion and can also be arranged differently depending on the modules selected.
In the area of *Soft Skill Qualifikations*, at least one of the modules *Industrial Business Administration* or *Ethics and Material Cycles* must be selected.

** The *Specialization/ Project Work* lasts two semesters and always begins in the winter semester. A profile subject can be chosen from approx. 10 offers. The distribution of the workload between winter and summer semesters may differ for individual profile subjects.

2.2 Overview: Fields and Modules

Area	Module	Responsible	SWS	CP
47 CP Fundamentals of Mathematics and Natural Sciences	Advanced Mathematics I	Griesmeier	6	7
	Advanced Mathematics II	Griesmeier	6	7
	Advanced Mathematics III	Griesmeier	6	7
	Computational Methods	Stein	3 + P	8
	General and Inorganic Chemistry	Behrens	5	6
	Organic Chemistry	Meier	4	5
	Elementary Physics	Ustinov	6	7
38 CP Fundamentals of Scientific Engineering	Engineering Mechanics: Statics and Strength of Material	Willenbacher	8	10
	Engineering Mechanics: Dynamics	Klahn	4	5
	Material Science and Engineering	Schneider	8	9
	Mechanical Design A	Matthiesen/ Albers	8	9
	Control Engineering and System Dynamics	Meurer	4	5
26 CP Thermodynamics and Transport Processes	Thermodynamics I	Enders	5	7
	Thermodynamics II	Enders	5	7
	Fluiddynamics	Nirschl	4	5
	Heat/ Mass Transfer	Wetzel	5	7
18 CP Fundamentals of Process Engineering	Mechanical Processing	Dittler	4	6
	Thermal Process Engineering	Zeiner	4	6
	Chemical Process Engineering	Wehinger	4	6
10 CP Mandatory Elective Courses	2 Elective Modules		4 each	5 each
11 CP Laboratories	Basic Practical Course	Horn, Sinanis	P	6
	Either: Process Machines Or: Practical Course in Organic Chemistry for Chemical Engineers	Gleiß Rapp	P	5
6 CP Soft Skill Qualifikations	Elective Modules		2 each	3 each
12 CP Specialization/ Project Work	1 Elective Module			12
12 LP	Bachelorarbeit			12
SUMME				180

CP: Credit Points (ECTS), SWS: weekly teaching hours

2.3 Lectures/ Exercises/ Laboratories
(Semester Overview, Attendance Time hours per week)

	1. Semester (WS)					2. Semester (SS)				
	V	**Ü**	**P**	***CP***	***E***	**V**	**Ü**	**P**	***CP***	***E***
Advaned Mathematics I and II	4	2	-	*7*	*S+K*	4	2	-	*7*	*S+K*
Computational Methods	-	-	-	-	-	2	1	P	*5*	*K*
Engineering Mechanics: Statics/ Strength of Material	2	2	-	*5*	-	2	2	-	*5*	*K*
General and Inorganic Chemistry (AAC)	3	2	-	*6*	*K*	-	-	-	-	-
Material Science and Engineering I and II	3	1	-	*4*	-	2	2	-	*5*	*M*
Mechanical Design A	4	2	-	*9*	*S+K*	-	-	-	-	-
Organic Chemistry for Engineers	-	-	-	-	-	2	2	-	*5*	*K*
Basic Lab Course	-	-	P	*2*	*S*	-	-	P	*4*	*S*
Total credit points/ Number of graded exams				*33*	*3*				*31*	*5*

	3. Semester (WS)					4. Semester (SS)				
	V	**Ü**	**P**	***LP***	***E***	**V**	**Ü**	**P**	***LP***	***E***
Advanced Mathematics III	4	2	-	*7*	*S+K*	-	-	-	-	-
Engineering Mechanics: Dynamics	2	2	-	*5*	*S+K*	-	-	-	-	-
Computational Methods	-	-	P	*3*	*S*	-	-	-	-	-
Control Engineering and System Dynamics	-	-	-	-	-	2	2	-	*5*	*K*
Fluiddynamics	-	-	-	-	-	2	2	-	*5*	*S+K*
Technical Thermodynamics I and II	3	2	-	*7*	*S+K*	3	2	-	*7*	*S+K*
Heat- and Masstransfer	-	-	-		-	3	2	-	*7*	*K*
Mandatory Elective Courses	-	-	-	-	-	2	2	-	*5*	*K*
Lab (Chemistry or Process Engineering) 2 weeks Feb./March	-	-	P	*5*	*S*	-	-	-	-	-
Soft Skill Qualification	2	-	-	*3*	*S*	-	-	-	-	-
Total credit points/ Number of graded exams				*30*	*3*				*31*	*5*

	5. Semester (WS)					6. Semester (SS)				
	V	**Ü**	**P**	***LP***	***E***	**V**	**Ü**	**P**	***LP***	***E***
Chemical Process Engineering	2	2	-	*6*	*K*	-	-	-	-	-
Thermal Process Engineering	2	2	-	*6*	*K*	-	-	-	-	-
Mechanical Processing	2	2	-	*6*	*K*	-	-	-	-	-
Elementary Physics	4	2	-	*7*	*K*	-	-	-	-	-
Mandatory Elective Courses	4	2	-	*5*	*K*	-	-	-	-	-
Specialization/ Project Work	1	1	-	*2*	-	1	1	P	*10*	*A+M*
Soft Skill Qualification*					-	2	-	-	*3*	*S*
Bachelor Thesis	-	-	-		-	360 hrs			*12*	*A*
Total credit points/ Number of graded exams				*32*	*5*				*25*	*3*

WS: Wintersemester, SS: Sommersemester
V: Lecture; Ü: Exercise P: Practial/ Lab; CP: Credit Points E: Examination
K: Written exam, M: Oral Exam, A: Examination of another type/ thesis, S: Completed Coursework (ungraded)

3 Study Program Structure

Mandatory	
Orientation Exam *This field will not influence the calculated grade of its parent.*	
Bachelor's Thesis	12 CP
Fundamentals of Mathematics and Natural Sciences	47 CP
Fundamentals of Scientific Engineering	38 CP
Thermodynamics and Transport Processes	26 CP
Fundamentals of Process Engineering	18 CP
Mandatory Elective Courses	10 CP
Laboratories *First usage possible from Oct 01, 2023.*	11 CP
Specialization/ Project Work	12 CP
Interdisciplinary Qualifications	6 CP
Voluntary	
Master's Transfer Account *This field will not influence the calculated grade of its parent.*	

3.1 Orientation Exam

Election notes
As an orientation exam, the following partial achievements must be passed by the end of the third semester:

- Advanced Mathematics I
- General and Inorganic Chemistry

Mandatory				
M-CIWVT-100874	Orientation Exam	DE	WS+SS	0 CP

3.2 Bachelor's Thesis

Credits
12

Prerequisite:

The Bachelor thesis may only be started when the requirements (at least 120 LP) have been fulfilled.

Procedure for registering the Bachelor's thesis

Registration for the Bachelor's thesis is handled by the Bachelor Examination Board:

- Registration before starting the thesis
- If possible, send documents to the Bachelor Examination Board via the Institute Secretariat.
- The Bachelor Examination Board requires the following documents no later than four weeks after the start of the work
  - Admission certificate https://www.ciw.kit.edu/1838.php filled out and signed
  - Copy of the assignment (signed by the person submitting the assignment)
- The Bachelor Examination Board will record and register the Bachelor thesis in the campus management system. The deadline for submission is also recorded by the Bachelor Examination Board.

Submission of the Bachelor's thesis:

- The maximum processing time is four months. The submission deadline is recorded in the campus management system. The thesis must be handed in within the deadline.
- When submitting the Bachelor's thesis, students must declare that they have written the thesis independently and have not used any sources or aids other than those specified. The exact wording can be found in the study and examination regulations.
  - The following must be handed in1 copy at the dean's office/at the Bachelor Examination Board.
  - Handing in at the supervisor after consultation
- The date of submission is the date of submission to the Bachelor Examination Board.

Mandatory				
M-CIWVT-103204	Bachelor's Thesis	DE	WS+SS	12 CP

3.3 Fundamentals of Mathematics and Natural Sciences

Credits
47

Mandatory				
M-MATH-100280	Advanced Mathematics I	DE	Jährlich	7 CP
M-MATH-100281	Advanced Mathematics II	DE	SS	7 CP
M-MATH-100282	Advanced Mathematics III	DE	WS	7 CP
M-CIWVT-101956	Computational Methods	DE	Jährlich	8 CP
M-CHEMBIO-101117	General and Inorganic Chemistry	DE	WS	6 CP
M-CHEMBIO-101115	Organic Chemistry for Engineers	DE	SS	5 CP
M-PHYS-100993	Elementary Physics	DE	WS	7 CP

3.4 Fundamentals of Scientific Engineering

Credits
38

Mandatory				
M-CIWVT-101128	Engineering Mechanics: Dynamics	DE	WS	5 CP
M-MACH-102567	Material Science and Engineering	DE	WS+SS	9 CP
M-MACH-106527	Mechanical Design A *First usage possible from Oct 01, 2023.*	DE	WS	9 CP
M-CIWVT-106308	Control Engineering and System Dynamics *First usage possible from Apr 01, 2023.*	DE	SS	5 CP
M-CIWVT-104006	Engineering Mechanics: Statics and Strength of Materials *First usage possible from Oct 01, 2017.*	DE	Jährlich	10 CP

3.5 Thermodynamics and Transport Processes

Credits
26

Mandatory				
M-CIWVT-101129	Thermodynamics I	DE	WS	7 CP
M-CIWVT-101130	Thermodynamics II	DE	SS	7 CP
M-CIWVT-101131	Fluiddynamics	DE	SS	5 CP
M-CIWVT-107675	Heat and Mass Transfer *First usage possible from Apr 01, 2026.*	DE	SS	7 CP

3.6 Fundamentals of Process Engineering

Credits
18

Mandatory				
M-CIWVT-101135	Mechanical Processing	DE	WS	6 CP
M-CIWVT-101134	Thermal Process Engineering	DE	WS	6 CP
M-CIWVT-101133	Chemical Process Engineering	DE	WS	6 CP

3.7 Mandatory Elective Courses

Credits
10

Election notes
In most cases, two modules totaling 10 ECTS are chosen (regardless of whether the modules are offered in the summer or winter term). For most optional subjects, participation is not recommended before the fourth semester.

Mandatory Elective Courses (Election: at least 10 credits)				
M-CIWVT-103297	Applied Apparatus Engineering	DE	SS	5 CP
M-CIWVT-106475	Biopharmaceutical Process Engineering *First usage possible from Apr 01, 2025.*	DE	SS	6 CP
M-CIWVT-107403	Bioprocess Development *First usage possible from Oct 01, 2025.*	DE	WS	6 CP
M-CIWVT-106434	Bioprocess Engineering *First usage possible from Oct 01, 2024.*	DE	WS	5 CP
M-CIWVT-106030	Catalysts for the Energy Transition *First usage possible from Oct 01, 2022.*	EN	SS	5 CP
M-CIWVT-106433	Introduction into Bioengineering *First usage possible from Apr 01, 2024.*	DE	SS	5 CP
M-CIWVT-107651	Electrochemical Energy Technologies and Materials *First usage possible from Apr 01, 2026.*	DE	SS	5 CP
M-CIWVT-101136	Energy Process Engineering	DE	WS	5 CP
M-CIWVT-106880	Advanced Methods in Linear Control *First usage possible from Oct 01, 2024.*	DE	WS	6 CP
M-CIWVT-106444	Intensification of Bioprocesses *First usage possible from Apr 01, 2025.*	DE	SS	6 CP
M-CIWVT-106476	Food Bioprocess Engineering *First usage possible from Oct 01, 2025.*	DE	WS	6 CP
M-MACH-106528	Mechanical Design B-C *First usage possible from Oct 01, 2023.*	DE	WS	12 CP
M-CIWVT-101137	Industrial Organic Chemistry	DE	WS	5 CP
M-ETIT-105703	Laboratory Course: Electrochemical Energy Technologies *First usage possible from Oct 01, 2021.*	DE/EN	SS	6 CP

3.8 Laboratories

Credits
11

Note regarding usage
First usage possible from Oct 01, 2023.

Mandatory				
M-CIWVT-106500	Basic Practical Course	DE	WS	6 CP
Advanced Practical Course (Election: 1 item)				
M-CIWVT-101139	Process Machines	DE	WS	5 CP
M-CHEMBIO-101116	Practical Course in Organic Chemistry for Chemical Engineers	DE	WS	5 CP

3.9 Specialization/ Project Work

Credits
12

In the fifth semester the possibility of profile building exists for the first time. Eleven specialization subjects are available. The size and structure of these specialization subjects are similar. All specialization subjects extend over two semesters, start in the winter semester and end at the end of May at the latest. In the winter semester, lectures usually take place in which extended, subject-specific knowledge is imparted. Subsequently, research-related project work is carried out in small groups. Prerequisites for participation in the profile subjects are at least 60 ECTS and at least one successfully completed internship (e.g. general and inorganic chemistry, process engineering,...).

The learning control of specialization subjects consists of two parts which are listed in the description of the module description (e.g. oral examination and presentation of the project work). The specialization subject is only passed if both partial examinations are passed (evaluated with at least "sufficient"). A failed partial performance can only be repeated once. Dates for repeat exams will be agreed with the person responsible for the subject.

As the practical work is carried out in the laboratory, the number of participants in the individual specialization subjects is limited. The registration for the specialization subjects is usually possible in July. Within a registration period of two weeks, students have the opportunity to choose their preferred subject (at least one first and one second wish). After the registration deadline, the places will be allocated automatically, taking into account your wishes as far as possible.

Before the start of the registration period, an information event will be held in June or July, in which the individual subjects will be presented and the registration procedure explained.

The location and time of the information event will be published in good time on the faculty's and student council's homepages https://www.ciw.kit.edu/4102.php

Election regulations
Elections in this field require confirmation.

Specialization/ Project Work (Election: at least 12 credits)				
M-CIWVT-104458	Applied Thermal Process Engineering	DE	WS	12 CP
M-CIWVT-106477	Automation and Control Systems Engineering *First usage possible from Oct 01, 2023.*	DE	WS	12 CP
M-CIWVT-101143	Biotechnology	DE	WS	12 CP
M-CIWVT-106825	Chemical Reaction Engineering *First usage possible from Oct 01, 2024.*	DE	WS	12 CP
M-CIWVT-101145	Energy and Environmental Engineering	DE	WS	12 CP
M-CIWVT-106700	Formulation and Characterisation of Energy Materials *First usage possible from Oct 01, 2024.*	DE	WS	12 CP
M-CIWVT-104457	Fundamentals of Refrigeration	DE	WS	12 CP
M-CIWVT-105995	Circular Economy *First usage possible from Oct 01, 2022.*	DE	WS	12 CP
M-CIWVT-101148	Food Technology	DE	Jährlich	12 CP
M-CIWVT-106448	Air Pollution Control *First usage possible from Oct 01, 2023.*	DE	WS	12 CP
M-CIWVT-101147	Mechanical Separation Technology	DE	WS	12 CP
M-CIWVT-101154	Micro Process Engineering	DE	WS	12 CP
M-CIWVT-101153	Process Development and Scale-up	DE	WS	12 CP
M-CIWVT-107495	Introduction to Thin Film Technology *First usage possible from Oct 01, 2025.*	DE	WS	12 CP

3.10 Interdisciplinary Qualifications

Credits
6

A total of 6 LPs must be completed in the area of "soft skill qualifications" during the Bachelor's programe. Non-technical modules, such as modules from other subject areas, language courses or other courses offered by the House of Competence (HoC) or the Centre for Applied Cultural Studies and General Studies (FORUM), belong to interdisciplinary qualifications.

Registration in the Campusmanagement System

Additional credits and interdisciplinary qualifications cannot always be registered directly in the CAS system (e.g. some modules from another faculty). In any case, you must contact Julia Hofer before the examination.

Exception:
interdisciplinary qualification at the House of Competence (HoC) or Language Centre

If the Soft Skill Qualification is taken at the HoC or Language Centre, then no certificate of approval is required for an examination achievement, as the achievements are automatically posted in the CAS system under "unallocated credits".

If you want to credit a performance that is listed under " unallocated credits", you have submit a form to the Masters Examination Board.

For forms, please refer to the website of the KIT Faculty of Chemical and Process Engineering https://www.ciw.kit.edu/bpa.php

Election notes
3 of the 6 LPs are fixed: At least one of the following modules must be selected:

- Ethics and Global Material Cycles
- Industrial Business Administration

Modules in the range of 3 LP can be freely selected. The following can be done

- either both of the above mentioned modules
- or any modules of at least 3 LP (e.g. HoC or FORUM courses)

can be selected.

Soft Skill Qualifications (Election: at least 6 credits)				
M-CIWVT-101149	Ethics and Global Material Cycles	DE	SS	3 CP
M-WIWI-100528	Industrial Business Administration		Jährlich	3 CP
M-CIWVT-106534	Data-Driven Modeling with Python *First usage possible from Oct 01, 2023.*	DE	WS	3 CP
M-CIWVT-107654	Process Engineering in Excel *First usage possible from Apr 01, 2026.*	DE	SS	3 CP
M-CIWVT-105848	SmartMentoring *First usage possible from Oct 01, 2021.*	DE	WS	3 CP

3.11 Master's Transfer Account

Students who have already earned at least 120 LP in their Bachelor's programe can earn credit points from a consecutive Master's programe at KIT up to a maximum of 30 LP.

Exams can be taken in the following subjects:

- Advanced Fundamentals
- Internship
- Soft Skill Qualifications

Further information on individual modules can be found in the module manual of the Master's program.

Within the first Master's semester, achievements can be taken over into the master program. Please contact the Master's Examination Board.
There is no obligation to transfer achievements form Master Transfer Account!

Election notes
Please note: Upon successful completion of all studies and exams needed for the bachelor's degree, a control of success registered as a prior master's examination may only be passed as long as you are enrolled in the bachelor's program. You should not yet have been admitted to the master's program and the master's semester should not yet have started.

This means that as soon as your admission to the master's program has been expressed and the master's semester has started, your participation in the examination is the **first regular examination** attempt within the framework of your master's studies.

Master Transfer Account (Election: at most 30 credits)				
M-CIWVT-101992	Single Results	DE		30 CP

Modelled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 120 credits in the following fields:
    - Fundamentals of Scientific Engineering
    - Fundamentals of Mathematics and Natural Sciences
    - Laboratories
    - Specialization/ Project Work
    - Thermodynamics and Transport Processes
    - Interdisciplinary Qualifications
    - Fundamentals of Process Engineering
    - Mandatory Elective Courses

4 Modules

M 4.1 Module: Automation and Control Systems Engineering [M-CIWVT-106477]

Coordinators: Prof. Dr.-Ing. Thomas Meurer
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work (Usage from 10/1/2023)

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	4	1

Mandatory			
T-CIWVT-113088	Automation and Control Systems Engineering - Exam	6 CP	Meurer
T-CIWVT-113089	Automation and Control Systems Engineering - Project Work	6 CP	Meurer

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

M 4.2 Module: Advanced Mathematics I [M-MATH-100280]

Coordinators: Prof. Dr. Roland Griesmaier
Organisation: KIT Department of Mathematics
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading	Duration	Language	Level	Version
7 CP	graded	1 term	German	3	3

Mandatory			
T-MATH-100275	Advanced Mathematics I	7 CP	Arens, Griesmaier, Hettlich
T-MATH-100525	Tutorial Advanced Mathematics I *This item will not influence the grade calculation of this parent.*	0 CP	Arens, Griesmaier, Hettlich

Assessment
Learning assessment is carried by a written examination of length 120 minutes and by homework assignments (pre-requesite). A "pass" result on the pre-requesite is a requirement for registration for the corresponding written examination.

Prerequisites
none

Competence Goal
The students know the fundamentals of one-dimensional calculus. They can reliably use limits, functions, power series and integrals. They understand central concepts such as continuity, differentiability or integrability and they know important statements about these concepts. The students can follow the arguments leading to these statements as presented in the lectures and are able to independently prove simple assertions based on these statements.

Content
Fundamentals, sequences and convergence, functions and continuity, series, differential calculus of one real variable, integral calculus

Module Grade Calculation
The module grade is the grade of the written examination

Workload
In class: 90 hours

- lectures, tutorials and examinations

Independent study: 120 hours

- independent review of course material
- work on homework assignments
- preparation for written exams

Literature
will be announced in class.

Base For
Advanced Mathematics II

M 4.3 Module: Advanced Mathematics II [M-MATH-100281]

Coordinators: Prof. Dr. Roland Griesmaier
Organisation: KIT Department of Mathematics
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading	Recurrence	Duration	Language	Level	Version
7 CP	graded	Each summer term	1 term	German	3	2

Mandatory			
T-MATH-100276	Advanced Mathematics II	7 CP	Arens, Griesmaier, Hettlich
T-MATH-100526	Tutorial Advanced Mathematics II *This item will not influence the grade calculation of this parent.*	0 CP	Arens, Griesmaier, Hettlich

Assessment
Learning assessment is carried by a written examination of length 120 minutes and by homework assignments (pre-requesite). A "pass" result on the pre-requesite is a requirement for registration for the corresponding written examination.

Prerequisites
none

Competence Goal
The students know about the fundamentals of linear algebra. The are able to use vectors, linear maps and matrices without problems. They have basic knowledge about Fourier series. The students also can theoretically and practically deal with initial value problems of ordinary differential equations. They can make use of classical solution techniques for linear differential equations.

Content
vector spaces, linear maps, eigenvalues, Fourier series, differential equations, Laplace transform

Module Grade Calculation
The module grade is the grade of the written examination.

Workload
In class: 90 hours

- lectures, tutorials and examinations

Independent study: 120 hours

- independent review of course material
- work on homework assignments
- preparation for written exams

Recommendations
The following modules should have been taken: Advanced Mathematics 1

Literature
will be announced in class.

Base For
Advanced Mathematics III

M 4.4 Module: Advanced Mathematics III [M-MATH-100282]

Coordinators: Prof. Dr. Roland Griesmaier
Organisation: KIT Department of Mathematics
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading	Recurrence	Duration	Language	Level	Version
7 CP	graded	Each winter term	1 term	German	3	2

Mandatory			
T-MATH-100277	Advanced Mathematics III	7 CP	Arens, Griesmaier, Hettlich
T-MATH-100527	Tutorial Advanced Mathematics III *This item will not influence the grade calculation of this parent.*	0 CP	Arens, Griesmaier, Hettlich

Assessment
Learning assessment is carried by a written examination of length 120 minutes and by homework assignments (pre-requesite). A "pass" result on the pre-requesite is a requirement for registration for the corresponding written examination.

Prerequisites
none

Competence Goal
The students know about differential calculus for vector-valued functions of several variables and about techniques of vector calculus such as the definition and application of differential operators, the computation of domain, line and surface integrals and important integral theorems. They have basic knowledge about partial differential equations and know basic facts from stochastics.

Content
Multidimensional calculus, domain integrals, vector calculus, partial differential equations, stochastics.

Module Grade Calculation
The module grade is the grade of the written examination.

Workload
In class: 90 hours

- lectures, tutorials and examinations

Independent study: 120 hours

- independent review of course material
- work on homework assignments
- preparation for written exams

Recommendations
The following modules should have been taken before: Advanced Mathematics I and II

Literature
will be announced in class.

M 4.5 Module: Advanced Methods in Linear Control [M-CIWVT-106880]

Coordinators: Prof. Dr.-Ing. Thomas Meurer
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses (Usage from 10/1/2024)

Credits	Grading	Recurrence	Duration	Language	Level	Version
6 CP	graded	Each winter term	2 terms	German	4	1

Mandatory			
T-CIWVT-113088	Automation and Control Systems Engineering - Exam	6 CP	Meurer

Assessment
Learning control is an oral exam lasting approx. 30 minutes.

Prerequisites
None.

Module Grade Calculation
The module grade is the grade of the oral exam.

M 4.6 Module: Air Pollution Control [M-CIWVT-106448]

Coordinators: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work (Usage from 10/1/2023)

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	4	1

Mandatory			
T-CIWVT-113046	Air Pollution Control	7 CP	Dittler
T-CIWVT-113047	Air Pollution Control - Project Work	5 CP	Dittler

Assessment
The learning control consists of two partial achievements:

1. oral examination, duration 30 minutes
2. project work

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

Competence Goal
Students undertstand transport behavior and methods of size distribution measurement of airborne fine particles in the context of environmental and nanotechnology. They are able to apply this knowledge to solve basic problems of particle technology in a team oriented approach.

Content
The classes provide a knowledge base of methods of particle dispersion, particle transport processes in gases, as well as methods for their characterization with applications in the environment and industrial product design. Practical experience related to these concepts is developed in a team based lab project.

Module Grade Calculation
The module grade is calculated from the grades of the two partial achievments:
40 % project work, 60 % oral examination.

Workload

- Attendance time: 56 h (V+Ü) + 120 (project work) + 10 (Excoursion)
- Self-Study: 24 h
- Oral examination: 140 h

Literature
Skriptum Gas-Partikel-Messtechnik

M 4.7 Module: Applied Apparatus Engineering [M-CIWVT-103297]

Coordinators: Dr. Martin Neuberger
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses

Credits	Grading	Recurrence	Duration	Language	Level	Version
5 CP	graded	Each summer term	1 term	German	4	1

Mandatory			
T-CIWVT-106562	Applied Apparatus Engineering	5 CP	Neuberger

Assessment
Success Control is an written examination of 90 minutes duration according to § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
None

Competence Goal
The students will be able to describe the necessary steps for concept, planning and calculation of a construction of a machine until the commissioning. This contains the choice and declaration of single components. The students will apply the principles of the machine design with respect to the requirements for different educts, products and processes.

Additionally to technical aspects, the students will learn about cost management, time management and quality management. The students will know the sequence of licensing and providing procedures.

Content
Project Management
Project time management, project cost management, work breakdown structure

Process of Machine Design
Product (requirements with respect to corrosion, purity, cleanness ...), process (manufacturing, pressure, temperature, ...), selection of materials and components (motors, pumps, vans, fittings), maintenance, repair, safety, manufacturing process (welding, brazing ...), transport, commissioning, performance test, approval ...

Procurement
Technical specification, call for tenders, contract design, claim management

Quality Management
Certification concerning ISO 9001:2015, quality planning, quality approval
e.g. welding process qualification, qualified welders ...
material qualification report, control of manufacturing and mounting, commissioning

Workload
Attendance time: 60 h
Self-study: 45 h
Exam preparation: 45 h

Literature
Walter Wagner: Planung im Anlagenbau; Vogel Business Media; Auflage: 3. Auflage (August 2009)

M 4.8 Module: Applied Thermal Process Engineering [M-CIWVT-104458]

Coordinators: Dr.-Ing. Benjamin Dietrich
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	3	4

Mandatory			
T-CIWVT-109120	Applied Thermal Process Engineering - Project Work	6 CP	Dietrich
T-CIWVT-110803	Applied Thermal Process Engineering - Exercises	6 CP	Dietrich

Assessment
The learning control consists of two module components:

- Exercises and lab (winter semester)
- Project work and presentation (summer semester)

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

Competence Goal
Students can

- explain basic, future-oriented processes of applied thermal process engineering
- process chain of a scientific question up to its answer: planning, conceptual design, implementation, execution and evaluation of fundamental experiments, describing aspects for implementation on a technical scale (scale-up)
- work scientifically using standard IT tools
- present scientific results
- independently acquire specialist knowledge

Content
Within the scope of this module an insight into the current research of the institute is to be made possible, which deals with future-oriented topics, such as renewable energy concepts, electromobility and energy storage. Three basic experiments in the fields of drying, heat transfer and crystallization are offered in the form of a project work.

First, the corresponding technical and methodological fundamentals are presented in a lecture. This also includes the transfer of necessary knowledge for the preparation of a scientific report or a scientific presentation as well as the use of special Excel tools such as solvers or macros. In special workshops at the TVT the lecture contents can be trained. Subsequently, experiments are carried out in the laboratory using modern, partly self-assembled measuring technology (e.g. temperature sensors based on single board computers / Arduino) on the respective topic. The evaluation is carried out using the basics laid down in the lecture and with the aid of corresponding chapters of the VDI heat atlas. The results are summarized in a work report. In the following step, a design calculation for the industrial scale-up with corresponding specifications of the required devices is prepared for one of the basic experiments. The design achieved is to be presented to the other students of the profile subject in a scientific seminar. The practical part is rounded off by an excursion to BASF in Ludwigshafen, which provides insights into the application of what has been learned in industrial implementation.

Module Grade Calculation
The module grade is the CP-weighted average of the two partial achievements.

Workload
Lectures and exercises: 100 h

Homework: 160 h

Labooratory work (incl. interpretation and report): 100 h

Recommendations
The successful participation in the lecture "Basics of Heat an Mass Transfer" of the TVT ist an advantage.

Literature

- VDI-Wärmeatlas, Springer 2013
- Own Mauscripts

M 4.9 Module: Bachelor's Thesis [M-CIWVT-103204]

Coordinators: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: Bachelor's Thesis

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each term	1 term	German	3	3

Mandatory			
T-CIWVT-106365	Bachelor's Thesis	12 CP	

Prerequisites
§ 14 (1) SPO

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 120 credits in your study program.

Competence Goal
Students are able to work on specialised problems with scientific methods independently and within a defined time frame.

M 4.10 Module: Basic Practical Course [M-CIWVT-106500]

Coordinators: Prof. Dr. Harald Horn
Dr. Sokratis Sinanis

Organisation: KIT Department of Chemical and Process Engineering

Part of: Laboratories (mandatory)

Credits	Grading	Recurrence	Duration	Language	Level	Version
6 CP	pass/fail	Each winter term	2 terms	German	3	1

Mandatory			
T-CIWVT-113117	Laboratory Work: General Chemistry	2 CP	Horn, West
T-CIWVT-113118	Practical Course: Process Engineering	4 CP	Sinanis

M 4.11 Module: Biopharmaceutical Process Engineering [M-CIWVT-106475]

Coordinators: Prof. Dr. Jürgen Hubbuch
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses (Usage from 4/1/2025)

Credits	Grading	Recurrence	Duration	Language	Level	Version
6 CP	graded	Each summer term	1 term	German	4	1

Mandatory			
T-CIWVT-113023	Biopharmaceutical Process Engineering	6 CP	Hubbuch

Assessment
Learning controlis a written examination of 120 min duration.

Prerequisites
None

Competence Goal
Overview on unit operations for protein separations and respective analytics used in the biotechnological industry.

Content
The elcture series adresses fundamentals in biotechnological purification of bio-products and respective analytics.

Module Grade Calculation
The module grade ist the grade of the written exam.

Workload

- Lectures and exercises: 60 hrs
- Homework: 80 hrs
- preparation of examination: 40 hrs

Literature
will be announced

M 4.12 Module: Bioprocess Development [M-CIWVT-107403]

Coordinators: Prof. Dr.-Ing. Alexander Grünberger
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses (Usage from 10/1/2025)

Credits	Grading	Recurrence	Duration	Language	Level	Version
6 CP	graded	Each winter term	1 term	German	4	1

Mandatory			
T-CIWVT-114538	Bioprocess Development	6 CP	

Assessment
Learning control ist an wirtten exam lastring 120 minutes.

Prerequisites
None.

Competence Goal
Subject-specific and methodological competencies:

The students

- Know the fundamental steps involved in developing a bioprocess, from concept to implementation.
- Understand and apply fundamental methods relevant to each stage of bioprocess development.
- Recognize how successive steps in bioprocess development are interconnected and how changes in one stage affect others.
- Be aware of the complexity and multidisciplinary nature of bioprocess development, integrating knowledge from biology, chemistry, engineering, and business.
- Learn to theoretically design a new bioprocess from scratch, considering all relevant constraints.
- Evaluate and mitigate critical steps and risks during bioprocess development.
- Develop bioprocesses with the end in mind, taking into account market requirements, cost efficiency, and sustainability.
- Stay informed about emerging trends, new methods, and technologies in the field, including the impact of artificial intelligence on future bioprocess development.

Social and self-competence:

The students

- Identify and summarize key elements and constraints of complex bioprocesses
- Developed effective communication skills to successfully work with experts from different disciplines involved in bioprocess development.
- Engaged in independent learning to continuously expand knowledge and adapt to new challenges in the field.
- Developed critical thinking, creativity and problem-solving skills necessary for developing fundamentally new processes and solutions
- Developed potential solutions and consider options for the development of a bioprocess

Content
Successful bioprocess development requires a range of technical and communication skills. The course will link microbial strain engineering with bioprocess engineering and connects the basic bioengineering knowledge gained in the first years of studies. Knowledge of previous courses will be reinforced and applied for the technical development of bioprocesses. Central guidelines and concepts to develop robust, economic and sustainable bioprocesses will be introduced. The objective of this course is to provide the students with the necessary and fundamental insight into bioprocess development and how different fields interact with each other. This includes (i) defining the product and (ii) the choice of raw material (ii), microbial host selection (iii), strain engineering (iv), bioprocess optimization (v), and scale-up and operation of the bioprocess (vi). State of the art knowledge will be supported by insights into emerging fields and topics within bioprocess development such as miniaturization, automatization, digitalization that will accelerate bioprocess development in future. The students will learn to think interdisciplinary and to apply the key principles of the different bioprocess development steps to develop future bioprocesses.

Teaching formats include a combination of lectures, exercises and case studies. Lecture topics include:

1. Bioprocess development workflow and guidelines
2. Substrate and host selection
3. Strain engineering and screening
4. Bioprocess optimization
5. Bioprocess-scale-up
6. Cost and sustainability estimation
7. Case studies
8. Regulatory and quality control requirements
9. Digitalisation and artificial intelligence

Module Grade Calculation
The module grade is the grade of the written exam.

Workload

- Attendance time: Lectures and exercieses 60 hrs
- Homework: Wrap-up and preperation of lectures and exercies: 80 hrs
- Exam preparation: 40 hrs

Recommendations
Bioprocess Engineering.

Literature

- Lecture scripts
- Pauline M. Doran, Bioprocess Engineering Principles, Academic Press; 2nd edition, ISBN: 012220851X
- Winfried Storhas, Bioverfahrensentwicklung, Wiley-VCH, 2. Aufl. 2014, ISBN: 978-3-527-32542-5

M 4.13 Module: Bioprocess Engineering [M-CIWVT-106434]

Coordinators: Prof. Dr.-Ing. Alexander Grünberger
Prof. Dr. Jürgen Hubbuch

Organisation: KIT Department of Chemical and Process Engineering

Part of: Mandatory Elective Courses (Usage from 10/1/2024)

Credits	Grading	Recurrence	Duration	Language	Level	Version
5 CP	graded	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-113019	Bioprocess Engineering	5 CP	Grünberger, Hubbuch

Assessment
Learning control is a written exam lasting approx. 120 minutes.

Prerequisites
None

Competence Goal
The students are able to apply basic operations and concepts of process engineering to bioprocesses. They can transfer reaction engineering approaches to microbial metabolism and use them to understand real processes. They know different processes, bioreactors and process control strategies in theory and learn how to calculate and evaluate real processes from a theoretical and application perspective. They will learn to interpret, discuss and critically assess various bioprocesses in detail. Students can analyze, structure and formally describe problems in the area of biotechnological separation processes. The students are able to critically assess the different procedures.

Content
Bioprocess engineering encompasses the design, operation, control, and optimization of biochemical processes involving various biological pathways or reactions mediated by living cells of animals, plants and microorganisms or enzymes under controlled conditions for the efficient biotransformation of raw material into a range of products at requisite scales. Bioprocesses have been developed for production of wide variety of commercial products ranging from cheap to expensive specialty chemicals as antibiotics, therapeutic proteins and vaccines. Bioprocess engineering is thus the backbone of the biotechnology industry that translates the research and development to the industries and mainly consists of three fields: (i) Upstream processing (ii) Bioreactor and bioreactions (iii) downstream processing.

The course will link with basic engineering and biotechnological knowledge gained in the first years of studies. Knowledge of previous courses will be reinforced and applied for the technical development of bioprocesses. The objective of this course is to provide the students with the necessary and fundamental insight of bioprocess engineering. This includes fundamentals in biocatalysis (mainly cells as biocatalysts), microbial kinetics, mass and energy balance in bioprocesses and kinetics of bioprocesses and fermentation. Here focus will be laid on fundamental kinetic and stoichiometric principles of microbial metabolism. Based on that design and evaluation of cultivation media will be discussed. In the second part bioreactor engineering design, operation and optimization principles of fermentation processes for the production of high value bio-products will be discussed. Topics include fundamentals of process control strategies such as batch, fed-batch and continues cultivations. Construction operation, function of different types of bioprocesses will be demonstrated. Advantages and disadvantages will be discussed. First insights into bioprocess analytics and control will be given. Finally, an outlook into emerging topics within bioprocess engineering is given, including topics such as automatization and digitalization of bioprocesses and economic and sustainability considerations of bioprocesses. Furthermore, introduction into fundamentals of downstream processing will be given, including cell disruption, solid-liquid separation, partitioning, adsorption and chromatography. The students will learn to think interdisciplinary and to apply the key principles of the different bioprocess development steps. Lecture contents will be deepened by exercises.

Module Grade Calculation
Grade of the module is the grade of the written examination.

Workload

- Lectures: 60 h
- Homework: 50 h
- Exam Preparation: 40 h

Literature

- Horst Chmiel, Bioprozesstechnik, 2011, DOI:10.1007/978-3-8274-2477-8
- Wilfried Storhas, Bioverfahrensentwicklung, 2013, ISBN: 978-3-527-32899-4
- Clemens Posten, Integrated Bioprocess Engineering, 2018, DOI:10.1515/9783110315394

M 4.14 Module: Biotechnology [M-CIWVT-101143]

Coordinators: Prof. Dr. Jürgen Hubbuch
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	4	5

Mandatory			
T-CIWVT-103668	Biotechnology	3 CP	Henke
T-CIWVT-103669	Biotechnology	9 CP	Perner-Nochta

Assessment
The module comprises two graded learning controls:

1. written examination lastin 90 minutes.
2. practical work/ protocol/ presentation

- project plan
- project work
- poster presentation/ talk
- report

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

Competence Goal
Basic understanding of processes and synthesis of processes in biotechnologic production

lecture Bioanalytics:

The students can describe the selection and implementation of methods for the analysis of biomolecules. Students will be able to evaluate the advantages and limitations of the various methods with regard to their areas of application in biotechnological research in the context of various biomolecules (in particular DNA, RNA, proteins/enzymes, metabolites). Students are able to select suitable methods and experimental designs for their own (future) work in the context of qualitative and quantitative bioanalytics.

Lecture „Management of scientific projects“ and exercises:
The students are able to conduct literature research on their own, design own experiments, evaluate their own data, write own scientific texts. They can plan their own small project regarding time and finances required and prepare a project plan as well as present it. They can prepare a (scientific) poster and present it.

Project Work:
The students are able to do own scientific research and practical work in the field of biotechnology. They know how to analyse their own gained data and prepare a project report.

Content
lecture Bioanalytics:

The lecture will introduce the most important methods for the analysis of biomolecules. According to the genetic information flow in the cell, methods of bioanalysis for DNA, RNA, proteins/enzymes and metabolites are taught. The theory and application of methods are illustrated using research examples. Methods focus on sequencing technologies, protein analysis, enzymology, chromatographic methods and the basics of mass spectrometry and NMR. Other microscopy methods and reporter systems for analyzing biomolecules in whole cells are also presented.

Lecture „Management of scientific projects“ and exercises:
The lecture covers literature research, design of experiments, data evaluation, scientific writing and project management; in parts it is software-based and carried out in an electronic classroom.

Practical excercises cover literature research, preparation of a project plan, presentation of the project plan, preparation of a poster, presentation of the poster

Procect Work:
Accomplishment of autonomous investigation and practical work in the field of biotechnology, preparation of a project report

Module Grade Calculation
weighted mean based on LP.

Workload
Bioanalytics:

- Lectures and Exercises: 30 h
- Homework: 30 h
- Exam Preparation: 30 h

Management of scientific projects:

- Lectures and Exercises: 45 h
- Homework: 45 h

Lab Work:

- Lab: 80 h
- Homework: 10 h

Project:

- Lab: 10 h
- Homework: 80 h

Literature
Will be announced.

M 4.15 Module: Catalysts for the Energy Transition [M-CIWVT-106030]

Coordinators: TT-Prof. Dr. Moritz Wolf
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses (Usage from 10/1/2022)

Credits	Grading	Recurrence	Duration	Language	Level	Version
5 CP	graded	Each summer term	1 term	English	4	1

Mandatory			
T-CIWVT-112214	Catalysts for the Energy Transition	5 CP	Wolf

Assessment
Learing control ist an oral exam, duration approx. 20 minutes.

Prerequisites
None.

Competence Goal
The students are able to explain properties and basic relationships in catalysis, know the preparation methods of heterogeneous catalysts and are familiar with characterisation techniques and their interpretation. They understand the interlink between the macroscopic and microscopic structural properties and activity, selectivity and stability based on exemplary sustainable applications of heterogeneous catalysis for the energy transition.

Content
Lecture:

- Introduction to catalysis: classification, significance and terminology
- Aspects of the (global) energy transition
  - Renewable energy sources
  - Hydrogen economy: production, purification, storage and transportation
- Components, preparation, characterisation and deactivation of heterogeneous catalysts for the following application examples
  - Production and conversion of synthesis gas
  - Valorisation of carbon dioxide: (point) sources, Power-to-X, sustainable chemicals
  - Chemical hydrogen storage
- Literature studies on catalyst design
  - Structure-reactivity and structure-stability relations
  - Alternative catalyst concepts

Practice:

- Processing and interpretation of data from catalyst characterisation
- Use cases from inand science

Module Grade Calculation
The module grade is the grade of oral examination.

Workload

- Attendance time: Lectures and exercises 45 h
- Self-study: 50 h
- Exam preparation: 55 h

Literature
Announced in lectures/on slides.

Fundamentals:

- I. Chorkendorff, J. W. Niemantsverdriet, *Concepts of Modern Catalysis and Kinetics*, 2003, Wiley.
- G. Ertl (Ed.), *Handbook of Heterogeneous Catalysis*, 2008, Wiley.

M 4.16 Module: Chemical Process Engineering [M-CIWVT-101133]

Coordinators: Prof. Dr.-Ing. Gregor Wehinger
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Process Engineering

Credits	Grading	Recurrence	Duration	Language	Level	Version
6 CP	graded	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-101884	Chemical Process Engineering	6 CP	Wehinger

Assessment
Learning control is a written examination lasting 120 minutes.

Prerequisites
None

Competence Goal
Students can analyse and design reactors for chemical and enzymatic-biochemical conversions in homogeneous phase. They are able to promote the formation of a certain desired product in multi-step reactions, when parallel and consecutive steps can yield further products. Furthermore, students can apply balances of energy to identify conditions of safe reactor operation when exo- and endothermic reactions are run.

Content
Application of mass and energy balances for the analysis and design of ideal reactors for single-phase conversions, and for the identification of optimum operation conditions.

Module Grade Calculation
grade of the written examination

Workload

- Attendance time: lectures and exercises: 60 h
- self-study: 60 h
- preparation of examination. 60 h

Recommendations
Courses of 1st - 4th semester

Literature

- Skript Chemische Verfahrenstechnik I, https://ilias.studium.kit.edu
- G.W. Roberts: Chemical Reactions and Chemical Reactors, Wiley VCH 2009
- O. Levenspiel: Chemical Reaction Engineering, John Wiley & Sons Inc. 1998

M 4.17 Module: Chemical Reaction Engineering [M-CIWVT-106825]

Coordinators: Prof. Dr.-Ing. Gregor Wehinger
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work (Usage from 10/1/2024)

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	4	2

Mandatory			
T-CIWVT-113695	Chemical Reaction Engineering - Exam	6 CP	Wehinger
T-CIWVT-113696	Chemical Reaction Engineering - Project Work	6 CP	

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

M 4.18 Module: Circular Economy [M-CIWVT-105995]

Coordinators: Prof. Dr.-Ing. Dieter Stapf
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work (Usage from 10/1/2022)

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	4	2

Mandatory			
T-CIWVT-112172	Circular Economy - Oral Exam	8 CP	Stapf
T-CIWVT-112173	Circular Economy - Project Work	4 CP	Stapf

Assessment
The learning control consists of two partial achievements:

1. Oral exam on lectures, exercises and case studies, duration approx. 30 minutes.
2. Project work, exmaination of another type. The term paper and the presentation of the results are graded.

Prerequisites
Participation in the Specialization/ Project Work is only possible if the following achievements have been made:

- At least 60 credits
- At least one lab

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

Competence Goal
The students understand important material systems and essential process steps of the provision and recycling of mineral and metallic raw materials and anthropogenic carbon. With the aim of closing cycles, they can use methods of process evaluation, such as analysis and assessment of process chains using efficiency indicators. To do this, students work on increasingly complex case studies in a team using scientific methods and finally apply these methods during project work.

Content
Introduction to transition in resources and technologies towards a sustainable circular economy. Knowledge acquisition in system analysis, in process efficiency assessment and in sustainability evaluation. Motivation for process engineering research and development in the field of sustainable raw material supply of a climate-neutral society:

- Material flow and process knowledge of the primary and the recycling industries
- Methodological knowledge (business management basics of relevance, material flow analysis, determination of performance indicators)
- Independent scientific work (application of knowledge, analysis, assessment) in case studies / as project work.

Module Grade Calculation
The module grade is the CP-weighted average of the two partial achievements.

Workload
Attendance time:

- Lectures and exercises: 45 h
- Project work: 80

Self-study:

- Wrap up lectures: 45 h
- Wrap up case studies: 60 h
- Preparation term paper and presentation: 40 h

Exam preparation: 90 h

M 4.19 Module: Computational Methods [M-CIWVT-101956]

Coordinators: Prof. Dr. Oliver Thomas Stein
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading	Duration	Language	Level	Version
8 CP	graded	2 terms	German	3	1

Mandatory			
T-MATH-102250	Introduction to Informatics and Algorithmic Mathematics - Exam	5 CP	Dörfler, Krause
T-CIWVT-101876	Application of Numerics in Engineering	3 CP	Stein

Assessment
The learning control consists of two partial achievements:

1. written examination lasting 75 minutes.
2. oral examination lasting approx. 10 minutes.
   Students must have understood knowledge about the content of the task and its solution and be able to reproduce it in their own words.

Prerequisites
None

Competence Goal
Higher programming languages, design and description of algorithms, basic algorithms from mathematics and computer science, implementation of mathematical concepts on computers, modeling and simulation of scientific and technical problems.

Students are able to solve engineering problems applying numerical methods, to solve a problem within a fixed time-frame in a team and to show their results in a concludin presentation.

Content
The course offers the basics to advanced studies. Key concepts of the lectures are: structured program design, iteration, recursion, data structures (in particular: arrays), procedural programming with functions and methods, developing application-oriented programs. In computer labs, the mathematical concepts will be implemented.

Fundamentals to solve problems in process engineering by applying numerical methods.

Module Grade Calculation
The module grade ist the grade of the written exam.

Workload
Lecture:

- attendance time: 60 h
- self-study: 90 h

practical work, programming:

- attendance time: 10 h
- self-study: 80 h

M 4.20 Module: Control Engineering and System Dynamics [M-CIWVT-106308]

Coordinators: Prof. Dr.-Ing. Thomas Meurer
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Scientific Engineering (Usage from 4/1/2023)

Credits	Grading	Recurrence	Duration	Language	Level	Version
5 CP	graded	Each summer term	1 term	German	3	1

Mandatory			
T-CIWVT-112787	Control Engineering and System Dynamics	5 CP	Meurer

Assessment
Learning control is a written exam, duration120 minutes.

Prerequisites
None

Competence Goal
Provision of linear system theory and simple controls for technical systems to CIW and BIW engineers.

Content
Dynamic systems, Properties of important systems and modeling, Stability, Controller design, Estimation

Module Grade Calculation
The module grade is the grade of the written exam.

Workload
Attendance Time:

- Lectures:30 hrs.
- Exercises 15 hrs.

Self-study:

- Preparation and wrap-up lectures sample course: 60 hrs.
- Exam preparation: 45 hrs.

Literature

- Meurer: Regelungstechnik und Systemdynamik, Vorlesungsskript.
- Aström, R. Murray: Feedback Systems, Princeton University Press, 2008.
- C.T. Chen: Linear System Theory and Design, Oxford Univ. Press, 1999.
- Lunze: Regelungstechnik I, Springer-Verlag, 2010.
- Lunze: Regelungstechnik II, Springer-Verlag, 2010.
- H. Unbehauen: Regelungstechnik I, Vieweg, 2005.

M 4.21 Module: Data-Driven Modeling with Python [M-CIWVT-106534]

Coordinators: Dr.-Ing. Frank Rhein
Organisation: KIT Department of Chemical and Process Engineering
Part of: Interdisciplinary Qualifications (Usage from 10/1/2023)

Credits	Grading	Recurrence	Duration	Language	Level	Version
3 CP	pass/fail	Each winter term	1 term	German	3	1

Mandatory			
T-CIWVT-113190	Data-Driven Modeling with Python	3 CP	Rhein

M 4.22 Module: Electrochemical Energy Technologies and Materials [M-CIWVT-107651]

Coordinators: Prof. Dr.-Ing. Ulrike Krewer
TT-Prof. Dr. Moritz Wolf

Organisation: KIT Department of Chemical and Process Engineering

Part of: Mandatory Elective Courses (Usage from 4/1/2026)

Credits	Grading	Recurrence	Duration	Language	Level	Version
5 CP	graded	Each summer term	1 term	German	4	1

Mandatory			
T-CIWVT-114998	Practical: Synthesis of electrochemical Materials	2 CP	Wolf
T-ETIT-114245	Electrochemical Energy Technologies	3 CP	Krewer

Assessment
The Learning control consists of two partial achievements:

- written exam lasting 120 minutes.
- pracital: ungraded coursework

Prerequisites
None.

Competence Goal
Students have well-grounded knowledge of electrochemical energy technologies for conversion and storage of electrical energy. They know the working principle of fuel cells, batteries, electrolyzers and redox flow cells and their components. They understand the underlying electrochemical, electrical and physical processes, and the resulting loss processes as function of operation and cell design. Participation in the course puts them in a position to build cells and evaluate and understand their performance and operating behavior. Furthermore, they can select the appropriate electrochemical cell for a given application, analyze, interpret and operate it. Students gain theoretical insight and practical experience in nanoparticle synthesis and preparation of electrocatalytic as well as electrode materials. They know relevant techniques for structural characterization and are able to analyze the corresponding data.

Content
Lecture: Electrochemical Energy Technologies

- Application and operating principle of electrochemical energy cells
- Thermodynamics, potential and voltage of electrochemical cells
- Electrochemical reactions and their kinetics
- Transport processes in electrochemical cells
- Design of electrochemical cells
- Operation of electrochemical cells

Exercise:

- Application of the theory to batteries, fuel cells and electrolysers including example calculations

Practical: Synthesis of electrochemical Materials

- Theory on routes for material synthesis
- Synthesis of electrocatalysts and materials for electrodes
- Structural characterization of electrochemical materials

Module Grade Calculation
The module grade ist the grade of the written exam.

Workload

- Attendance time in lectures, exercises: 30 hrs
- Homework: 30 hrs
- Exam preparation: 30 hrs
- Laboratory experiments: 5 experiments, 3 h each: 15 hrs
- Preparation and follow-up of practical course: 20 hrs
- Preparation of lab reports: 25 hrs

M 4.23 Module: Elementary Physics [M-PHYS-100993]

Coordinators: Prof. Dr. Alexey Ustinov
Organisation: KIT Department of Physics
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading	Recurrence	Duration	Language	Level	Version
7 CP	graded	Each winter term	1 term	German	3	2

Mandatory			
T-PHYS-101577	Elementary Physics	7 CP	Ustinov

Assessment
See components of this module.

Prerequisites
The module *Advanced Mathematics I* has to be passed.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module M-MATH-100280 - Advanced Mathematics I must have been passed.

Recommendations
Contents of *Engineering Mechanics: Dynamics*

Literature

- P. Tipler, Physik für Wissenschaftler und Ingenieure, Springer 2015
- E. Hering, R. Martin, M. Stohrer, Physik für Ingenieure, Springer 2016

M 4.24 Module: Energy and Environmental Engineering [M-CIWVT-101145]

Coordinators: Prof. Dr. Reinhard Rauch
Prof. Dr.-Ing. Dimosthenis Trimis

Organisation: KIT Department of Chemical and Process Engineering

Part of: Specialization/ Project Work

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	4	4

Mandatory			
T-CIWVT-103527	Energy and Environmental Engineering Project Work	4 CP	Rauch, Trimis
T-CIWVT-108254	Energy and Environmental Engineering	8 CP	Rauch, Trimis

Assessment
The learning control consists of two partial achievements:

- Written examination, duration 120 minutes
- Examination of another type, project work

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

Competence Goal
The students will be able to discuss, analyze and compare applications in energy engineering and environmental protection (primary/secundary means, efficiency, raw materials etc.).

Content
Introduction into production of fuels (chemical energy carriers) from fossil and renewable sources and their use, prevention of formation of pollutants, removal of pollutants, review and selected examples, fundamentals and applications of high temperature energy conversion.

Module Grade Calculation
The module grade is the CP-weighted average of the two partial achievements.

Workload
Attendance time: 60 h
Excoursions: 20 h
Self-Study: 90 h
Project work: 90 h
Exam preparation: 100 h

Recommendations
Courses of 1st - 4 th semester

Literature
lecture notes and specific literature indicated during lectures, additionally:
J. Warnatz, U. Maas, R.W. Dibble: Combustion, Spinger Verlag, Berlin, Heidelberg 1997
G. Schaub, T. Turek: Energy Flows, Material Cycles and Global Development, Springer Verlag, Berlin 2011
M. Crocker (Hrsg.): Thermochemical Conversion of Biomass to Liquid Fuels and Chemicals, Springer-Verlag, Berlin 2010
E. Rebhan (Hrsg.): Energiehandbuch – Gewinnung, Wandlung und Nutzung von Energie, Springer-Verlag, Berlin 2002
B. Elvers (Hrsg.): Handbook of Fuels, Wiley-VCH, Weinheim 2008

M 4.25 Module: Energy Process Engineering [M-CIWVT-101136]

Coordinators: Dr. Frederik Scheiff
Prof. Dr. Oliver Thomas Stein

Organisation: KIT Department of Chemical and Process Engineering

Part of: Mandatory Elective Courses

Credits	Grading	Recurrence	Duration	Language	Level	Version
5 CP	graded	Each winter term	1 term	German	4	1

Mandatory			
T-CIWVT-101889	Energy Process Engineering	5 CP	Scheiff, Stein

Assessment
Learning control is a written examination lasting 150 min.

Prerequisites
None.

Competence Goal
Students learn to classify energy and the different appearances of energy,knowledge of the different energy sources and the national and global energy demand,knowledge and solution of simple tasks in energy conversion with different conversion methods

Content
Basics: Concepts, forms of appearance of energy, systems and balances

Process Engineering: Energy carriers, energy conversion, energy transportation and storage, decentral energy systems

Ecology / Economy / Policy

Module Grade Calculation
Grade of the written examination

Workload
lectures: 56 h

self-study: 50 h

preparation of examination: 44 h

Recommendations
Thermodynamik

Literature

- In der Vorlesung angegebene Litaratur, zusätzlich:
- P. Stephan, K. Schaber, K. Stephan, F. Mayinger: Thermodynamik, Springer Verlag, Berlin 2006
- J. Warnatz, U. Maas, R.W. Dibble: Combustion, Spinger Verlag, Berlin, Heidelberg 1997
- G. Schaub, T. Turek: Energy Flows, Material Cycles and Global Development, Springer Verlag, Berlin 2011
- VDI-Gesellschaft Energietechnik (Hrsg.): Energietechnische Arbeitsmappe, Springer-Verlag , Berlin 2000
- M. Crocker (Hrsg.): Thermochemical Conversion of Biomass to Liquid Fuels and Chemicals, Springer-Verlag, Berlin 2010
- E. Rebhan (Hrsg.): Energiehandbuch – Gewinnung, Wandlung und Nutzung von Energie, Springer-Verlag, Berlin 2002
- B. Elvers (Hrsg.): Handbook of Fuels, Wiley-VCH, Weinheim 2008

M 4.26 Module: Engineering Mechanics: Dynamics [M-CIWVT-101128]

Coordinators: TT-Prof. Dr. Christoph Klahn
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Scientific Engineering

Credits	Grading	Recurrence	Duration	Language	Level	Version
5 CP	graded	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-101877	Engineering Mechanics: Dynamics, Exam	5 CP	Klahn
T-CIWVT-106290	Engineering Mechanics: Dynamics	0 CP	Klahn

Assessment
The learning control consists of two partial achievements

1. Completed coursework/ prerequisite
2. a written examination lasting 120 minutes

Prerequisites
None

Competence Goal
Students possess basic knowledge in Engineering Mechanics/Dynamics, they are familiar with problem solving and able to use this knowledge for theoretical analysis and solution of practical engineering problems.

Content
Kinematics and dynamics of mass point;
Kinematics and dynamics of rigid body;
The principle of linear momentum, angular momentum, work and energy theorem;
Oscillation of the systems with one or more freedom degrees;
Relative movement of mass point;
Methods in analytical Mechanics, Lagrange equation;

Module Grade Calculation
grade of the written examination. Superior preliminary test can be credited according to §7,13 SPO.

Workload
lectures and exercises: 56 h
self study: 56 h
preparation for examination 40h

Recommendations
modules of 1. -2. semester.

Literature

- Gross/Ehlers/Wriggers/Schröder/Mülle: Formeln und Aufgaben zur Technischen Mechanik 3, 13. Auflage https://doi.org/10.1007/978-3-662-66190-1
- Kühlhorn/Silber: Technische Mechanik für Ingenieure, Hüthig 2000
- Hibbler: Dynamik,Pearson 2006, 10. Auflage
- Wriggers/Nackenhorst/Beuermann/Spiess/Löhnert: Technische Mechanik kompakt, Teubner2006

M 4.27 Module: Engineering Mechanics: Statics and Strength of Materials [M-CIWVT-104006]

Coordinators: Prof. Dr. Norbert Willenbacher
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Scientific Engineering (Usage from 10/1/2017)

Credits	Grading	Duration	Language	Level	Version
10 CP	graded	2 terms	German	3	4

Mandatory			
T-CIWVT-103687	Engineering Mechanics: Statics and Strength of Materials	10 CP	Oelschlaeger, Willenbacher

Assessment
Learning Control is a written examination lasting 90 minutes.

Prerequisites
None

Content
forces and momentums, static balance, bearings, frameworks, tension/ elongagion in general (3D), internal force variables of beams, friction, principle of virtual work, tension/ elongation in rods, hypothesis of stabiligy, torsion, buckling

Module Grade Calculation
The module grade ist the grade of the written exam.

Workload
Attendance time: 120 h
Self-study: 120 h
Exam preparation: 60 h

Literature

- ross/Hauger/Schnell/Schröder: Technische Mechanik
  Bd. 1: Statik, Springer 2004, 8. Auflage;
  Bd. 2: Elastostatik Springer (2002) 7. Auflage,
- Hibbeler:
  Technische Mechanik 1- Statik, Pearson (2005), 10. Auflage;
  Technische Mechanik 2 - Festigkeitslehre, Pearson (2006) 5. Auflage
  Mechanics of Materials, Pearson (2004),
- Kühhorn/Silber: Technische Mechanik für Ingenieure, Hüthig (2000)
- Wriggers/Nackenhorst/Beuermann/Spiess/Löhnert: Technische Mechanik kompakt, Teubner (2006)
- Müller/Ferber: Technische Mechanik für Ingenieure (mit CD-Rom), Fachbuchverlag Leipzig (2005)
- Richard/Sander: Technische Mechanik - Festigkeitslehre, Vieweg (2006)

M 4.28 Module: Ethics and Global Material Cycles [M-CIWVT-101149]

Coordinators: Prof. Dr. Reinhard Rauch
Organisation: KIT Department of Chemical and Process Engineering
Part of: Interdisciplinary Qualifications

Credits	Grading	Recurrence	Duration	Language	Level	Version
3 CP	pass/fail	Each summer term	1 term	German	3	4

Mandatory			
T-CIWVT-112372	Global Material Cycles	1 CP	Rauch
T-CIWVT-112373	Ethics	2 CP	Hillerbrand

Assessment
Examination consists of

1. Ethics: regular attendance at lectures and exercises; short presentation; written elaboration
2. Global Material Cycles: written exmaination (ungraded), duration 60 minutes.

Prerequisites
None

Competence Goal
Basic understanding of: Examples of global material cycles and effects caused by human societies, Important limitations for material and energy conversion by human societies (civilization, industrialization), Basic knowledge in engineering ethics, Competences in "handling" with ethical questions for engineers

Content
Bio-geosphere as environment for human life. selected examples of global material cycles. limits of man-made material and energy conversion. sustainability as term. priority rules for sustainability and for shaping the future. technology assessment, engineering codes. responsibility individual, collective, corporate

Workload

- lectures and exercises: 15 h
- homework: 45 h
- preparation of examination: 30 h

Literature

- I. v. d. Poel, L. Royakkers: Ethics, Technology and Engineering: An Introduction, Wiley-Blackwell 2011
- H. Lenk, M. Maring: Natur-Umwelt-Ethik, LIT Verlag Münster 2003
- G. Schaub, Th. Turek: Energy Flows, Material Cycles, and Global Development - A Process Engineering Approach to the Earth System, Springer Verlag Berlin 2010

M 4.29 Module: Fluiddynamics [M-CIWVT-101131]

Coordinators: Prof. Dr.-Ing. Hermann Nirschl
Organisation: KIT Department of Chemical and Process Engineering
Part of: Thermodynamics and Transport Processes

Credits	Grading	Recurrence	Duration	Language	Level	Version
5 CP	graded	Each summer term	1 term	German	3	2

Mandatory			
T-CIWVT-101882	Fluiddynamics, Exam	5 CP	Nirschl
T-CIWVT-101904	Fluiddynamics, Tutorial	0 CP	Nirschl

Assessment
Learning control consists of:

1. written exam of 120 minutes duration according to § 4 (2) SPO.

2. Non-graded precondition for participation according to § 4 (3) SPO:
eihter 4 of 5 compulsory exercises have to be approved
or a group presentation has to be given during the lecture

Prerequisites
none

Competence Goal
The students have the ability to analyse, to structure and to describe problems in fluid dynamics. The also can use the specific methods for the calculation of specific flows with the studied tools. Besides they are able to discuss the different procedures critically.

Content
Fundamentals of fluid dynamics: hydro static, aerostatik, compressible and incompressible flows, turbulent flows, Navier-Stokes equations, boundary layer theory

Module Grade Calculation
grade of the written examination

Workload
lecture 2 SWH, exercises 2 SWH: 56 h
self-study: 56 h
preparation of examination: 56 h

Recommendations
Courses of 1st - 3rd semester

Literature
Nirschl, Zarzalis: Skriptum Fluidmechanik

Zierep: Grundzüge der Strömungslehre, Teubner 2008

Prandtl: Führer durch die Strömungslehre, Teubner 2008

M 4.30 Module: Food Bioprocess Engineering [M-CIWVT-106476]

Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses (Usage from 10/1/2025)

Credits	Grading	Recurrence	Duration	Language	Level	Version
6 CP	graded	Each winter term	1 term	German	4	2

Mandatory			
T-CIWVT-113021	Food Bioprocess Engineering	6 CP	Leister

Assessment
Learning control is a written examination lasting approx. 120 minutes.

Prerequisites
None.

Competence Goal
Lecture:

Students will be able to describe the basics of microbial spoilage and the possibilities for preserving food and life science products. They will be able to analyze the suitability of different preservation methods for different products and assign their respective advantages and disadvantages. In addition, students can name biotechnologically produced foods and describe the corresponding processes and the equipment used. Using application examples from food bioprocess engineering, they can demonstrate, discuss and debate the special features of process control.

Exercise:

Students are able to carry out calculations for process design independently for selected applications and to use the necessary tools methodically and appropriately.

Content
The students learn

- which microorganisms are important for the safety and production of food and life science products.
- technical possibilities to ensure the safety of food.
- about selected historical biotechnological processes for food production and their modern technological implementation options.
- to understand the approach of a food engineer in product and process development based on current case studies.
- the calculation principles for technical process design.
- know product-oriented application examples.

Module Grade Calculation
The module grade is the grade of the written exam.

Workload

- Attendance time/ lectures and exercises: 60 hrs
- homework - wrap-up of lectures and exercises: 80 hrs
- exam preparation: 40 hrs

Literature

- Vorlesungsfolien, Skripte mit Übungsfragen, FAQ zum Vorlesungsstoff
- Lebensmittelmikrobiologie (J. Krämer, UTB Ulmer)
- Lebensmittelbiotechnologie (Heinz Rutloff, Akademie Verlag)
- Lebensmittelverfahrenstechnik, Teil A (Schuchmann, Wiley)
- Lebensmittelbiotechnologie: eine Einführung (P. Czermak, GIT)
- Lebensmittelbiotechnolige (R. Heiss, Springer)
- Lexikon der Lebensmitteltechnologie (B. Kunz, Springer)

M 4.31 Module: Food Technology [M-CIWVT-101148]

Coordinators: Dr.-Ing. Nico Leister
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading	Duration	Language	Level	Version
12 CP	graded	2 terms	German	4	5

Mandatory			
T-CIWVT-103528	Food Technology	5 CP	Leister
T-CIWVT-103529	Food Technology Project Work	7 CP	Leister

Assessment
The learning control consists of two partial achievements:

1. Oral examination (in the group) lasting approx. 45 minutes
2. Project work (presentation and report of results)

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

Competence Goal
The students are able to design and evaluate simple food products. They learned to define, focus and solve tasks milestone-oriented as an interdisciplinary team. The gained in depth insight in the influence of recipe and process parameters on food quality parameters using a selected product produced on pilot scale. They will be able to present targets and results of their team project in a clear, conceptual and comprehensible manner.

Content
Lecture: Basic introduction to the design and quality assurance of selected foods;
project work (team work): definition, production and evaluation of selected products as a team; presentation and defense of the project and its results incl. degustation in a bigger group;
field trip to industrial production plants

Module Grade Calculation
The module grade is the CP-weighted average of the two partial achievements.

Workload

- Attendance time: 115 hrs
  (lecture 2 SWS, project work 5 SWS)
- self study: 185 hrs
  (project design, project meetings, research on project work, lab, preparation and wrap-up)
- exam preparation: 60 hrs

Literature
Will be offered within the lecture, depending on products available

M 4.32 Module: Formulation and Characterisation of Energy Materials [M-CIWVT-106700]

Coordinators: Dr.-Ing. Claude Oelschlaeger
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work (Usage from 10/1/2024)

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	4	1

Mandatory			
T-CIWVT-113478	Formulation and Characterisation of Energy Materials - Exam	8 CP	Oelschlaeger
T-CIWVT-113479	Formulation and Characterisation of Energy Materials - Project Work	4 CP	Oelschlaeger

Assessment
The learning control consists of two partial achievements:

1. project work (teamwise)
2. oral examinations (courses)

The oral examinations have to be passed as a precondition for project work

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

Competence Goal
Basic knowledge about the design of complex fluids based on dispersions or emulsions by chemical engineering processes. Fundamental comprehension of applications and working properties, flow behavior and colloidal stability of disperse systems. Applying this knowledge in context of their project work. They gather experience in teamoriented problem solving.

Content
Representation of a systematic of the relation between the quality aspects of products and their physico-chemical properties. Furthermore, these properties are generated in the respective production processes. This systematics is fundamentally presented in the lecture "Fabrication and rheological characterization of energy materials".The application of this systematics is practiced on specific case studies.

M 4.33 Module: Fundamentals of Refrigeration [M-CIWVT-104457]

Coordinators: Prof. Dr.-Ing. Steffen Grohmann
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	3	4

Mandatory			
T-CIWVT-109117	Fundamentals of Refrigeration, Oral Examination	6 CP	Grohmann
T-CIWVT-109118	Fundamentals of Refrigeration, Project Work	6 CP	Grohmann

Assessment
The learning control consists of two partial achievements:

1. Project work/ presentation, examination of another type
2. Oral exam of about 30 minutes duration

The project work is a prerequisite for the oral examination.

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

Competence Goal
Students are able to explain and apply the fundamentals of refrigeration to various refrigeration technologies. They are able to describe properties of refrigerants and working fluids, and to assess their environmental impact based in different criteria. The students can develop concepts of refrigeration and heat pump processes using phase diagrams and fluid property models, and they are able to explore the energy consumption based on first and second law analyses. They are able to design various circuit configurations, to dimension and select refrigeration compressors and heat exchangers, and to design suitable control systems.

Content
Introduction to the fundamentals of refrigeration, phase diagrams, energy transformation based on first and second law analyses, refrigerants and working fluids including their environmental impact, design of common refrigeration and heat pump processes, major circuit components and process control.

Module Grade Calculation
The module grade is the CP-weighted average of the two partial achievements.

Workload
Attendance time: Lecture 2 SWS, Exercises 1 SWS: 45 h
Self-Study: 60 h
Exam Praparation: 75 h
Project work including presentation: 180 h

Recommendations
None

Literature

- Jungnickel, H., Agsten, R. und Kraus, W.E., 3. Auflage (1990), Verlag Technik GmbH, Berlin
- v. Cube, H.L. (Hrsg.), Lehrbuch der Kältetechnik Band 1 und 2, 4. Auflage (1997), C.F. Müller, Heidelberg
- Gosney, W.B., Principles of Refrigeration, Cambridge University Press, Cambridge, 1982
- Berliner, P., Kältetechnik Vogel-Verlag, Würzburg (1986 und frühere)
- Kältemaschinenregeln, Deutscher Kälte- und Klimatechnischer Verein (DKV) (Herausgeber)
- DKV-Arbeitsblätter für die Wärme- und Kältetechnik in: C.F. Müller Verlag, Hüthig Gruppe, Heidelberg, wird jeweils aktualisiert (Sept. 2008)

M 4.34 Module: General and Inorganic Chemistry [M-CHEMBIO-101117]

Coordinators: Prof. Dr. Mario Ruben
Organisation: KIT Department of Chemistry and Biosciences
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading	Recurrence	Duration	Language	Level	Version
6 CP	graded	Each winter term	1 term	German	3	1

Mandatory			
T-CHEMBIO-101866	General and Inorganic Chemistry	6 CP	Ruben

Assessment
graded: written examination (150 min)

Prerequisites
none

Competence Goal
The students get a basic understanding of the inorganic chemistry. With the knowledge of the periodic table of the elements and basic knowledge of the chemical bond the students are able to describe different compounds and to estimate different reactivities.

Content
Structure of the matter, nuclear models, periodic table of the elements.The chemical bond. Structure of Metals, ion crystals, covalent bonds, metal complexes. Chemical reactions, chemical equilibrium, law of mass action, solubility product. Acids and bases, redox reactions

Module Grade Calculation
grade of the written examination

Workload
Lectures and exercises: 56h

Homework and preparation of examination: 94h

Literature
Mortimer, Müller (aktuelle Auflage): Chemie, Thieme Verlag

Riedel (aktuelle Auflage): Moderne Anorganische Chemie, de Gruyter Verlag

Hollemann, Wieberg (aktuelle Auflage): Lehrbuch der Anorganischen Chemie, de Gruyter Verlag

M. Binnewies, M. Jäckel, H. Willner, G. Rayner-Canham: Allgemeine und Anorganische Chemie, Spektrum Verlag 2004

C. E. Housecroft, A. G. Sharpe, Anorganische Chemie, Pearson Verlag 2006.

Base For
Anorganisch chemisches Praktikum

M 4.35 Module: Heat and Mass Transfer [M-CIWVT-107675]

Coordinators: Dr.-Ing. Benjamin Dietrich
Prof. Dr.-Ing. Thomas Wetzel

Organisation: KIT Department of Chemical and Process Engineering

Part of: Thermodynamics and Transport Processes (Usage from 4/1/2026)

Credits	Grading	Recurrence	Duration	Language	Level	Version
7 CP	graded	Each summer term	1 term	German	3	1

Mandatory			
T-CIWVT-115040	Heat and Mass Transfer	7 CP	Dietrich, Wetzel

Assessment
Learning control is a written examination lasting 180 minutes.

Prerequisites
none

Competence Goal
Elaborating the fundamental physics and laws of heat and mass transfer and at the provision of knowledge about of the methodological tools required for solving engneering tasks in these fields.

Content
Heat Transfer: Definitions - System, balances and conservation equations, kinetics of heat transfer, heat conduction, heat radiation, heat transfer between solids and moving fluids, dimensionless numbers.

Mass Transfer: Kinetics of mass transfer, equilibrium, diffusion and mass flow, Knudsen- and multi-component diffusion, Lewis analogy of heat and mass transfer.

Module Grade Calculation
Grade of the written examination

Workload

- lecture: 75 h
- self-study: 55 h
- preparation of examination: 80 h

Recommendations
Courses of 1st - 3rd semester, especially fundamentals of themodynamics.

Literature
v. Boeckh, Wetzel: Wärmeübertragung, Springer 2017

M 4.36 Module: Industrial Business Administration [M-WIWI-100528]

Coordinators: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Business and Economics
Part of: Interdisciplinary Qualifications

Credits	Grading	Duration	Level	Version
3 CP	pass/fail	1 term	3	1

Mandatory			
T-WIWI-100796	Industrial Business Administration	3 CP	Fichtner

Assessment
The assessment of this course is a ungraded written examination (60 min) according to §4(2), 1 of the examination regulation.

Prerequisites
None

Competence Goal
Students are able to describe and differentiate legal forms for industrial enterprises.

Students will gain knowledge about different ways of financing to raise capital.

The students gain knowledge about the basics of financial accounting and are able to record and book performance and capital flows occurring in companies.

The students gain knowledge about different types of cost accounting and are able to apply them.

Students gain knowledge of the basics of investment planning and are able to evaluate investments economically.

The students gain knowledge about the basics of linear optimization and can solve simple optimization problems with the Simplex algorithm.

The students gain knowledge about basic marketing methods and can describe and differentiate them from each other.

The students gain knowledge about basic methods of project management and can apply them to practical examples.

Content

- Goals and basics
- Legal framework for industrial enterprises
- financial accounting
- cost accounting
- investment calculation
- optimisation
- network technique

Workload
The total workload for this course is approximately 90 hours.

M 4.37 Module: Industrial Organic Chemistry [M-CIWVT-101137]

Coordinators: Prof. Dr. Reinhard Rauch
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses

Credits	Grading	Recurrence	Duration	Language	Level	Version
5 CP	graded	Each winter term	1 term	German	3	1

Mandatory			
T-CIWVT-101890	Industrial Organic Chemistry	5 CP	Rauch

Assessment
Learning control is a written examination of 120 min duration according to § 4 Abs. 2 SPO.

Prerequisites
Organic Chemistry

Competence Goal
Consolidate knowledge of organic materials and types of chemical reactions; understand logic relations between types of chemical reaction and technical processes, for selected examples; understand industrial material conversion pathways from raw materials to final products.

Content
Feedstock's for industrial processes of organic chemistry, industrial production of basic chemicals and intermediates using practical examples, digitalization and industry 4.0 in the chemical industry.

Mechanism during formation of synthetic macromolecules, production and properties of plastics and polymers, spectroscopic methods of analyzing organic molecules.

Module Grade Calculation
grade of the written examination

Workload
lecture: 60 h
self-study: 40 h
preparation of examination: 50 h

Literature
Handouts
Onken, Behr: Chem. Prozeßkunde, Wiley-VCH 1996
Arpe: Industrielle Org. Chemie, Wiley-VCH 2007
Brahm: Polymerchemie kompakt, Hirzel 2009
Tieke: Makromolekulare Chemie, Wiley-VCH 2014
Hesse u.a.: Spektroskop. Methoden in der OC, Thieme 2011

M 4.38 Module: Intensification of Bioprocesses [M-CIWVT-106444]

Coordinators: Prof. Dr.-Ing. Dirk Holtmann
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses (Usage from 4/1/2025)

Credits	Grading	Recurrence	Duration	Language	Level	Version
6 CP	graded	Each summer term	1 term	German	4	1

Mandatory			
T-CIWVT-112998	Intensification of Bioprocesses - Written Exam	6 CP	Holtmann

Assessment
The learing controlis a written examination, duration: 90 minutes.

Prerequisites
None.

Competence Goal
Technical and methodological competencies

Students will be able to:

- explain the concepts of process intensification
- describe different intensified processes quantitatively
- design and evaluate bioprocess engineering processes on the basis of PI
- analyse interdisciplinary problems at the interface of technology and biological systems and develop solutions to problems
- develop processes with optimal productivities using as little energy and raw materials as possible by combining the advantages of individual disciplines

Social and personal competence

The students will be able to:

- analyse the framework conditions for innovative processes and identify the essential aspects
- identify and evaluate (interdisciplinary) process options
- become independently familiar with new topics
- summarize complex scientific processes

Content
Companies in the chemical and biotechnology industries face particular challenges in times of rising raw material costs, increased competition, and shorter product life cycles.

Process-intensified operations offer great potential for resource efficiency by helping to save materials and energy. According to a generally accepted definition, "Process Intensification (PI) is a collection of revolutionary innovative principles (paradigm shifts) for equipment and processes that can lead to significant improvements in process or process chain efficiency, investment and operating costs, quality, waste, process safety (and other aspects)".

In recent years, process intensification methods have been increasingly used in bioprocess engineering (USP and DSP). These methods are the focus of this module. The following topics are covered in the module:

- Definition of PI, distinction between process optimization and PI.
- Examples from chemical engineering
- Intensified bioreactors and reactor selection (e.g., single-use technologies, rotating bed reactors, enzyme membrane reactors, biofilm reactors)
- PI through adapted operating modes (e.g., repeated fed-batch, perfusion, continuous processes, in situ product removal)
- Process intensification through immobilized enzymes and microorganisms
- Integration of chemo- and biocatalysis
- Electro biotechnological processes
- Photo biotechnological processes
- Use of ultrasound and microwaves for bioprocess intensification
- Bioprocesses in alternative reaction media
- Use of extremophilic organisms / unconventional production organisms

In all sub-areas, the focus is on the quantitative description of the intensified processes.

Module Grade Calculation
The module grade is the grade of the written exam.

Workload

- Attendance time: 60 hrs lectures and exercieses
- Preparation and wrap-up lectures: 80 hrs
- Exam preparation: 40 hrs

Recommendations
Fundamentals in bioprocess engineering are required.

Literature

- Frerich J. Keil (2017) Process intensification, doi.org/10.1515/revce-2017-0085
- Andrzej Stankiewicz, Tom van Gerven, Georgios Stefanidis (2019) The Fundamentals of Process Intensification, Wiley-VCH, Weinheim, ISBN: 978-3-527-32783-6
- VDI ZRE Publikationen: Kurzanalyse Nr. 24, Ressourceneffizienz durch Prozessintensivierung
- Burek et al (2022) Process Intensification as Game Changer in Enzyme Catalysis, https://doi.org/10.3389/fctls.2022.858706

Further literature recommendations will be announced.

M 4.39 Module: Introduction into Bioengineering [M-CIWVT-106433]

Coordinators: Prof. Dr.-Ing. Alexander Grünberger
Prof. Dr.-Ing. Dirk Holtmann
Prof. Dr. Jürgen Hubbuch
Dr.-Ing. Ulrike van der Schaaf

Organisation: KIT Department of Chemical and Process Engineering

Part of: Mandatory Elective Courses (Usage from 4/1/2024)

Credits	Grading	Recurrence	Duration	Language	Level	Version
5 CP	graded	Each summer term	1 term	German	3	1

Mandatory			
T-CIWVT-113018	Introduction into Bioengineering	5 CP	Grünberger, Holtmann, Hubbuch, van der Schaaf

M 4.40 Module: Introduction to Thin Film Technology [M-CIWVT-107495]

Coordinators: Prof. Dr.-Ing. Wilhelm Schabel
Dr. Philip Scharfer

Organisation: KIT Department of Chemical and Process Engineering

Part of: Specialization/ Project Work (Usage from 10/1/2025)

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	3	1

Mandatory			
T-CIWVT-114692	Introduction to Thin Film Technology - Project Work	6 CP	Schabel, Scharfer
T-CIWVT-114693	Introduction to Thin Film Technology - Exercises and Lab	6 CP	Schabel, Scharfer

Prerequisites
60 LP, at least one lab work passed.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

Competence Goal
Students can

- explain basic, future-oriented processes of thin film technology
- explain a process chain of a scientific question up to its answer: planning, conceptual design, implementation, execution and evaluation of fundamental experiments, describing aspects for implementation on a technical scale (scale-up)
- work scientifically using standard IT tools
- present scientific results
- independently acquire specialist knowledge

Literature

- VDI-Wärmeatlas, Springer 2013
- eigene Skripte

M 4.41 Module: Laboratory Course: Electrochemical Energy Technologies [M-ETIT-105703]

Coordinators: Prof. Dr.-Ing. Ulrike Krewer
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: Mandatory Elective Courses (Usage from 10/1/2021)

Credits	Grading	Recurrence	Duration	Language	Level	Version
6 CP	graded	Each summer term	1 term	German/English	3	5

Mandatory			
T-ETIT-111376	Laboratory Course: Electrochemical Energy Technologies	6 CP	Röse

Assessment
Success control takes place in the form of other types of examination. It consists of four experiments and written reports are assessed in each case. The module grade is based on the overall impression.

The successfully completed exoeriments together form an examination unit. If you fail, you have to repeat the internship in its entirety.

Prerequisites
None

Competence Goal
The students learn the technical fundamentals of electrochemical technologies as well as measurement methods for their characterization. They understand how to experimentally analyze and quantitatively describe processes at interfaces under substrate conversion by charge transfer. They are able to build electrochemical cells, understand their functional principle and are able to determine electrochemical processes. Furthermore, they are able to apply electrochemical measurement methods specifically to questions that are relevant for the analysis of modern energy converters and storage technologies.

They are also able to document and evaluate measured data and to critically discuss the results. They can competently carry out error estimations and confidently master computer-assisted data evaluation.

Content
Methods course: Introduction to electrochemical processes and measurement techniques

Four selected electrochemistry experiments will be carried out:

Experiment 1: Determination of transport parameters of reversible systems

- Voltammetry at a stationary electrode
- Voltammetry at a rotating disc electrode

Experiment 2: Determination of hydrogen and oxygen overvoltage

Experiment 3: Construction of a polymer electrolyte membrane fuel cell

Experiment 4: Investigation of the self-constructed PEM fuel cell under various operating conditions

Module Grade Calculation
The module grade results of the assessment of the written reports. Details will be given during the lecture.

Additional Information
Participation in the safety instruction and the methods course is mandatory. Participation in the safety instruction is required in the same examination period as the internship and must be completed again if the internship is repeated.

Workload

1. Methods course incl. preparation and follow-up: 30 h
2. Attendance time in the practical course: 4 x 5 h (block course)
3. Preparation for the experiments: 30 h
4. Preparation of protocols: 100 h

Total: 180 h

M 4.42 Module: Material Science and Engineering [M-MACH-102567]

Coordinators: Dr.-Ing. Johannes Schneider
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Scientific Engineering

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each term	2 terms	German	3	1

Mandatory			
T-MACH-105148	Examination Material Science I & II	9 CP	Schneider

Assessment
oral exam

Prerequisites
None

Competence Goal
The students are able to describe the relationship between atomic structure, microscopical observations, and properties of solid materials.

The students can describe the typical property profiles and can name applications for the most important engineering materials.

The students are able to describe standard materials characterization methods and can explain the evaluation of these methods. They can judge materials on base of the data obtained by these methods.

The students are able to describe the basic mechanisms of hardening for ferrous and non-ferrous materials and reflect these mechanisms using phase and TTT diagrams.

The students can interpret given phase, TTT or other diagrams relevant for materials science, gather information from them and can correlate them regarding the microstructure evolution.

The students can describe the phenomena correlated with materials science in polymers, metals and ceramics and depict differences.

The students know about standard materials characterization methods and are able to asses materials on base of the data obtained by these methods.

Content
Atomic structure and atomic bonds

Structures of crystalline and amorphous solids

Defects in crystalline solids

Alloys

Transport and transformation phenomena in the solid state
Corrosion

Wear

Mechanical properties
Testing of materials
Ferrous materials

Non-ferrous metals and alloys

Polymers

Engineering ceramics
Composites

Module Grade Calculation
grade of the oral exam

Workload
regular attendance: 90 hours
self-study: 180 hours

Teaching and Learning Methods
lectures and exercices

Literature
W. Bergmann: Werkstofftechnik I + II, Hanser Verlag, München, 2008/9
M. Merkel: Taschenbuch der Werkstoffe, Hanser Verlag, München, 2008
R. Schwab: Werkstoffkunde und Werkstoffprüfung für Dummies, Wiley VCH, Weinheim, 2011
J.F. Shackelford; Werkstofftechnologie für Ingenieure, Pearson Studium, München, 2008 (E-Book)
J.F. Shackelford,: Introduction to Materials Science for Engineers. Prentice Hall, 2008
lecture notes and lab script

M 4.43 Module: Mechanical Design A [M-MACH-106527]

Coordinators: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Electrical Engineering and Information Technology
KIT Department of Mechanical Engineering

Part of: Fundamentals of Scientific Engineering (Usage from 10/1/2023)

Credits	Grading	Recurrence	Duration	Language	Level	Version
9 CP	graded	Each winter term	1 term	German	3	3

Mandatory			
T-MACH-112984	Mechanical Design A	7 CP	Düser, Matthiesen
T-MACH-112981	Mechanical Design A, Workshop	2 CP	Düser, Matthiesen

Assessment
See individual courses

Prerequisites
None

Competence Goal
In mechanical design, students acquire skills in analysis and synthesis using examples. These include both individual machine elements such as bearings or springs and more complicated systems such as gears or couplings. After completing the machine design theory, the students are able to apply the contents learned to other technical systems - even those not known from the lecture - by transferring the principles of action and basic functions learned from examples to other contexts. This enables students to independently analyze unknown technical systems and synthesize suitable systems for given problems.

Content
MD A

- Springs
- Technical Systems
- Bearings
- Sealings
- Component Joints
- Gears

Module Grade Calculation
The module grade ist the grade of the written exam.

Additional Information
None

Workload
MKL A: Total workload: 240 h, thereof attendance 75 h, divided into lecture + exercise: 4 SWS -> 60 h as well as workshop: 1 SWS -> 15 h; self-study 165 h

Recommendations
None

Teaching and Learning Methods
Lectures, exercises and semester-long workshops as well as project work

Literature
Grundlagen der Berechnung und Gestaltung von Maschinenelementen; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X oder Volltextzugriff über Uni-Katalog der Universitätsbibliothek

Grundlagen von Maschinenelementen für Antriebsaufgaben; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-29629-8

Base For
None

M 4.44 Module: Mechanical Design B-C [M-MACH-106528]

Coordinators: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Electrical Engineering and Information Technology
KIT Department of Mechanical Engineering

Part of: Mandatory Elective Courses (Usage from 10/1/2023)

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	4	1

Mandatory			
T-MACH-112985	Mechanical Design B and C	6 CP	Düser, Matthiesen
T-MACH-112982	Mechanical Design B, Workshop	3 CP	Düser, Matthiesen
T-MACH-112983	Mechanical Design C, Workshop	3 CP	Düser, Matthiesen

Assessment
See individual courses

Prerequisites
None

Competence Goal
In mechanical design, students acquire skills in analysis and synthesis using examples. These include both individual machine elements such as bearings or springs and more complicated systems such as gears or couplings. After completing the machine design theory, the students are able to apply the contents learned to other technical systems - even those not known from the lecture - by transferring the principles of action and basic functions learned from examples to other contexts. This enables students to independently analyze unknown technical systems and synthesize suitable systems for given problems.

Content
MD B

- Design
- Tolerances & Fittings
- Gear Transmission
- Clutches

MD C

- Bolt connections
- Dimensioning
- Electric Motors + Hydraulics

Module Grade Calculation
The module grade ist the grade of the written exam.

Additional Information
None

Workload
MKL B: Total workload: 180 h, thereof attendance: 67.5 h, divided into lecture + tutorial: 3 SWS -> 45 h and workshop: 1.5 SWS -> 22.5; self-study 112.5 h

MKL C: Total workload: 180 h, of which attendance: 67.5 h, divided into lecture + exercise: 3 SWS -> 45 h as well as workshop: 1.5 SWS -> 22.5; self-study 112.5 h

Recommendations
None

Teaching and Learning Methods
Lectures, exercises and semester-long workshops as well as project work

Literature
Grundlagen der Berechnung und Gestaltung von Maschinenelementen; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X oder Volltextzugriff über Uni-Katalog der Universitätsbibliothek

Grundlagen von Maschinenelementen für Antriebsaufgaben; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-29629-8

Base For
None

M 4.45 Module: Mechanical Processing [M-CIWVT-101135]

Coordinators: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Process Engineering

Credits	Grading	Recurrence	Duration	Language	Level	Version
6 CP	graded	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-101886	Mechanical Processing	6 CP	Dittler

Assessment
Learning control is a written examination lasting 135 minutes (15 minutes reading time and 120 minutes to complete the tasks).

Prerequisites
None

Competence Goal
Students have a basic understanding of properties & behavior of particulate systems in important engineering applications; they are able to use this understanding for calculations and design of selected processes.

Content

- Unit operations of mechanical processing - introduction and overview
- Particle size distribution - determination, depiction, conversion
- Forces on particles in flows
- Separating function - characterization of a separations process
- Fundamentals of mixing and stirring
- Introduction to dimensional analysis
- Characterizations of packings
- Capillarity in porous systems
- Flow through porous systems, fluidized bed
- Fundamentals of agglomeration
- Fundamentals of storage and conveyance

Module Grade Calculation
The module grade is the grade of the written exam.

Workload

- Attendance time: Lectures and exercises: 60 hrs
- Self-study: 45 hrs (about three hours per week)
- Preparation of examination: 75 hrs

Recommendations
Courses of 1st - 4th semester

Literature

- Dittler, Skriptum MVT
- Löffler, Raasch: Grundlagen der Mechanischen Verfahrenstechnik, Vieweg 1992
- Schubert, Heidenreich, Liepe, Neeße: Mechanische Verfahrenstechnik, Deutscher Verlag Grundstoffindustrie, Leipzig 1990
- Dialer, Onken, Leschonski: Grundzüge Verfahrenstechnik&Reaktionstechnik, Hanser Verlag 1986
- Zogg: Einführung in die Mechanische Verfahrenstechnik, Teubner 1993

M 4.46 Module: Mechanical Separation Technology [M-CIWVT-101147]

Coordinators: Dr.-Ing. Marco Gleiß
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	4	3

Mandatory			
T-CIWVT-103448	Mechanical Separation Technology Exam	8 CP	Gleiß
T-CIWVT-103452	Mechanical Separation Technology Project Work	4 CP	Gleiß

Assessment
The learning control consists of two partial achievements:

1. An oral individual examination with a duration of about 30 minutes for the lecture "Mechanical Separation Technology" and related exercises

2. Project work. Practical collaboration, written report and oral presentation of the results are rated.

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

Competence Goal
The students are able to explain the fundamental laws and the derived physical principles of the particle separation from liquids and not only to relate them to the principally suited separation apparatuses but also special variants. They have the ability to apply the relationship betwen product operation and design parameters to different separation techniques. They can analyse separation problems with scientific methods and give alternative problem solution proposals. The students are able to execute their fundamental and process knowledge practically to the example of beer brewing.

Content
Physical fundamentals, apparatuses, applications,strategies; characterisation of particle systems and slurries; pretreatment methods to enhance the separability of slurries; fundamentals, apparatuses and process technology of static and centrifugal sedimentation, flotation, depth filtration, crossflow filtration, cake forming vacuum and gas overpressure filtration, filter centrifuges and press filters; filter media; selection criteria and scale-up methods for separation apppartuses and machines; apparatus combinations; case studies to solve sparation problems.

Module Grade Calculation
The module grade is the CP-weighted average of the two partial achievements.

Workload
Lecture 3 SWS exercises 1 SWS:

- attendance time: 60h
- self-study: 80h
- examination preparation: 80h

project work

- attendance time and self-study: 140h

Literature
Anlauf: Script "Mechanische Separationstechnik - Fest/Flüssig-Trennung"

M 4.47 Module: Micro Process Engineering [M-CIWVT-101154]

Coordinators: Prof. Dr.-Ing. Peter Pfeifer
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	4	3

Mandatory			
T-CIWVT-103666	Micro Process Engineering	7 CP	Pfeifer
T-CIWVT-103667	Micro Process Engineering	5 CP	Dittmeyer, Pfeifer

Assessment
The learning control consists of three partial achievements:

1. Oral examination of about 25 minutes duration
2. project work

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

Competence Goal
The students are able apply the methods of process intensification by microstructuring of the reaction zone and are capable of analyzing the advantages and disadvantages while transferring given processes into microreactors. With knowledge of special production processes for micro reactors, students are able to design microstructured systems in terms of heat exchange and to analyze the possibilities of transferring processes from conventional technology into the microreactor with regard to heat transfer performance. They understand also how the mechanisms of mass transport and mixing interact in microstructured flow mixers, and are able to apply this knowledge to the combination of mixing and reaction. They can also analyze possible limitations in the process adaptation and are thus able to design microstructured reactors for homogeneous reactions appropriately. The students understand the significance of the residence time distribution for the conversion and selectivity and are capable of analyzing the interaction of mass transport by diffusion and hydrodynamic residence time in microstructured equipment in given applications.

Content
Basic knowledge of micro process engineering systems: fabrication of microstructured systems and interaction with processes, intensification of heat exchange and special effects by heat conduction, residence time distribution in reactors and peculiarities in microstructured systems, structured flow mixers (designs and characterization) and dimensioning of structured reactors with regard to heat and mass transfer.

Module Grade Calculation
The module grade is the CP-weighted average of the two partial achievements.

Workload

- Attendance time: Lectures and exercises 60 hrs
- Self-study: 60 hrs
- Exam preparation: 2 weeks/ 60 hrs
- Project work: 180 hrs

Literature
Scriptum (slides collection)

text books:

- Kockmann, Norbert (Hrsg.), Micro Process Engineering, Fundamentals, Devices, Fabrication, and Applications, ISBN-10: 3-527-31246-3
- Micro Process Engineering - A Comprehens (Hardcover), Volker Hessel (Editor), Jaap C. Schouten (Editor), Albert Renken (Editor), Yong Wang (Editor), Junichi Yoshida (Editor), 3 Bände, 1500 Seiten, Wiley VCH, ISBN-10: 3527315500
- Winnacker-Küchler: Chemische Technik, Prozesse und Produkte, BAND 2: NEUE TECHNOLOGIEN, Kapitel Mikroverfahrenstechnik S. 759-819, ISBN-10: 3-527-30430-4
- Emig, Gerhard, Klemm, Elias, Technische Chemie, Einführung in die chemische Reaktionstechnik, Springer-Lehrbuch, 5., aktual. u. erg. Aufl., 2005, 568 Seiten, ISBN-10: 3-540-23452-7 (Kapitel Mikroreaktionstechnik S. 444-467)
- Chemical Kinetics, ISBN 978-953-51-0132-1 "Application of Catalysts to Metal Microreactor Systems", P. Pfeifer, http://www.intechopen.com/books/chemical-kinetics/application-of-catalysts-to-metal-microreactor-systems

M 4.48 Module: Organic Chemistry for Engineers [M-CHEMBIO-101115]

Coordinators: Prof. Dr. Michael Meier
Organisation: KIT Department of Chemistry and Biosciences
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading	Recurrence	Duration	Language	Level	Version
5 CP	graded	Each summer term	1 term	German	3	1

Mandatory			
T-CHEMBIO-101865	Organic Chemistry for Engineers	5 CP	Meier

Assessment
graded: written examination

Prerequisites
none

Competence Goal
Relevance of Organic Chemistry; fundamental and method-oriented knowledge;correlation between structure and reactivity;knowledge of important concepts and principles;self-solving of problems in Organic Chemistry

Content
Nomenclature, electronic structure and bonding of organic molecules; Organic substance classes and functional groups; Reaction mechanisms and synthesis of organic compounds; Stereoisomers and optical activity; Synthetic polymers and biopolymers;Identification of organic compounds

Module Grade Calculation
grade of the written examination

Workload
lectures and exercises: 34h

homework and preparation of examination: 86h

Literature
Paula Y. Bruice: Organic Chemistry, 5th ed., Prentice Hall, 2007

Paula Y. Bruice: Study guide and solutions manual, 5th ed., Prentice Hall, 2007

K.P.C. Vollhardt, Neil Schore: Organic Chemistry, 5th ed., Palgrave Macmillan, 2006

K.P.C. Vollhardt, Study guide and solutions manual, 5th ed., Palgrave Macmillan, 2006

M 4.49 Module: Orientation Exam [M-CIWVT-100874]

Organisation: KIT Department of Chemical and Process Engineering
Part of: Orientation Exam

Credits	Grading	Recurrence	Duration	Language	Level	Version
0 CP	pass/fail	Each term	2 terms	German	3	1

Mandatory			
T-MATH-100275	Advanced Mathematics I	7 CP	Arens, Griesmaier, Hettlich
T-MATH-100525	Tutorial Advanced Mathematics I	0 CP	Arens, Griesmaier, Hettlich
T-CHEMBIO-101866	General and Inorganic Chemistry	6 CP	Ruben

Modeled Deadline
This module must be passed until the end of the **3. semester**.

Prerequisites
None

M 4.50 Module: Practical Course in Organic Chemistry for Chemical Engineers [M-CHEMBIO-101116]

Coordinators: Dr. Andreas Rapp
Organisation: KIT Department of Chemistry and Biosciences
Part of: Laboratories (Advanced Practical Course)

Credits	Grading	Recurrence	Duration	Language	Level	Version
5 CP	pass/fail	Each winter term	1 term	German	3	1

Mandatory			
T-CHEMBIO-101868	Practical Course in Organic Chemistry for Chemical Engineers	5 CP	Rapp

Assessment
protocols and analytical results

Prerequisites
Compulsory preconditions: written examination OC

Competence Goal
After that course the students should be able to build up a reaction apparatus, to handle hazardous materials and perform chemical reactions. Furthermore the students get an insight in most important purification procedures, e.g. distilation, extraction.

Content
Key reactions in Organic Chemistry, e.g.: nucleophilic substitution, electrophilic aromatic substitution, carbony compounds, additions to non-activated double bonds

Module Grade Calculation
average out of lab experiments/ analytical results

Workload
lectures and exercises: 45h

homework and preparation of examination: 75h

Literature
Schwetlick: Organikum, Wiley-VCH

M 4.51 Module: Process Development and Scale-up [M-CIWVT-101153]

Coordinators: Prof. Dr.-Ing. Jörg Sauer
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each winter term	2 terms	German	4	4

Mandatory			
T-CIWVT-103530	Process Development and Scale-up	8 CP	Sauer
T-CIWVT-103556	Process Development and Scale-up Project Work	4 CP	Sauer
T-CIWVT-111005	Exercises Process Development and Scale-up	0 CP	Sauer

Assessment
The learning control consists of three partial achievements:

- Project work/ presentation and report
- Ungraded online-tests (prerequisite for oral examination)
- Individual oral examination, duration 30 minutes

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your study program.

Competence Goal
The students are capable of developing energy and material balances for complex processes in process technology and to analyze processes in terms of potentials for optimization. They are able to derive suitable methods for the optimization of such processes.
The students are able to calculate the costs of major pieces of equipment and to apply estimation methods for investment costs of production plants. Together with the calculation of variable production costs they are able to analyze the profitability of a chemical process plant. Furthermore the students learn basic concepts of project management, they are enabled to work in teams and guided for intependent scientific work.

Content
Introduction into the basics of process development and project management for the development of chemical processes from the lab into production scale, including the design of a chemical process, design of miniplants and scale-up into production scale. Overview over methods for the economic, technical evaluation of processes and the preparation of business concepts.

Module Grade Calculation
50 % oral examination, 50 % project work.

Additional Information
As part of the project study a visit to the IKFT and the bioliq plant at the Campus North is intended, as well as an excursion to an industrial company.

Workload
Lecture and Exercise:
Attendance time: 45 h
Self-study: 90 h
Exam preparation: 45 h
Project work: 180 h

Literature

- Vorlesungs- und Übungsfolien (KIT Studierendenportal ILIAS)
- Helmus, F. P., Process Plant Design: Project Management from Inquiry to Acceptance, Wiley-VCH, 2008.
- Towler, G., Sinnott, R. K., Chemical Engineering Design: Principles, Practice and Economics of Plant and Process Design, Butterworth-Heinemann, 2012.
- Peters, M.S., Timmerhaus, K.D., West R.E.: Plant Design and Economics for Chemical Engineers, 2003, Mc Graw-Hill, NY.
- Seider, W.D., Seader, J.D., Lewin, D. R., Widagdo, S.: Product and Process Design Principles, Wiley & Sons, NY, 2010.
- Vogel, G.H.:. Verfahrensentwicklung, Wiley-VCH, 2002.
- Belbin, R.M., Management Teams, Why They Succeed or Fail, Routledge, NY, 2013.
- Busse von Colbe, W.; Coenenberg, A.G., Kajüter, P., Linnhoff, U., Betriebswirtschaftslehre für Führungskräfte, 2002, S. 148

M 4.52 Module: Process Engineering in Excel [M-CIWVT-107654]

Coordinators: Dr.-Ing. Peter Bächler
Organisation: KIT Department of Chemical and Process Engineering
Part of: Interdisciplinary Qualifications (Usage from 4/1/2026)

Credits	Grading	Recurrence	Duration	Language	Level	Version
3 CP	graded	Each summer term	1 term	German	3	1

Mandatory			
T-CIWVT-115002	Process Engineering in Excel	3 CP	Bächler

Assessment
Learning control is a completed courswork (ungraded): Processing, documentation, and presentation/discussion of the solution to a programming task.

Prerequisites
None.

Competence Goal
The main goal of the course is to learn and apply engineering-oriented methods by application of the spreadsheet program Excel. The use of Excel by the students is already encouraged during the lectures, and time is designated for self-directed problem solving. After completing the course, students are able to solve and visualize basic chemical engineering problems using Excel. To this end, students learn how to use various tools in Excel (e.g. Solver, regression analysis, VBA programming, etc.).

Content
Advantages of working with Excel is shown using direct examples from the fundamentals of process and chemical engineering. The following list provides an overview of the content of the lecture, covering both Excel-related skills and tools as well as the respective chemical engineering examples:

- Fundamentals of calculations and chart creation in spreadsheet programs using particle size distributions / particle size analysis (example: MVT)
- Numerical solution of equations using the Excel Solver based on model equations that cannot be solved analytically, applied to the determination of the drag coefficient of spheres (example: MVT)
- Linear regression of experimental data and model development in Excel using vapor pressure equations and adsorption isotherms (examples: TVT)
- Numerical solution of differential equations based on reaction kinetics (example: CVT)
- Fundamentals of VBA programming for solving more advanced chemical engineering problems (e.g. modeling baghouse filters for gas cleaning, layout of absorption processes, heat exchanger calculations, thermodynamic properties of humid air, etc.).

Module Grade Calculation
Ungraded.

Additional Information
The course will not take place in the last week of April/May. The exact lecture blocks will be announced.

Workload

- Lecture: 30 h
- Homework & Completing voluntary exercises: 30 h
- Exam preparation: 30 h

Recommendations
Active participation in the lecture is recommended. You are welcome to bring your own laptop with Excel installed.

Literature

- Uwe Feuerriegel: Verfahrenstechnik mit EXCEL: Verfahrenstechnische Berechnungen effektiv durchführen und professionell dokumentieren.
- Karl Schwister und Volker Leven: Verfahrenstechnik für Ingenieure: Ein Lehr- und Übungsbuch.

M 4.53 Module: Process Machines [M-CIWVT-101139]

Coordinators: Prof. Dr.-Ing. Hermann Nirschl
Organisation: KIT Department of Chemical and Process Engineering
Part of: Laboratories (Advanced Practical Course)

Credits	Grading	Recurrence	Duration	Language	Level	Version
5 CP	pass/fail	Each winter term	1 term	German	3	1

Mandatory			
T-CIWVT-101903	Laboratory Work Process Machines	5 CP	Gleiß

Assessment
Learning control is a completed courswwork (not graded):
during lab course for each experiment
starting colloquium oral/written, practical work, written report

Prerequisites
written exam "organic chemistry" must be passed.

Competence Goal
The students are able to explain fundamentals of process design for selected process apparatuses and machines. They have the ability to carry out practical experiments to these processes by themselves after advice and according to a manual, to collect experimental data, to describe and to interpret them. They can make easy calculations regarding the design of the examined processes.

Content

- error calculation
- pumps
- electroseparator
- power input into stirred vessels
- heat transfer in and out stirred vessels
- refrigerator/heat pump
- emulsification
- tranport of plastic granulate in a scrw-reactor
- volume flow measurement of gases
- residence time measurement

Module Grade Calculation
Non graded

Workload
presence time: 7 experiments, 30 h
preparation and reports: 120 h

Literature
scripts for lecture and manuals for lab course

M 4.54 Module: Single Results [M-CIWVT-101992]

Coordinators: Dr.-Ing. Barbara Freudig
Organisation: KIT Department of Chemical and Process Engineering
Part of: Master's Transfer Account

Credits	Grading	Language	Level	Version
30 CP	pass/fail	German	3	7

Master Transfer Examinations (Election: at least 30 credits)			
T-CIWVT-106149	Initial Exam Process Technology and Plant Design	0 CP	Scheiff
T-CIWVT-106148	Practical Course Process Technology and Plant Design	0 CP	Scheiff
T-CIWVT-106150	Process Technology and Plant Design Written Exam	8 CP	Scheiff
T-CIWVT-106029	Biopharmaceutical Purification Processes	6 CP	Hubbuch
T-CIWVT-106032	Kinetics and Catalysis	6 CP	Wehinger
T-CIWVT-113235	Exercises: Membrane Technologies	1 CP	Horn, Saravia
T-CIWVT-113236	Membrane Technologies in Water Treatment	5 CP	Horn, Saravia
T-CIWVT-106035	Computational Fluid Dynamics	6 CP	Nirschl
T-CIWVT-106028	Particle Technology Exam	6 CP	Dittler
T-CIWVT-114107	Thermal Process Engineering II	6 CP	Zeiner
T-CIWVT-106033	Thermodynamics III	6 CP	Enders
T-CIWVT-106036	Internship	14 CP	Bajohr

Prerequisites
None

M 4.55 Module: SmartMentoring [M-CIWVT-105848]

Coordinators: Dr.-Ing. Barbara Freudig
Organisation: KIT Department of Chemical and Process Engineering
Part of: Interdisciplinary Qualifications (Usage from 10/1/2021)

Credits	Grading	Recurrence	Duration	Language	Level	Version
3 CP	pass/fail	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-111761	SmartMentoring - Group Management	2 CP	Freudig

M 4.56 Module: Thermal Process Engineering [M-CIWVT-101134]

Coordinators: Prof. Dr.-Ing. Tim Zeiner
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Process Engineering

Credits	Grading	Recurrence	Duration	Language	Level	Version
6 CP	graded	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-101885	Thermal Process Engineering	6 CP	Zeiner

Assessment
Learning control is a written examination lasting 180 minutes.

Prerequisites
None

Competence Goal
Students can explain fundamental knowledge in the field of Thermal Separations. Emphasis is laid on the difference between methodological tools and their application for the description of selected unit operations. They can work on standard types of problems in the field of Thermal Process Engineering. They can solve it mathematically and can apply methologocal tools adequate. Furthermore, the students can quantitatively apply these tools and skills to processes and problems which are new to them.

Content
In this course, the fundamentals of thermal process engineering are deepened and systematically applied to the design of thermal separation processes. Building on the underlying physical and chemical principles, material, energy, and phase equilibria are discussed and used to describe and evaluate real separation tasks. The focus is on the thermal separation processes of distillation and rectification, absorption, extraction, crystallization, and adsorption. For each process, the operating principles, typical apparatus configurations, and basic design approaches are introduced.

Module Grade Calculation
The mark of the module is equal to the mark of the written examination.

Workload

- Attendence time (lecture and tutorials): 60 hrs
- Self study: 40 hrs
- Examination preparation: 80 hrs

Recommendations
Courses of 1st - 4th semester

Literature

- A. Mersmann, M. Kind, J. Stichlmair „Thermische Verfahrenstechnik“, Springer-Verlag, Berlin, 2005.
- K. Sattler, „Thermische Trennverfahren, Grundlagen, Auslegung, Apparate“ VCH Verlag 3. Auflage, 2001.
- K. Schönbucher, „Thermische Verfahrenstechnik“, Springer-Verlag, Berlin, 2002.
- P. Grassmann, F. Widmer, H. Sinn, „Einführung in die thermische Verfahrenstechnik“, Gruyter Verlag; Auflage: 3, 1997.
- M. Baerns, A. Behr, A. Brehm, J. Gmehling, H. Hofmann, U. Onken, A. Renken, „Technische Chemie“, Wiley-VCH, 2006.
- M.L. McCabe, J.C. Smith, P. Harriot, „Unit Operations of Chemical Engineering“ Mc Graw Hill, New York 2000

M 4.57 Module: Thermodynamics I [M-CIWVT-101129]

Coordinators: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: Thermodynamics and Transport Processes

Credits	Grading	Recurrence	Duration	Language	Level	Version
7 CP	graded	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-101878	Thermodynamics I, Tutorial	0 CP	Enders
T-CIWVT-101879	Thermodynamics I, Exam	7 CP	Enders

Assessment
The learning control consists of two partial achievements:

1. Written examination lasting 120 min
2. Prerequisite for participation: Completed coursework;
   2 of 3 compulsory exercises have to be approved

Prerequisites
Before taking the written exam, the compleded coursework must be passed.

Competence Goal
Students are able to analyse and to design energy conversion processes by applying the first and second law of thermodynamics. They understand the behaviour of real pure substances, and they are able to explain thermodynamic processes with and without phase change by means of state diagrams and process schemes.

Content
Fundamental terms; thermodynamic equilibrium and temperature; properties and equation of state for ideal gases; energy and first law for closed systems; balances for open systems; entropy and thermodynamic potentials; second law; equations of state for pure component caloric properties; phase change behavior of pure component systems and state diagrams; thermodynamic cycles for power generation, refrigeration and heat pumps; exergy

Module Grade Calculation
The module grade is the grade of the written examination.

Workload
Lectures and exercises: 70 h
Homework: 80 h
Preparation of Examination : 60 h

Recommendations
courses of 1st and 2nd semester

Literature

- Schaber, K.: Skriptum Thermodynamik I (www.ttk.uni-karlsruhe.de)
- Stephan, P., Schaber, K., Stephan, K., Mayinger, F.: Thermodynamik, Band 1 Einstoffsysteme, 18. Aufl., Springer, 2009
- Baehr, H. D.: Thermodynamik, 11.Aufl., Springer, 2002
- Sandler, S. I.: Chemical, Biochemical and Engineering Thermodynamics, J. Wiley & Sons, 2006

M 4.58 Module: Thermodynamics II [M-CIWVT-101130]

Coordinators: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: Thermodynamics and Transport Processes

Credits	Grading	Recurrence	Duration	Language	Level	Version
7 CP	graded	Each summer term	1 term	German	3	2

Mandatory			
T-CIWVT-101880	Thermodynamics II, Tutorial	0 CP	Enders
T-CIWVT-101881	Thermodynamics II, Exam	7 CP	Enders

Assessment
The learning control consists of two partial achievements:

1. Written examination lasting 120 min
2. Prerequisite for participation: Completed coursework;
   2 of 3 compulsory exercises have to be approved

Prerequisites
Before taking the written exam, the compleded coursework must be passed.

Competence Goal
Students understand the behavior of real gases, gas-vapor mixtures, simple real mixtures, chemical equilibria of ideal gases. They are able to explain and to analyse corresponding thermodynamic processes by means of state diagrams and process schemes. They are able to analyse and to design these processes based on balance equations and phase equilibria.

Content
Real gases and liquification of gases; thermodynamic potentials; characterization of mixtures; mixtures of ideal gases; gas-vapor mixtures and processes with humid air; phase equilibria and phase diagrams, laws of Raoult and Henry, liquid-liquid equilibria; enthalpy of mixtures; general description of mixtures and chemical potential; reaction equilibria of ideal gases; fundamentals of combustion processes.

Module Grade Calculation
The module grade is the grade of the written examination.

Workload
Lectures and exercises: 70 h
Homework: 80 h
Preparation of Examination : 60 h

Recommendations
courses of 1st - 3rd semester

Thermodynamics I

Literature

- Stephan, P., Schaber, K., Stephan, K., Mayinger, F.: Thermodynamik, Band 2: Mehrstoffsysteme und chemische Reaktionen, 15. Aufl., Springer, 2010
- Baehr, H. D., Kabelac, S. : Thermodynamik, 14. Aufl., Springer, 2009
- Sandler, S. I.: Chemical, Biochemical and Engineering Thermodynamics, J. Wiley & Sons, 2006
- Gmehling, J., Kolbe, B.: Thermodynamik, 2. Auflage, VCH Verlag Weinheim, 1992

5 Module components

T 5.1 Module component: Automation and Control Systems Engineering - Exam [T-CIWVT-113088]

Coordinators: Prof. Dr.-Ing. Thomas Meurer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106477 - Automation and Control Systems Engineering
M-CIWVT-106880 - Advanced Methods in Linear Control

Type	Credits	Grading	Version
Oral examination	6 CP	graded	1

Courses					
WT 25/26	2243020	Advanced Methods in Linear Control	3 SWS	Lecture / Practice (/ 🗣	Meurer
WT 25/26	2243021	Exkursion im Profilfach Automatisierungs- und Regelungstechnik	1 SWS	Excursion (E / 🗣	Meurer
Exams					
ST 2026	7243020	Automation and Control Systems Engineering - Exam			Meurer, Jerono

Legend: 💻 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.2 Module component: Advanced Mathematics I [T-MATH-100275]

Coordinators: PD Dr. Tilo Arens
Prof. Dr. Roland Griesmaier
PD Dr. Frank Hettlich

Organisation: KIT Department of Mathematics

Part of: M-CIWVT-100874 - Orientation Exam
M-MATH-100280 - Advanced Mathematics I

Type	Credits	Grading	Term offered	Version
Written examination	7 CP	graded	Each term	3

Courses					
WT 25/26	0131000	Höhere Mathematik I für die Fachrichtungen Maschinenbau, Geodäsie und Geoinformatik, Materialwissenschaft und Werkstofftechnik, und Ingenieurpädagogik	4 SWS	Lecture	Arens
WT 25/26	0131200	Höhere Mathematik I für die Fachrichtungen Chemieingenieurwesen und Verfahrenstechnik, Bioingenieurwesen, und Mechatronik und Informationstechnik	4 SWS	Lecture	Arens
Exams					
WT 25/26	6700007	Advanced Mathematics I			Arens, Griesmaier, Hettlich
ST 2026	6700025	Advanced Mathematics I			Arens, Griesmaier, Hettlich

Assessment
Learning assessment is carried out by written examination of 120 minutes length.

Prerequisites
A "pass" result on the pre-requesite in AM I is a requirement for registration for the examination in AM I.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MATH-100525 - Tutorial Advanced Mathematics I must have been passed.

T 5.3 Module component: Advanced Mathematics II [T-MATH-100276]

Coordinators: PD Dr. Tilo Arens
Prof. Dr. Roland Griesmaier
PD Dr. Frank Hettlich

Organisation: KIT Department of Mathematics

Part of: M-MATH-100281 - Advanced Mathematics II

Type	Credits	Grading	Term offered	Version
Written examination	7 CP	graded	Each term	2

Courses					
ST 2026	0180800	Höhere Mathematik II für die Fachrichtungen Maschinenbau, Geodäsie und Geoinformatik, Materialwissenschaft und Werkstofftechnik, und Ingenieurpädagogik	4 SWS	Lecture	Hettlich
ST 2026	0181000	Höhere Mathematik II für die Fachrichtungen Chemieingenieurwesen und Verfahrenstechnik, Bioingenieurwesen, und Mechatronik und Informationstechnik	4 SWS	Lecture	Hettlich
Exams					
WT 25/26	6700008	Advanced Mathematics II			Arens, Griesmaier, Hettlich
ST 2026	6700001	Advanced Mathematics II			Arens, Griesmaier, Hettlich

Assessment
Learning assessment is carried out by written examination of 120 minutes length.

Prerequisites
A "pass" result on the pre-requesite in AM II is a requirement for registration for the examination in AM II.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MATH-100526 - Tutorial Advanced Mathematics II must have been passed.

T 5.4 Module component: Advanced Mathematics III [T-MATH-100277]

Coordinators: PD Dr. Tilo Arens
Prof. Dr. Roland Griesmaier
PD Dr. Frank Hettlich

Organisation: KIT Department of Mathematics

Part of: M-MATH-100282 - Advanced Mathematics III

Type	Credits	Grading	Term offered	Version
Written examination	7 CP	graded	Each term	2

Courses					
WT 25/26	0131400	Höhere Mathematik III für die Fachrichtungen Maschinenbau, Materialwissenschaft und Werkstofftechnik, Chemieingenieurwesen und Verfahrenstechnik, Bioingenieurwesen, und Mechatronik und Informationstechnik	4 SWS	Lecture	Hettlich
Exams					
WT 25/26	6700009	Advanced Mathematics III			Arens, Griesmaier, Hettlich
ST 2026	6700002	Advanced Mathematics III			Arens, Griesmaier, Hettlich

Assessment
Learning assessment is carried out by written examination of 120 minutes length.

Prerequisites
A "pass" result on the pre-requesite in AM III is a requirement for registration for the examination in AM III.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MATH-100527 - Tutorial Advanced Mathematics III must have been passed.

T 5.5 Module component: Air Pollution Control [T-CIWVT-113046]

Coordinators: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106448 - Air Pollution Control

Type	Credits	Grading	Term offered	Version
Oral examination	7 CP	graded	Each summer term	1

Courses					
WT 25/26	2244020	Gas Particle Measurement Technology	2 SWS	Lecture / 🗣	Dittler
WT 25/26	2244021	Exercises on 2244020 Gas Particle Measurement Technology	1 SWS	Practice / 🗣	Dittler, und Mitarbeitende
Exams					
WT 25/26	7244021	Air Pollution Control			Dittler

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is an oral examination lasting approx. 30 minutes.

Prerequisites
None

T 5.6 Module component: Air Pollution Control - Project Work [T-CIWVT-113047]

Coordinators: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106448 - Air Pollution Control

Type	Credits	Grading	Version
Examination of another type	5 CP	graded	1

Courses					
WT 25/26	2244023	Air Pollution Control - Excursion	2 SWS	Excursion (E / 🗣)	Dittler, und Mitarbeitende
ST 2026	2244022	Air Pollution Control - Project Work	2 SWS	Project (P / 🗣)	Dittler, und Mitarbeitende
Exams					
WT 25/26	7244022	Air Pollution Control - Project Thesis			Dittler

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a project work; examination of another type.

Prerequisites
None

T 5.7 Module component: Application of Numerics in Engineering [T-CIWVT-101876]

Coordinators: Prof. Dr. Oliver Thomas Stein
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101956 - Computational Methods

Type	Credits	Grading	Version
Coursework (oral)	3 CP	pass/fail	2

Courses					
WT 25/26	2232150	Practical Course Numerics in Engineering Science	3 SWS	Practical course / 🗣	Stein, und Mitarbeitende
Exams					
WT 25/26	7232150 _Kolloquium	Application of Numerics in Engineering			Stein

Legend: 🖥 Online, 🌍 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
Written Examination T-MATH-102250 - Einstieg in die Informatik und algorithmische Mathematik

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MATH-102250 - Introduction to Informatics and Algorithmic Mathematics - Exam must have been started.

T 5.8 Module component: Applied Apparatus Engineering [T-CIWVT-106562]

Coordinators: Dr. Martin Neuberger
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-103297 - Applied Apparatus Engineering

Type	Credits	Grading	Term offered	Version
Written examination	5 CP	graded	Each summer term	1

Courses					
ST 2026	2245830	Applied Apparatus Engineering	4 SWS	Lecture /	Neuberger
Exams					
WT 25/26	7245830	Applied Apparatus Engineering			Neuberger
ST 2026	7245830	Applied Machine Design			Neuberger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Learning Control is a written examination, 90 minutes duration.

Prerequisites
None

T 5.9 Module component: Applied Thermal Process Engineering - Exercises [T-CIWVT-110803]

Coordinators: Dr.-Ing. Benjamin Dietrich
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-104458 - Applied Thermal Process Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	6 CP	graded	Each winter term	2

Courses					
WT 25/26	2260310	Fundamentals of Applied Thermal Process Engineering	2 SWS	Lecture / 🗣	Dietrich, Wetzel, Zeiner
WT 25/26	2260311	Selected Chapters of Applied Thermal Process Engineering	2 SWS	Seminar / 🗣	Dietrich, Wetzel, Zeiner, und Mitarbeitende
WT 25/26	2260312	Practical Course on Applied Thermal Process Engineering (Project Work)	2 SWS	Practical course / 🗣	Dietrich, Wetzel, Zeiner, und Mitarbeitende
Exams					
WT 25/26	7260310	Applied Thermal Process Engineering - Exercises			Dietrich

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is an examination of another type:
The exercises (maximum 10 points) and two lab experiments (maximum 20 points) are assessed. The module component is passed if at least 15 points are achieved. Grading key on request.

Prerequisites
None

T 5.10 Module component: Applied Thermal Process Engineering - Project Work [T-CIWVT-109120]

Coordinators: Dr.-Ing. Benjamin Dietrich
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-104458 - Applied Thermal Process Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	6 CP	graded	Each summer term	2

Courses					
ST 2026	2260310	Grundlagen der Angewandten Thermischen Verfahrenstechnik (Profilfach)	2 SWS	Lecture / 🗣	Dietrich, Wetzel, Zeiner
ST 2026	2260311	Ausgewählte Kapitel der Angewandten Thermischen Verfahrenstechnik (Profilfach)	2 SWS	Seminar / 🗣	Dietrich, Wetzel, Zeiner
ST 2026	2260312	Praktikum zu Angewandte Thermische Verfahrenstechnik (Profilfach)	2 SWS	Practical course / 🗣	Dietrich, Wetzel, Zeiner, und Mitarbeitende
Exams					
ST 2026	7260312	Thermal Process Engineering			Dietrich

Legend: 💻 Online, 🗣💻 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a project work; examination of another type.

Prerequisites
None

T 5.11 Module component: Automation and Control Systems Engineering - Project Work [T-CIWVT-113089]

Coordinators: Prof. Dr.-Ing. Thomas Meurer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106477 - Automation and Control Systems Engineering

Type	Credits	Grading	Version
Examination of another type	6 CP	graded	1

Courses					
WT 25/26	2243020	Advanced Methods in Linear Control	3 SWS	Lecture / Practice (/ 🗣	Meurer
WT 25/26	2243021	Exkursion im Profilfach Automatisierungs- und Regelungstechnik	1 SWS	Excursion (E / 🗣	Meurer
ST 2026	2243022	Automation and Control Systems Engineering - Project Work	3 SWS	Project (P / 🗣	Meurer
Exams					
WT 25/26	7243022	Automation and Control Systems Engineering - Project Work			Meurer, Jerono

Legend: 💻 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.12 Module component: Bachelor's Thesis [T-CIWVT-106365]

Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-103204 - Bachelor's Thesis

Type	Credits	Grading	Term offered	Version
Final Thesis	12 CP	graded	Each term	3

Final Thesis
This module component represents a final thesis. The following periods have been supplied:

Submission deadline	4 months
Maximum extension period	4 weeks
Correction period	6 weeks

This thesis requires confirmation by the examination office.

T 5.13 Module component: Biopharmaceutical Process Engineering [T-CIWVT-113023]

Coordinators: Prof. Dr. Jürgen Hubbuch
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106475 - Biopharmaceutical Process Engineering

Type	Credits	Grading	Term offered	Version
Written examination	6 CP	graded	Each term	1

Courses					
ST 2026	2214040	Biopharmaceutical Process Engineering	3 SWS	Lecture / 🗣	Hubbuch
ST 2026	2214041	Excercises on 2241040 Biopharmaceutical Process Engineering	1 SWS	Practice / 🗣	Hubbuch, und Mitarbeiter
Exams					
WT 25/26	7214040	Biopharmaceutical Process Engineering (previously Downstream Processing)			Hubbuch
ST 2026	7214040	Biopharmaceutical Process Engineering (previously Downstream Processing)			Hubbuch

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lasting 120 minutes.

Prerequisites
None

Workload
180 hours

T 5.14 Module component: Biopharmaceutical Purification Processes [T-CIWVT-106029]

Coordinators: Prof. Dr. Jürgen Hubbuch
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading	Version
Written examination	6 CP	graded	1

Courses					
WT 25/26	2214010	Biopharmaceutical Purification Processes	3 SWS	Lecture /	Hubbuch, Franzreb
WT 25/26	2214011	Exercises on 2214010 Biopharmaceutical Purification Processes	1 SWS	Practice /	Hubbuch, Franzreb
Exams					
WT 25/26	7214010	Biopharmaceutical Purification Processes (written exam)			Hubbuch
ST 2026	7214010	Biopharmaceutical Purification Processes			Hubbuch

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
The examination is a written examination with a duration of 120 minutes (section 4 subsection 2 number 1 SPO).

T 5.15 Module component: Bioprocess Development [T-CIWVT-114538]

Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-107403 - Bioprocess Development

Type	Credits	Grading	Version
Written examination	6 CP	graded	1

Courses					
WT 25/26	2213050	Bioprocess Development	2 SWS	Lecture /	Grünberger
WT 25/26	2213051	Exercises on 2213050 Bioprocess Development	2 SWS	Practice /	Grünberger
Exams					
WT 25/26	7213050	Bioprocess Development			Grünberger
ST 2026	7213050	Bioprocess Development			Grünberger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

T 5.16 Module component: Bioprocess Engineering [T-CIWVT-113019]

Coordinators: Prof. Dr.-Ing. Alexander Grünberger
Prof. Dr. Jürgen Hubbuch

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-106434 - Bioprocess Engineering

Type	Credits	Grading	Term offered	Version
Written examination	5 CP	graded	Each winter term	2

Courses					
WT 25/26	2213010	Bioprocess Engineering	4 SWS	Lecture /	Grünberger, Hubbuch
WT 25/26	2213011	Revision Course Bioprocess Engineering	1 SWS	Practice /	Grünberger
Exams					
WT 25/26	7213010-VBP-947	Bioprocess Engineering			Grünberger, Hubbuch
ST 2026	7213010-VBP-947	Bioprocess Engineering			Grünberger, Hubbuch

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Assessment
Written examination with a duration of 120 minutes.

T 5.17 Module component: Biotechnology [T-CIWVT-103669]

Coordinators: Dr.-Ing. Iris Perner-Nochta
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101143 - Biotechnology

Type	Credits	Grading	Version
Examination of another type	9 CP	graded	2

Courses					
WT 25/26	2214210	Profile Subject Biotechnology - Management of Scientific Projects	3 SWS	Lecture / Practice (/ 🗣	Perner-Nochta, Grünberger, und Mitarbeitende
WT 25/26	2214211	Profile Subject Biotechnology - Laboratory Work (2214210)	6 SWS	Practical course / 🗣	Perner-Nochta, Grünberger, und Mitarbeitende
WT 25/26	2214212	Profile Subject Biotechnology - Exercises on Management of Scientific Projects (2214210)	1 SWS	Practice / 🗣	Perner-Nochta, und Mitarbeitende
ST 2026	2214211	Profile Subject Biotechnology - Laboratory Work (2214210)	6 SWS	Practical course / 🗣	Perner-Nochta, und Mitarbeitende
ST 2026	2214212	Profile Subject Biotechnology - Exercises on Management of Scientific Projects (2214210)	1 SWS	Project (P / 🗣	Perner-Nochta, und Mitarbeitende
Exams					
WT 25/26	7214210	Biotechnology			Perner-Nochta, Hubbuch

Legend: 💻 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is an examination of another type, project work.

Prerequisites
None

T 5.18 Module component: Biotechnology [T-CIWVT-103668]

Coordinators: Dr. Nadja Alina Henke
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101143 - Biotechnology

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each term	2

Courses					
WT 25/26	2214215	Bioanalytics	2 SWS	Lecture /	Henke, Bleher
Exams					
WT 25/26	7214215	Bioanalytics			Henke, Bleher
ST 2026	7214215	Bioanalytics			Henke, Bleher

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Prerequisites
None

T 5.19 Module component: Catalysts for the Energy Transition [T-CIWVT-112214]

Coordinators: TT-Prof. Dr. Moritz Wolf
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106030 - Catalysts for the Energy Transition

Type	Credits	Grading	Term offered	Version
Written examination	5 CP	graded	Each summer term	1

Courses					
ST 2026	2231410	Catalysts for the Energy Transition	2 SWS	Lecture / 🗣	Wolf
ST 2026	2231411	Übungen zu 2231410 Catalysts for the Energy Transition	1 SWS	Practice / 🗣	Wolf
Exams					
WT 25/26	7231410	Catalysts for the Energy Transition			Wolf
ST 2026	7231410	Catalysts for the Energy Transition			Wolf

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Oral exam, duration approx. 20 minutes.

Prerequisites
None.

T 5.20 Module component: Chemical Process Engineering [T-CIWVT-101884]

Coordinators: Prof. Dr.-Ing. Gregor Wehinger
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101133 - Chemical Process Engineering

Type	Credits	Grading	Version
Written examination	6 CP	graded	1

Courses					
WT 25/26	2220010	Chemical Process Engineering	2 SWS	Lecture / 🗣	Wehinger
WT 25/26	2220011	Exercises on 2220010 Chemical Process Engineering	2 SWS	Practice / 🗣	Wehinger, und Mitarbeitende
WT 25/26	2220012	Revision Course for the Chemical Process Engineering Exam	2 SWS	Practice / 💻	Wehinger, und Mitarbeitende
ST 2026	2220012	Revision Course for the Chemical Process Engineering Exam	2 SWS	Practice / 💻	Wehinger, und Mitarbeitende
Exams					
WT 25/26	7220010	Chemical Process Engineering			Wehinger
ST 2026	7220010	Chemical Process Engineering			Wehinger

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lasting 120 minutes.

Prerequisites
None

T 5.21 Module component: Chemical Reaction Engineering - Exam [T-CIWVT-113695]

Coordinators: Prof. Dr.-Ing. Gregor Wehinger
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106825 - Chemical Reaction Engineering

Type	Credits	Grading	Version
Oral examination	6 CP	graded	1

Courses					
WT 25/26	2220020	Chemical Process Engineering II	2 SWS	Lecture / 🗣	Wehinger
WT 25/26	2220021	Exercises on 2220020 Chemical Process Engineering II	1 SWS	Practice / 🗣	Wehinger
Exams					
ST 2026	7220021	Chemical Reaction Engineering - Exam			Wehinger

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.22 Module component: Chemical Reaction Engineering - Project Work [T-CIWVT-113696]

Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106825 - Chemical Reaction Engineering

Type	Credits	Grading	Term offered	Version
Examination of another type	6 CP	graded	Each summer term	1

Courses					
WT 25/26	2220022	Chemical Reaction Engineering - Excursion	1 SWS	Excursion (E / 🗣	Wehinger
ST 2026	2220023	Chemical Reaction Engineering - Project Work	3 SWS	Project (P / 🗣	Wehinger
Exams					
ST 2026	7220023	Chemical Reaction Engineering - Project Work			Wehinger

Legend: 💻 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.23 Module component: Circular Economy - Oral Exam [T-CIWVT-112172]

Coordinators: Prof. Dr.-Ing. Dieter Stapf
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-105995 - Circular Economy

Type	Credits	Grading	Term offered	Version
Oral examination	8 CP	graded	Each winter term	1

Courses					
WT 25/26	2232220	Circular Economy	2 SWS	Lecture / 🗣	Stapf
WT 25/26	2232221	Exercises on 2232220 Circular Economy	1 SWS	Practice / 🗣	Stapf
Exams					
ST 2026	7232220	Circular Economy - Oral Exam			Stapf

Legend: 💻 Online, 🎭 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The learning control is an oral examination on lectures, exercises and case studies, duration approx. 30 minutes.

Prerequisites
None.

T 5.24 Module component: Circular Economy - Project Work [T-CIWVT-112173]

Coordinators: Prof. Dr.-Ing. Dieter Stapf
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-105995 - Circular Economy

Type	Credits	Grading	Term offered	Version
Examination of another type	4 CP	graded	Each summer term	1

Courses					
ST 2026	2232222	Circular Economy - Project Work	2 SWS	Project (P / 🗣	Stapf, und Mitarbeitende
Exams					
WT 25/26	7232222	Circular Economy - Project Work			Stapf

Legend: 💻 Online, 🌀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is an examination of another type. The following partial aspects are included in the grading: Term paper and presentation.

Prerequisites
None.

T 5.25 Module component: Computational Fluid Dynamics [T-CIWVT-106035]

Coordinators: Prof. Dr.-Ing. Hermann Nirschl
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading	Term offered	Version
Written examination	6 CP	graded	Each term	1

Courses					
WT 25/26	2245020	Computational Fluid Dynamics	2 SWS	Lecture / 🗣	Nirschl, und Mitarbeitende
WT 25/26	2245021	Exercises for 2245020 Computational Fluid Dynamics	1 SWS	Practice / 🗣	Nirschl, und Mitarbeitende
Exams					
WT 25/26	7245020	Computational Fluid Dynamics			Nirschl
ST 2026	7245020	Computational Fluid Dynamics			Nirschl

Legend: 💻 Online, 💠 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lasting 90 minutes.

Prerequisites
None

T 5.26 Module component: Control Engineering and System Dynamics [T-CIWVT-112787]

Coordinators: Prof. Dr.-Ing. Thomas Meurer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106308 - Control Engineering and System Dynamics

Type	Credits	Grading	Term offered	Version
Written examination	5 CP	graded	Each summer term	1

Courses					
ST 2026	2243010	Control Engineering and System Dynamics	2 SWS	Lecture /	Meurer
ST 2026	2243011	Exercises on Control Engineering and System Dynamics	1 SWS	Practice /	Meurer, und Mitarbeiter
ST 2026	2243012	Tutorial on Control Engineering and System Dynamics	1 SWS	Tutorial (/	Meurer, und Mitarbeitende
Exams					
WT 25/26	7243010	Control Engineering and System Dynamics			Meurer
ST 2026	7243010	Control Engineering and System Dynamics			Meurer

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

T 5.27 Module component: Data-Driven Modeling with Python [T-CIWVT-113190]

Coordinators: Dr.-Ing. Frank Rhein
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106534 - Data-Driven Modeling with Python

Type	Credits	Grading	Version
Coursework	3 CP	pass/fail	1

Courses					
WT 25/26	2245320	Data-Driven Modeling with Python	2 SWS	Lecture / 🗣	Rhein
WT 25/26	2245321	Project Work on 2245320 Data-Driven Modeling with Python	1 SWS	Practice / 🗣	Rhein
Exams					
WT 25/26	7245321	Data-Driven Modeling with Python - Project			Rhein
ST 2026	7245321	Data-Driven Modeling with Python - Project			Rhein

Legend: 💻 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.28 Module component: Electrochemical Energy Technologies [T-ETIT-114245]

Coordinators: Prof. Dr.-Ing. Ulrike Krewer
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-CIWVT-107651 - Electrochemical Energy Technologies and Materials

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each summer term	2

Courses					
ST 2026	2304356	Electrochemical Energy Technologies	1 SWS	Lecture / 🗣	Krewer
ST 2026	2304357	Exercices to 2304356 Electrochemical Energy Technologies	1 SWS	Practice / 🗣	Krewer

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success control takes place in form of a written examination (120 minutes).

Prerequisites
none

T 5.29 Module component: Elementary Physics [T-PHYS-101577]

Coordinators: Prof. Dr. Alexey Ustinov
Organisation: KIT Department of Physics
Part of: M-PHYS-100993 - Elementary Physics

Type	Credits	Grading	Version
Written examination	7 CP	graded	1

Courses					
WT 25/26	4040321	Physikalische Grundlagen für die Studiengänge Chemie- und Bioingenieurwesen sowie Verfahrenstechnik	4 SWS	Lecture / 🗣	Ustinov
WT 25/26	4040322	Übungen zu Physikalische Grundlagen für die Studiengänge Chemie- und Bioingenieurwesen sowie Verfahrenstechnik	2 SWS	Practice / 🗣	Ustinov, Fischer
Exams					
WT 25/26	7800108	Elementary Physics			Ustinov
ST 2026	7800108	Elementary Physics			Ustinov

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written exam (usually about 180 min)

T 5.30 Module component: Energy and Environmental Engineering [T-CIWVT-108254]

Coordinators: Prof. Dr. Reinhard Rauch
Prof. Dr.-Ing. Dimosthenis Trimis

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101145 - Energy and Environmental Engineering

Type	Credits	Grading	Version
Written examination	8 CP	graded	1

Courses					
WT 25/26	2231150	Processes for the Production of Chemical Energy Carriers	2 SWS	Lecture / 🗣	Rauch
WT 25/26	2232050	Fundamentals of High Temperature Energy Conversion	2 SWS	Lecture / 🗣	Trimis
Exams					
WT 25/26	7231150	Energy and Environmental Engineering			Rauch, Trimis
ST 2026	7231150	Energy and Environmental Engineering			Trimis, Rauch

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lasting 120 minutes.

Prerequisites
None

T 5.31 Module component: Energy and Environmental Engineering Project Work [T-CIWVT-103527]

Coordinators: Prof. Dr. Reinhard Rauch
Prof. Dr.-Ing. Dimosthenis Trimis

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101145 - Energy and Environmental Engineering

Type	Credits	Grading	Version
Examination of another type	4 CP	graded	1

Courses					
ST 2026	2231151	Energy and Environmental Engineering - Project Work	3 SWS	Project (P / 🗣)	Rauch, Trimis, Scheiff
Exams					
WT 25/26	7231151	Energy and Environmental Engineering Project Work			Rauch, Trimis

Legend: 📱 Online, 💮 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The learning control is an examination of another type; project work.

Prerequisites
None

T 5.32 Module component: Energy Process Engineering [T-CIWVT-101889]

Coordinators: Dr. Frederik Scheiff
Prof. Dr. Oliver Thomas Stein

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101136 - Energy Process Engineering

Type	Credits	Grading	Term offered	Version
Written examination	5 CP	graded	Each term	1

Courses					
WT 25/26	2232110	Energy Process Engineering	2 SWS	Lecture / 🗣	Stein, Scheiff
WT 25/26	2232111	Exercises on 2232110 Energy Process Engineering	1 SWS	Practice / 🗣	Stein, Scheiff, und Mitarbeitende
Exams					
WT 25/26	7232110	Energy Process Engineering			Stein, Scheiff
ST 2026	7232110	Energy Process Engineering			Scheiff, Stein

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lasting 150 minutes.

Prerequisites
None

T 5.33 Module component: Engineering Mechanics: Dynamics [T-CIWVT-106290]

Coordinators: TT-Prof. Dr. Christoph Klahn
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101128 - Engineering Mechanics: Dynamics

Type	Credits	Grading	Term offered	Version
Coursework	0 CP	pass/fail	Each winter term	1

Courses					
WT 25/26	2241010	Engineering Mechanics: Dynamics	2 SWS	Lecture / 🗣	Klahn
WT 25/26	2241011	Exercises on 2241010 Engineering Mechanics: Dynamics	2 SWS	Practice / 🗣	Klahn, Rentschler
WT 25/26	2241012	Tutorial on 2241010 Engineering Mechanics: Dynamics	1 SWS	Tutorial (/ 🗣	Klahn
Exams					
WT 25/26	7241011	Engineering Mechanics: Dynamics			Klahn

Legend: 📱 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The learning control is a completed coursework: 3 of 4 exercises have to be passed.

T 5.34 Module component: Engineering Mechanics: Dynamics, Exam [T-CIWVT-101877]

Coordinators: TT-Prof. Dr. Christoph Klahn
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101128 - Engineering Mechanics: Dynamics

Type	Credits	Grading	Term offered	Version
Written examination	5 CP	graded	Each term	2

Courses					
WT 25/26	2241010	Engineering Mechanics: Dynamics	2 SWS	Lecture / 🗣	Klahn
WT 25/26	2241011	Exercises on 2241010 Engineering Mechanics: Dynamics	2 SWS	Practice / 🗣	Klahn, Rentschler
WT 25/26	2241012	Tutorial on 2241010 Engineering Mechanics: Dynamics	1 SWS	Tutorial (/ 🗣	Klahn
Exams					
WT 25/26	7241010	Engineering Mechanics: Dynamics, Exam			Klahn
ST 2026	7241010	Engineering Mechanics: Dynamics, Exam			Klahn

Legend: 🖥 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learming control is a written examination lasting 120 minutes.

Prerequisites
Prerequisite: 3 of 4 exercises have to be passed.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-CIWVT-106290 - Engineering Mechanics: Dynamics must have been passed.

T 5.35 Module component: Engineering Mechanics: Statics and Strength of Materials [T-CIWVT-103687]

Coordinators: Dr.-Ing. Claude Oelschlaeger
Prof. Dr. Norbert Willenbacher

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-104006 - Engineering Mechanics: Statics and Strength of Materials

Type	Credits	Grading	Term offered	Version
Written examination	10 CP	graded	Each term	2

Courses					
WT 25/26	2242210	Engineering Mechanics: Statics	2 SWS	Lecture / 🗣	Willenbacher, Oelschlaeger
WT 25/26	2242211	Exercises on 2242210 Engineering Mechanics: Statics	2 SWS	Practice / 🗣	Oelschlaeger, und Mitarbeitende
WT 25/26	2242212	Seminar zur Technischen Mechanik	2 SWS	Seminar / 🗣	Oelschlaeger, und Mitarbeitende
ST 2026	2242220	Engineering Mechanics: Strength of Materials	2 SWS	Lecture / 🗣	Oelschlaeger
ST 2026	2242221	Exercises on 2242220 Engineering Mechanics: Strength of Materials	2 SWS	Practice / 🗣	Oelschlaeger, und Mitarbeitende
ST 2026	2242222	Seminar zur Technischen Mechanik – Festigkeitslehre	2 SWS	Seminar / 🗣	Oelschlaeger, und Mitarbeitende
Exams					
WT 25/26	7242211	Engineering Mechanics: Statics and Strength of Materials			Oelschlaeger
ST 2026	7242211	Engineering Mechanics: Statics and Strength of Materials			Oelschlaeger

Legend: 🖥 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
none

T 5.36 Module component: Ethics [T-CIWVT-112373]

Coordinators: Prof. Dr. Dr. Rafaela Hillerbrand
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101149 - Ethics and Global Material Cycles

Type	Credits	Grading	Term offered	Version
Coursework	2 CP	pass/fail	Each summer term	1

Courses					
ST 2026	2231160	Ethics and Global Material Cycles	2 SWS	Lecture / 🗣	Hillerbrand, Rauch
Exams					
ST 2026	7231161	Ethics			Hillerbrand

Legend: 💻 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None.

T 5.37 Module component: Examination Material Science I & II [T-MACH-105148]

Coordinators: Dr.-Ing. Johannes Schneider
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102567 - Material Science and Engineering

Type	Credits	Grading	Term offered	Version
Oral examination	9 CP	graded	Each winter term	1

Courses					
WT 25/26	2181555	Materials Science and Engineering I for ciw, vt, MIT	4 SWS	Lecture / Practice (/ 🗣	Schneider
ST 2026	2182562	Materials Science and Engineering II for ciw, vt, mit	4 SWS	Lecture / Practice (/ 🗣	Schneider
Exams					
WT 25/26	76-T-MACH-105148	Examination Material Science I, II			Schneider
ST 2026	76-T-MACH-105148	Examination Material Science I & II			Schneider

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
oral; 30 to 40 minutes

No tools and reference tools are allowed!

Prerequisites
none

Additional Information
The course is offered in German.

Workload
270 hours

T 5.38 Module component: Exercises Process Development and Scale-up [T-CIWVT-111005]

Coordinators: Prof. Dr.-Ing. Jörg Sauer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101153 - Process Development and Scale-up

Type	Credits	Grading	Term offered	Version
Coursework	0 CP	pass/fail	Each winter term	1

Courses					
WT 25/26	2231311	Exercises on 2231310 Process Development and Scale-Up	2 SWS	Practice / 🗣	Sauer, und Mitarbeitende
Exams					
WT 25/26	7231311	Exercises Process Development and Scale-up			Sauer

Legend: 🖥 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.39 Module component: Exercises: Membrane Technologies [T-CIWVT-113235]

Coordinators: Prof. Dr. Harald Horn
Dr.-Ing. Florencia Saravia

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading	Term offered	Version
Coursework	1 CP	pass/fail	Each summer term	1

Courses					
ST 2026	2233011	Membrane Technologies in Water Treatment - Excercises	1 SWS	Practice /	Horn, Saravia, und Mitarbeitende
Exams					
ST 2026	7233011	Exercises for Membrane Technologies			Horn, Saravia

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Assessment
Learning control is a completed coursework: Submission of exercises, membrane design and short presentation (5 minutes, group work).

T 5.40 Module component: Fluiddynamics, Exam [T-CIWVT-101882]

Coordinators: Prof. Dr.-Ing. Hermann Nirschl
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101131 - Fluiddynamics

Type	Credits	Grading	Version
Written examination	5 CP	graded	1

Courses					
ST 2026	2245010	Fluiddynamics	2 SWS	Lecture / 🗣	Nirschl
ST 2026	2245011	Fluiddynamics - Exercises	2 SWS	Practice / 🗣	Nirschl
Exams					
WT 25/26	7245010	Fluiddynamics			Nirschl
ST 2026	7245010	Fluiddynamics			Nirschl

Legend: 💻 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lasting 120 minutes.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-CIWVT-101904 - Fluiddynamics, Tutorial must have been passed.

T 5.41 Module component: Fluiddynamics, Tutorial [T-CIWVT-101904]

Coordinators: Prof. Dr.-Ing. Hermann Nirschl
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101131 - Fluiddynamics

Type	Credits	Grading	Term offered	Version
Coursework	0 CP	pass/fail	Each summer term	1

Courses					
ST 2026	2245010	Fluiddynamics	2 SWS	Lecture / 🗣	Nirschl
ST 2026	2245011	Fluiddynamics - Exercises	2 SWS	Practice / 🗣	Nirschl
Exams					
WT 25/26	7245011	Fluiddynamics, Tutorial			Nirschl
ST 2026	7245011	Fluiddynamics, Tutorial			Nirschl

Legend: 💻 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a completed coursework.

T 5.42 Module component: Food Bioprocess Engineering [T-CIWVT-113021]

Coordinators: Dr.-Ing. Nico Leister
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106476 - Food Bioprocess Engineering

Type	Credits	Grading	Term offered	Version
Written examination	6 CP	graded	Each winter term	2

Courses					
WT 25/26	2211020	Food Bioprocess Engineering	2 SWS	Lecture / 🗣	Leister
WT 25/26	2211021	Exercises on 2211020 Food Bioprocess Engineering	2 SWS	Practice / 🗣	Leister
Exams					
WT 25/26	7211020	Food Bioprocess Engineering			Leister
WT 25/26	7211021	Food Biotechnology			Leister
ST 2026	7211020	Food Bioprocess Engineering			Leister

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
This module is sucessfully completed by a written exam of 120 min.

Prerequisites
Keine.

Workload
180 hours

T 5.43 Module component: Food Technology [T-CIWVT-103528]

Coordinators: Dr.-Ing. Nico Leister
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101148 - Food Technology

Type	Credits	Grading	Term offered	Version
Oral examination	5 CP	graded	Each summer term	3

Courses					
WT 25/26	2211040	Introduction to Food Technology	2 SWS	Lecture / 🗣	Leister, und Mitarbeitende, Ellwanger
WT 25/26	2211041	Food Technology - Project Work	1 SWS	Project (P / 🗣	Leister, und Mitarbeitende, Ellwanger
ST 2026	2211043	Food Technology - Excursion	1 SWS	Excursion (E / 🗣	van der Schaaf, und Mitarbeitende
Exams					
WT 25/26	7211040	Food Technology			Leister

Legend: 📱 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None.

T 5.44 Module component: Food Technology Project Work [T-CIWVT-103529]

Coordinators: Dr.-Ing. Nico Leister
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101148 - Food Technology

Type	Credits	Grading	Version
Examination of another type	7 CP	graded	1

Courses					
WT 25/26	2211041	Food Technology - Project Work	1 SWS	Project (P / 🗣	Leister, und Mitarbeitende, Ellwanger
ST 2026	2211041	Food Technology - Project Work	4 SWS	Project (P / 🗣	van der Schaaf, und Mitarbeitende
Exams					
WT 25/26	7211041	Food Technology Project Work			Leister

Legend: 💻 Online, 💮 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a projekt work/ examination of another type.

Prerequisites
None

T 5.45 Module component: Formulation and Characterisation of Energy Materials - Exam [T-CIWVT-113478]

Coordinators: Dr.-Ing. Claude Oelschlaeger
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106700 - Formulation and Characterisation of Energy Materials

Type	Credits	Grading	Version
Oral examination	8 CP	graded	1

Courses					
WT 25/26	2242025	Formulation and Characterization of Energy Materials	3 SWS	Lecture / 🗣	Willenbacher, Hochstein, Oelschlaeger
WT 25/26	2242026	Exercises on 2242025 Formulation and Characterization of Energy Materials	1 SWS	Practice / 🗣	Willenbacher, Oelschlaeger, und Mitarbeitende
Exams					
ST 2026	7242025	Formulation and Characterisation of Energy Materials - Exam			Willenbacher, Oelschlaeger

Legend: 🖥 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.46 Module component: Formulation and Characterisation of Energy Materials - Project Work [T-CIWVT-113479]

Coordinators: Dr.-Ing. Claude Oelschlaeger
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106700 - Formulation and Characterisation of Energy Materials

Type	Credits	Grading	Term offered	Version
Examination of another type	4 CP	graded	Each summer term	1

Exams			
ST 2026	7242026	Formulation and Characterisation of Energy Materials - Project Work	Willenbacher, Oelschlaeger

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-CIWVT-113478 - Formulation and Characterisation of Energy Materials - Exam must have been passed.

T 5.47 Module component: Fundamentals of Refrigeration, Oral Examination [T-CIWVT-109117]

Coordinators: Prof. Dr.-Ing. Steffen Grohmann
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-104457 - Fundamentals of Refrigeration

Type	Credits	Grading	Term offered	Version
Oral examination	6 CP	graded	Each summer term	3

Courses					
WT 25/26	2250110	Refrigeration A	2 SWS	Lecture / 🗣	Grohmann
WT 25/26	2250111	Refrigeration A - Exercises	1 SWS	Practice / 🗣	Grohmann, und Mitarbeitende
Exams					
WT 25/26	7250110	Fundamentals of Refrigeration, oral examination			Grohmann
ST 2026	7250110	Fundamentals of Refrigeration, oral examination			Grohmann

Legend: 💻 Online, 🌍 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning Control is an oral examination about the lecture "Grundlagen der Kältetechnik" lasting approx. 30 minutes.

Prerequisites
Projects Work

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-CIWVT-109118 - Fundamentals of Refrigeration, Project Work must have been started.

T 5.48 Module component: Fundamentals of Refrigeration, Project Work [T-CIWVT-109118]

Coordinators: Prof. Dr.-Ing. Steffen Grohmann
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-104457 - Fundamentals of Refrigeration

Type	Credits	Grading	Version
Examination of another type	6 CP	graded	1

Courses					
ST 2026	2250112	Fundamentals of Refrigeration - Project Work	2 SWS	Practice / 🗣	Grohmann
Exams					
WT 25/26	7250112	Fundamentals of Refrigeration, Project Work			Grohmann
ST 2026	7250112	Fundamentals of Refrigeration, Project Work			Grohmann

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a completed coursework: groupwork, project presentation.

Prerequisites
None

T 5.49 Module component: General and Inorganic Chemistry [T-CHEMBIO-101866]

Coordinators: Prof. Dr. Mario Ruben
Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CHEMBIO-101117 - General and Inorganic Chemistry
M-CIWVT-100874 - Orientation Exam

Type	Credits	Grading	Term offered	Version
Written examination	6 CP	graded	Each winter term	1

Courses					
WT 25/26	5004	Allgemeine und Anorganische Chemie (für Studierende des Chemieingenieurwesens, der Angewandten Geowissenschaften sowie der Materialwissenschaften und Werkzeugtechnik)	3 SWS	Lecture / 🗣	Behrens
WT 25/26	5005	Seminar zur Vorlesung Allgemeine und Anorganische Chemie (für Studierende des Chemieingenieurwesens, der Angewandten Geowissenschaften sowie der Materialwissenschaften und Werkzeugtechnik)	2 SWS	Seminar / 🗣	Behrens, Schacherl
Exams					
WT 25/26	7100003	General and Inorganic Chemistry			Anson, Behrens
WT 25/26	7100004	General and Inorganic Chemistry			Anson, Behrens

Legend: 💻 Online, 🎭 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.50 Module component: Global Material Cycles [T-CIWVT-112372]

Coordinators: Prof. Dr. Reinhard Rauch
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101149 - Ethics and Global Material Cycles

Type	Credits	Grading	Term offered	Version
Coursework	1 CP	pass/fail	Each summer term	1

Courses					
ST 2026	2231160	Ethics and Global Material Cycles	2 SWS	Lecture / 🗣	Hillerbrand, Rauch
Exams					
WT 25/26	7231160	Ethics and Global Material Cycles			Rauch
ST 2026	7231160	Global Material Cycles			Rauch

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None.

T 5.51 Module component: Heat and Mass Transfer [T-CIWVT-115040]

Coordinators: Dr.-Ing. Benjamin Dietrich
Prof. Dr.-Ing. Thomas Wetzel

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-107675 - Heat and Mass Transfer

Type	Credits	Grading	Term offered	Version
Written examination	7 CP	graded	Each term	1

Courses					
ST 2026	2260030	Heat and Mass Transfer	3 SWS	Lecture / 🗣	Wetzel, Dietrich
ST 2026	2260031	Exercises on 2260030 Heat and Mass Transfer	2 SWS	Practice / 🗣	Wetzel, Dietrich, und Mitarbeitende
Exams					
WT 25/26	7260030	Fundamentals of Heat and Mass Transfer			Wetzel, Dietrich
ST 2026	7260030	Fundamentals of Heat and Mass Transfer			Wetzel, Dietrich

Legend: 💻 Online, 💠 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lasting 180 minutes.

Prerequisites
None

T 5.52 Module component: Industrial Business Administration [T-WIWI-100796]

Coordinators: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Business and Economics
Part of: M-WIWI-100528 - Industrial Business Administration

Type	Credits	Grading	Term offered	Version
Coursework (written)	3 CP	pass/fail	Each winter term	1

Courses					
WT 25/26	2581040	Industrial Business Administration	2 SWS	Lecture / 🗣	Fichtner
Exams					
WT 25/26	7981040	Industrial Business Administration			Fichtner
ST 2026	7981040	Industrial Business Administration			Fichtner

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The assessment of this course is a ungraded written examination (60 min).

Prerequisites
None

T 5.53 Module component: Industrial Organic Chemistry [T-CIWVT-101890]

Coordinators: Prof. Dr. Reinhard Rauch
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101137 - Industrial Organic Chemistry

Type	Credits	Grading	Term offered	Version
Written examination	5 CP	graded	Each term	1

Courses					
WT 25/26	2231140	Industrial Organic Chemistry	3 SWS	Lecture / 🗣	Rauch
WT 25/26	2231141	Exercises on 2231140 Industrial Organic Chemistry	1 SWS	Practice / 🗣	Rauch
Exams					
WT 25/26	7231140	Industrial Organic Chemistry			Rauch
ST 2026	7231140	Industrial Organic Chemistry			Rauch

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lasting 120 minutes.

Prerequisites
None

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module M-CHEMBIO-101115 - Organic Chemistry for Engineers must have been started.

T 5.54 Module component: Initial Exam Process Technology and Plant Design [T-CIWVT-106149]

Coordinators: Dr. Frederik Scheiff
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading	Term offered	Version
Coursework (written)	0 CP	pass/fail	Each winter term	1

Courses					
WT 25/26	2231010	Process Technology and Plant Design I	2 SWS	Lecture / 🗣	Scheiff, Bajohr
WT 25/26	2231012	Practical Course Process Technology and Plant Design	1 SWS	Practical course / 🗣	Scheiff, und Mitarbeitende
Exams					
WT 25/26	7231011-1	Initial Exam Process Technology and Plant Design			Scheiff
WT 25/26	7231011-2	Initial Exam Process Technology and Plant Design			Scheiff

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Completed coursework; ungraded exam

Prerequisites
None

T 5.55 Module component: Intensification of Bioprocesses - Written Exam [T-CIWVT-112998]

Coordinators: Prof. Dr.-Ing. Dirk Holtmann
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106444 - Intensification of Bioprocesses

Type	Credits	Grading	Version
Written examination	6 CP	graded	1

Courses					
ST 2026	2212050	Intensification of Bioprocesses	2 SWS	Lecture / 🗣	Holtmann
ST 2026	2212051	Intensification of Bioprocesses - Exercises	2 SWS	Practice / 🗣	Holtmann, und Mitarbeitende
Exams					
WT 25/26	7212050-WP-IBP	Intensification of Bioprocesses - Written Exam			Holtmann
ST 2026	7212050-WP-IBP	Intensification of Bioprocesses - Written Exam			Holtmann

Legend: 🖥 Online, 🗣🖥 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.56 Module component: Internship [T-CIWVT-106036]

Coordinators: Dr.-Ing. Siegfried Bajohr
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading	Version
Coursework	14 CP	pass/fail	1

Exams			
WT 25/26	7200000	Internship	Bajohr

T 5.57 Module component: Introduction into Bioengineering [T-CIWVT-113018]

Coordinators: Prof. Dr.-Ing. Alexander Grünberger
Prof. Dr.-Ing. Dirk Holtmann
Prof. Dr. Jürgen Hubbuch
Dr.-Ing. Ulrike van der Schaaf

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-106433 - Introduction into Bioengineering

Type	Credits	Grading	Version
Written examination	5 CP	graded	1

Courses					
ST 2026	2210010	Introduction into Bioengineering	4 SWS	Lecture / 🗣	Grünberger, Holtmann, Hubbuch, van der Schaaf
Exams					
WT 25/26	7210010	Introduction into Bioengineering			Grünberger, Holtmann, Hubbuch, van der Schaaf
ST 2026	7210010	Introduction into Bioengineering			Grünberger, Holtmann, Hubbuch, van der Schaaf

Legend: 🖥 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

T 5.58 Module component: Introduction to Informatics and Algorithmic Mathematics - Exam [T-MATH-102250]

Coordinators: Prof. Dr. Willy Dörfler
PD Dr. Mathias Krause

Organisation: KIT Department of Mathematics

Part of: M-CIWVT-101956 - Computational Methods

Type	Credits	Grading	Version
Written examination	5 CP	graded	1

Courses					
WT 25/26	0101100	Einstieg in die Informatik und algorithmische Mathematik	2 SWS	Lecture / 🗣	Krause
WT 25/26	0101200	Übungen zu 0101100 (Einstieg in die Informatik und algorithmische Mathematik)	2 SWS	Practice / 🗣	Krause
WT 25/26	0101300	Rechnerpraktikum zu 0101100	2 SWS	Practical course	Krause
ST 2026	0150700	Einstieg in die Informatik und Algorithmische Mathematik (für Bio- und Chemie-Ingenieurwesen)	2 SWS	Lecture	Krause, Karch, Doll
ST 2026	0150800	Übungen zu 0150700	1 SWS	Practice	Krause, Karch, Doll
ST 2026	0150900	Praktikum zu 0150700	2 SWS	Practical course	Krause, Karch, Doll
Exams					
WT 25/26	7700003_02	Introduction to Informatics and Algorithmic Mathematics - Post-Exam (C++)			Dörfler
ST 2026	7700003_01	Introduction to Informatics and Algorithmic Mathematics - C++-Exam			Krause

Legend: 🖥 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.59 Module component: Introduction to Thin Film Technology - Exercises and Lab [T-CIWVT-114693]

Coordinators: Prof. Dr.-Ing. Wilhelm Schabel
Dr. Philip Scharfer

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-107495 - Introduction to Thin Film Technology

Type	Credits	Grading	Version
Examination of another type	6 CP	graded	1

Courses					
WT 25/26	2260240	Introduction to Thin Film Technology	2 SWS	Lecture / 🗣	Scharfer, Schabel
WT 25/26	2260241	Selected Chapters of Thin Film Technology	2 SWS	Seminar / 🗣	Scharfer, Schabel
WT 25/26	2260242	Thin Film Technology - Lab	2 SWS	Practical course / 🗣	Scharfer, Schabel
Exams					
WT 25/26	7260240	Introduction to Thin Film Technology - Exercises and Lab			Schabel

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.60 Module component: Introduction to Thin Film Technology - Project Work [T-CIWVT-114692]

Coordinators: Prof. Dr.-Ing. Wilhelm Schabel
Dr. Philip Scharfer

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-107495 - Introduction to Thin Film Technology

Type	Credits	Grading	Term offered	Version
Examination of another type	6 CP	graded	Each summer term	1

Courses					
WT 25/26	2260242	Thin Film Technology - Lab	2 SWS	Practical course / 🗣	Scharfer, Schabel
ST 2026	2260243	Introduction to Thin Film Technology - Project Work	2 SWS	Project (P / 🗣	Scharfer, Schabel
ST 2026	2260244	Introduction to Thin Film Technology - Excursion	1 SWS	Excursion (E / 🗣	Scharfer, Schabel
Exams					
ST 2026	7260243	Introduction to Thin Film Technology - Project Work			Schabel

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

T 5.61 Module component: Kinetics and Catalysis [T-CIWVT-106032]

Coordinators: Prof. Dr.-Ing. Gregor Wehinger
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading	Term offered	Version
Written examination	6 CP	graded	Each term	2

Courses					
ST 2026	2220030	Kinetics and Catalysis	2 SWS	Lecture / 🗣	Wehinger
ST 2026	2220031	Kinetics and Catalysis - Exercises	1 SWS	Practice / 🗣	Wehinger, und Mitarbeitende
Exams					
WT 25/26	7220030	Kinetics and Catalysis			Wehinger
ST 2026	7220030	Kinetics and Catalysis			Wehinger

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lasting 90 minutes.

Prerequisites
None

T 5.62 Module component: Laboratory Course: Electrochemical Energy Technologies [T-ETIT-111376]

Coordinators: Dr. Philipp Röse
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-105703 - Laboratory Course: Electrochemical Energy Technologies

Type	Credits	Grading	Term offered	Version
Examination of another type	6 CP	graded	Each summer term	2

Courses					
ST 2026	2304303	Laboratory Electrochemical Energy Technologies	4 SWS	Practical course / 🗣	Röse, Krewer
Exams					
ST 2026	7300022	Laboratory course: Electrochemical Energy Technologies			Röse

Legend: 📱 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Success control takes place in the form of other types of examination. It consists of four experiments and written reports are assessed in each case. The module grade is based on the overall impression.

The successfully completed exoeriments together form an examination unit. If you fail, you have to repeat the internship in its entirety.

Prerequisites
see module

Additional Information
Participation in the safety instruction and the methods course is mandatory.

T 5.63 Module component: Laboratory Work Process Machines [T-CIWVT-101903]

Coordinators: Dr.-Ing. Marco Gleiß
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101139 - Process Machines

Type	Credits	Grading	Term offered	Version
Coursework (practical)	5 CP	pass/fail	Each winter term	4

Courses					
WT 25/26	2200300	Practical Course Process Machines	3 SWS	Practical course / 🗣	Gleiß, Dietrich, Enders, Grohmann, Harth, Meyer, Nirschl, Stapf, van der Schaaf, Wetzel, Willenbacher, Zeiner, und Mitarbeitende
Exams					
WT 25/26	7200300	Laboratory Work Process Machines			Gleiß

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
Written Exam "Organic Chemistry" must be passed.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module M-CHEMBIO-101115 - Organic Chemistry for Engineers must have been passed.
2. The module M-CHEMBIO-101116 - Practical Course in Organic Chemistry for Chemical Engineers must not have been started.

T 5.64 Module component: Laboratory Work: General Chemistry [T-CIWVT-113117]

Coordinators: Prof. Dr. Harald Horn
Stephanie West
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106500 - Basic Practical Course

Type	Credits	Grading	Term offered	Version
Coursework (practical)	2 CP	pass/fail	Each winter term	1

Courses					
WT 25/26	2200350	Safety Instruction and Introduction to Practical Courses 1st Semester BIW und CIW	1 SWS	Lecture / 🗣	Dietrich, Sinanis, West, und Mitarbeitende
WT 25/26	2233060	Basic Practical Course - Part I: General Chemistry	2 SWS	Practical course / 🗣	Horn, West
Exams					
WT 25/26	7233060	Laboratory Work: General Chemistry			Horn

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-CHEMBIO-101866 - General and Inorganic Chemistry must have been passed.

T 5.65 Module component: Mechanical Design A [T-MACH-112984]

Coordinators: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106527 - Mechanical Design A

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	7 CP	graded	Each winter term	1 semesters	2

Courses					
WT 25/26	2145170	Mechanical Design A	3 SWS	Lecture / 🗣	Matthiesen, Düser
WT 25/26	2145194	Tutorial for Mechanical Design A	1 SWS	Practice / 🗣	Matthiesen, Düser
Exams					
WT 25/26	76-T-MACH-112984	Mechanical Design A			Matthiesen, Düser
ST 2026	76-T-MACH-112984	Mechanical Design A			Matthiesen, Düser

Legend: 💻 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written exam with a duration of 90 Minutes

Prerequisites
Admission to the exam only with succesful completion of Workshop Mechanical Design A (T-MACH-112981)

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-112981 - Mechanical Design A, Workshop must have been passed.

Recommendations
None

Additional Information
Students are familiar with the basic machine elements of technical systems and are able to analyze them in a system context

The course is offered in German.

Workload
210 hours

T 5.66 Module component: Mechanical Design A, Workshop [T-MACH-112981]

Coordinators: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106527 - Mechanical Design A

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	2 CP	pass/fail	Each winter term	1 semesters	2

Courses					
WT 25/26	2145171	Mechanical Design A - Workshop	1 SWS	Practical course / 🗣	Matthiesen, Düser
Exams					
WT 25/26	76-T-MACH-112981	Mechanical Design A, Workshop			Düser, Matthiesen
ST 2026	76-T-MACH-112981	Mechanical Design A, Workshop			Düser, Matthiesen

Legend: 💻 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Concomitant to the lecture, a workshop with 3 workshop sessions takes place over the semester. During the workshop the students are divided into groups and their mechanical design knowledge will be tested during a colloquium at the beginning of every single workshop session. The attendance is mandatory and will be controlled.

The pass of the colloquia and the process of the workshop task are required for the successful participation.

Prerequisites
None

Recommendations
None

Additional Information
The course is offered in German.

Workload
60 hours

T 5.67 Module component: Mechanical Design B and C [T-MACH-112985]

Coordinators: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106528 - Mechanical Design B-C

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	6 CP	graded	Each summer term	2 semesters	1

Courses					
WT 25/26	2145140	Mechanical Design C	2 SWS	Lecture / 🗣	Matthiesen, Düser
WT 25/26	2145141	Tutorials Mechanical Design C	1 SWS	Practice / 🗣	Matthiesen, Düser
ST 2026	2146200	Mechanical Design B	2 SWS	Lecture / 🗣	Matthiesen, Düser
ST 2026	2146201	Exercises for Mechanical Design B	1 SWS	Practice / 🗣	Matthiesen, Düser
Exams					
WT 25/26	76-T-MACH-112985	Mechanical Design B & C			Matthiesen, Düser
ST 2026	76-T-MACH-112985	Mechanical Design B & C			Matthiesen, Düser

Legend: 💻 Online, 🎭 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Written exam consisting of a written & design part (total 240 minutes)

Prerequisites
Admission to the exam only with succesful completion of Workshop Mechanical Design B (T-MACH-112982) AND Workshop Mechanical Design C (T-MACH-112983)

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-112983 - Mechanical Design C, Workshop must have been passed.
2. The module component T-MACH-112982 - Mechanical Design B, Workshop must have been passed.

Recommendations
None

Additional Information
The course is offered in German.

Workload
180 hours

T 5.68 Module component: Mechanical Design B, Workshop [T-MACH-112982]

Coordinators: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106528 - Mechanical Design B-C

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	3 CP	pass/fail	Each summer term	1 semesters	1

Courses					
ST 2026	2146202	Workshop of Mechanical Design B	2 SWS	Practical course / 🗣	Matthiesen, Düser
Exams					
WT 25/26	76-T-MACH-112982	Mechanical Design B, Workshop			Matthiesen, Düser
ST 2026	76-T-MACH-112982	Mechanical Design B, Workshop			Matthiesen, Düser

Legend: 🖥 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Concomitant to the lecture, a workshop with 3 workshop sessions takes place over the semester. During the workshop the students are divided into groups and their mechanical design knowledge will be tested during a colloquium at the beginning of every single workshop session. The attendance is mandatory and will be controlled.

A CAD task from the area of mechanical design must be processed. This will be approved within an examination.

The pass of the colloquia and the process of the workshop task are required for the successful participation.

Prerequisites
None

Recommendations
None

Additional Information
The course is offered in German.

Workload
90 hours

T 5.69 Module component: Mechanical Design C, Workshop [T-MACH-112983]

Coordinators: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106528 - Mechanical Design B-C

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	3 CP	pass/fail	Each winter term	1 semesters	1

Courses					
WT 25/26	2145142	Workshop 'Mechanical Design C'	1.5 SWS	Practical course / 🗣	Matthiesen, Düser
Exams					
WT 25/26	76-T-MACH-112983	Mechanical Design C, Workshop			Düser, Matthiesen

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Concomitant to the lecture, a workshop with 3 workshop sessions takes place over the semester. During the workshop the students are divided into groups and their mechanical design knowledge will be tested during a colloquium at the beginning of every single workshop session. The attendance is mandatory and will be controlled.

A CAD task from the area of mechanical design must be processed. This will be approved within an examination.

The pass of the colloquia and the process of the workshop task are required for the successful participation.

Prerequisites
None

Recommendations
None

Additional Information
The course is offered in German.

Workload
90 hours

T 5.70 Module component: Mechanical Processing [T-CIWVT-101886]

Coordinators: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101135 - Mechanical Processing

Type	Credits	Grading	Term offered	Version
Written examination	6 CP	graded	Each term	1

Courses					
WT 25/26	2244010	Mechanical Processing	2 SWS	Lecture / 🗣	Dittler
WT 25/26	2244011	Exercises on 2244010 Mechanical Processing	2 SWS	Practice / 🗣	Dittler, und Mitarbeitende
Exams					
WT 25/26	7244010	Mechanical Processing			Dittler
ST 2026	7244010	Mechanical Processing			Dittler

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lasting 135 minutes (15 minutes reading time and 120 minutes to complete the tasks).

Prerequisites
None

T 5.71 Module component: Mechanical Separation Technology Exam [T-CIWVT-103448]

Coordinators: Dr.-Ing. Marco Gleiß
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101147 - Mechanical Separation Technology

Type	Credits	Grading	Term offered	Version
Oral examination	8 CP	graded	Each summer term	1

Courses					
WT 25/26	2245230	Mechanical Separation Technology	3 SWS	Lecture / 🗣	Gleiß
WT 25/26	2245231	Exercises for 2245230 Mechanical Separation Technology	1 SWS	Practice / 🗣	Gleiß
Exams					
WT 25/26	7245231	Mechanical Separation Technology Exam			Gleiß

Legend: 🖥 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is an oral examination lasting approx. 30 minutes.

Prerequisites
None

T 5.72 Module component: Mechanical Separation Technology Project Work [T-CIWVT-103452]

Coordinators: Dr.-Ing. Marco Gleiß
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101147 - Mechanical Separation Technology

Type	Credits	Grading	Version
Examination of another type	4 CP	graded	1

Courses					
ST 2026	2245232	Project Work for Profile Subject Mechanical Separation Techniques	1 SWS	Practice / 🗣	Gleiß, und Mitarbeitende
Exams					
WT 25/26	7245232	Mechanical Separation Technology Project Work			Gleiß

Legend: 💻 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a project work; examination of another type.

Prerequisites
none

T 5.73 Module component: Membrane Technologies in Water Treatment [T-CIWVT-113236]

Coordinators: Prof. Dr. Harald Horn
Dr.-Ing. Florencia Saravia
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading	Term offered	Version
Written examination	5 CP	graded	Each summer term	1

Courses					
ST 2026	2233010	Membrane Technologies in Water Treatment	2 SWS	Lecture / 🗣	Horn, Saravia
ST 2026	2233011	Membrane Technologies in Water Treatment - Excercises	1 SWS	Practice / 🏵	Horn, Saravia, und Mitarbeitende
Exams					
WT 25/26	7233010	Membrane Technologies in Water Treatment			Horn, Saravia
ST 2026	7233010	Membrane Technologies in Water Treatment			Horn, Saravia

Legend: 🖥 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is an written examination lasting 90 minutes.

Prerequisites
Prerequisite: Submission of exercises, membrane design and short presentation (5 minutes, group work).

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-CIWVT-113235 - Exercises: Membrane Technologies must have been passed.

T 5.74 Module component: Micro Process Engineering [T-CIWVT-103666]

Coordinators: Prof. Dr.-Ing. Peter Pfeifer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101154 - Micro Process Engineering

Type	Credits	Grading	Term offered	Version
Oral examination	7 CP	graded	Each summer term	1

Courses					
WT 25/26	2220220	Design of Micro Reactors	3 SWS	Lecture / Practice (/ 🗣	Pfeifer
Exams					
ST 2026	7220222	Micro Process Engineering			Pfeifer

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Die Erfolgskontrolle ist eine mündliche Einzelprüfung nach § 4 Abs. 2 Nr. 2 der SPO Bachelor Chemieingenieurwesen und Verfahrenstechnik 2015 im Umfang von ca. 25 Minuten zu Lehrveranstaltung "Auslegung von Mikroreaktoren".

Prerequisites
None

T 5.75 Module component: Micro Process Engineering [T-CIWVT-103667]

Coordinators: Prof. Dr.-Ing. Roland Dittmeyer
Prof. Dr.-Ing. Peter Pfeifer

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101154 - Micro Process Engineering

Type	Credits	Grading	Version
Examination of another type	5 CP	graded	1

Courses					
ST 2026	2220221	Micro Process Engineering - Project Work	2 SWS	Practice / 🗣	Dittmeyer, Pfeifer, und Mitarbeitende
Exams					
ST 2026	7220221	Micro Process Engineering			Pfeifer

Legend: 🖥 Online, 🌍 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Die Erfolgskontrolle ist eine Prüfungsleistung anderer Art (Projektarbeit) nach § 4 Abs. 2 Nr. 3 der SPO Bachelor Chemieingenieurwesen und Verfahrenstechnik 2015. Es werden die praktische Mitarbeit, der schriftliche Bericht sowie die mündliche Präsentation der Ergebnisse individuell bewertet.

Prerequisites
None

T 5.76 Module component: Organic Chemistry for Engineers [T-CHEMBIO-101865]

Coordinators: Prof. Dr. Michael Meier
Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CHEMBIO-101115 - Organic Chemistry for Engineers

Type	Credits	Grading	Version
Written examination	5 CP	graded	2

Courses					
ST 2026	5142	Organische Chemie für CIW/VT und BIW	2 SWS	Lecture / 🗣	Pianowski
ST 2026	5143	Übungen zu Organische Chemie für CIW/VT und BIW	2 SWS	Practice / 🗣	Pianowski
Exams					
ST 2026	7100017	Organic Chemistry for CIW, BIW, VT und MWT			Podlech, Pianowski
ST 2026	7100029	Organic Chemistry for CIW, BIW, VT und MWT, second exam			Podlech, Pianowski

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
acc. to module description

T 5.77 Module component: Particle Technology Exam [T-CIWVT-106028]

Coordinators: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading	Version
Written examination	6 CP	graded	1

Courses					
ST 2026	2244030	Particle Technology	2 SWS	Lecture / 🗣	Dittler
ST 2026	2244031	Particle Technology - Exercises	1 SWS	Practice / 🗣	Dittler, und Mitarbeitende
Exams					
WT 25/26	7244030	Particle Technology Exam			Dittler
ST 2026	7244030	Particle Technology Exam			Dittler

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lasting 135 minutes (15 minutes reading time and 120 minutes to complete the tasks).

Prerequisites
None

T 5.78 Module component: Practical Course in Organic Chemistry for Chemical Engineers [T-CHEMBIO-101868]

Coordinators: Dr. Andreas Rapp
Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CHEMBIO-101116 - Practical Course in Organic Chemistry for Chemical Engineers

Type	Credits	Grading	Version
Coursework (practical)	5 CP	pass/fail	1

Courses					
WT 25/26	5123	Organisch-Chemisches Praktikum für Studierende des Chemie- und Bioingenieurwesens		Practical course / 🗣	Mitarbeiter, Rapp, Meier
Exams					
WT 25/26	7100018	Practical Course in Organic Chemistry for Chemical Engineers			Rapp

Legend: 🖥 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module M-CHEMBIO-101115 - Organic Chemistry for Engineers must have been passed.

T 5.79 Module component: Practical Course Process Technology and Plant Design [T-CIWVT-106148]

Coordinators: Dr. Frederik Scheiff
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading	Term offered	Version
Coursework (practical)	0 CP	pass/fail	Each winter term	1

Courses					
WT 25/26	2231012	Practical Course Process Technology and Plant Design	1 SWS	Practical course / 🗣	Scheiff, und Mitarbeitende
Exams					
WT 25/26	7231012	practical course Process Technology and Plant Design			Scheiff

Legend: 🖥 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Compleded coursework/ practical course

Prerequisites
Ungraded exam

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-CIWVT-106149 - Initial Exam Process Technology and Plant Design must have been passed.

T 5.80 Module component: Practical Course: Process Engineering [T-CIWVT-113118]

Coordinators: Dr. Sokratis Sinanis
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106500 - Basic Practical Course

Type	Credits	Grading	Term offered	Version
Coursework (practical)	4 CP	pass/fail	Each summer term	1

Courses					
WT 25/26	2200350	Safety Instruction and Introduction to Practical Courses 1st Semester BIW und CIW	1 SWS	Lecture / 🗣	Dietrich, Sinanis, West, und Mitarbeitende
ST 2026	2200305	Basic Practical Course - Part II: Process Engineering	3 SWS	Practical course / 🗣	Bajohr, Sinanis, Dietrich, Horn, Meyer, Müller, West, Wetzel, Zeiner, und Mitarbeitende
Exams					
ST 2026	7200305	Practical Course: Process Engineering			Sinanis

Legend: 🖥 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Modeled Prerequisites

The following conditions have to be fulfilled:

1. The module component T-CHEMBIO-101866 - General and Inorganic Chemistry must have been passed.

T 5.81 Module component: Practical: Synthesis of electrochemical Materials [T-CIWVT-114998]

Coordinators: TT-Prof. Dr. Moritz Wolf
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-107651 - Electrochemical Energy Technologies and Materials

Type	Credits	Grading	Term offered	Version
Coursework (practical)	2 CP	pass/fail	Each summer term	1

Courses					
ST 2026	2231440	Practical Synthesis of Electrochemical Materials	1 SWS	Practical course / 🗣	Wolf
Exams					
ST 2026	7231440	Practical: Synthesis of electrochemical Materials			Wolf

Legend: 💻 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Ungraded coursework: The practical is passed if all colloquia and protocols have been passed.

Prerequisites
None.

T 5.82 Module component: Process Development and Scale-up [T-CIWVT-103530]

Coordinators: Prof. Dr.-Ing. Jörg Sauer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101153 - Process Development and Scale-up

Type	Credits	Grading	Term offered	Version
Oral examination	8 CP	graded	Each summer term	2

Courses					
WT 25/26	2231310	Process Development and Scale-Up	2 SWS	Lecture / 🗣	Sauer
Exams					
ST 2026	7231310	Process Development and Scale-up			Sauer

Legend: 💻 Online, 🌀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-CIWVT-111005 - Exercises Process Development and Scale-up must have been passed.

T 5.83 Module component: Process Development and Scale-up Project Work [T-CIWVT-103556]

Coordinators: Prof. Dr.-Ing. Jörg Sauer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101153 - Process Development and Scale-up

Type	Credits	Grading	Term offered	Version
Examination of another type	4 CP	graded	Each summer term	1

Courses					
ST 2026	2231312	Project Work in the Profile Course "Process Development and Scale-up"	2 SWS	Project (P / 🗣	Sauer, und Mitarbeitende
ST 2026	2231313	Presentation Profile Course "Process Development and Scale-up"		Others (sons / 🗣	Sauer
Exams					
ST 2026	7231312	Process Development and Scale-up Project Work			Sauer

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is an examination of another type: Project work.

Prerequisites
None.

T 5.84 Module component: Process Engineering in Excel [T-CIWVT-115002]

Coordinators: Dr.-Ing. Peter Bächler
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-107654 - Process Engineering in Excel

Type	Credits	Grading	Version
Coursework	3 CP	pass/fail	1

Courses					
ST 2026	2244210	Process Engineering in Excel	2 SWS	Block / 🗣	Bächler
Exams					
ST 2026	7244210	Process Engineering in Excel			Bächler

Legend: 💻 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.85 Module component: Process Technology and Plant Design Written Exam [T-CIWVT-106150]

Coordinators: Dr. Frederik Scheiff
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading	Term offered	Version
Written examination	8 CP	graded	Each term	1

Courses					
WT 25/26	2231010	Process Technology and Plant Design I	2 SWS	Lecture / 🗣	Scheiff, Bajohr
WT 25/26	2231012	Practical Course Process Technology and Plant Design	1 SWS	Practical course / 🗣	Scheiff, und Mitarbeitende
ST 2026	2231011	Process Technology and Plant Design II	3 SWS	Lecture / 🗣	Scheiff, Bajohr
Exams					
WT 25/26	7231010	Process Technology and Plant Design Written Exam			Scheiff
ST 2026	7231010	Process Technology and Plant Design Written Exam			Scheiff

Legend: 💻 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lasting 180 minutes.

Prerequisites
None

T 5.86 Module component: SmartMentoring - Group Management [T-CIWVT-111761]

Coordinators: Dr.-Ing. Barbara Freudig
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-105848 - SmartMentoring

Type	Credits	Grading	Version
Coursework	2 CP	pass/fail	1

Exams			
WT 25/26	7200110	SmartMentoring - Group Management	

T 5.87 Module component: Thermal Process Engineering [T-CIWVT-101885]

Coordinators: Prof. Dr.-Ing. Tim Zeiner
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101134 - Thermal Process Engineering

Type	Credits	Grading	Version
Written examination	6 CP	graded	1

Courses					
WT 25/26	2260110	Thermal Process Engineering	2 SWS	Lecture / 🗣	Zeiner
WT 25/26	2260111	Exercises for 2260110 Thermal Process Engineering	2 SWS	Practice / 🗣	Zeiner, und Mitarbeitende
Exams					
WT 25/26	7260110	Thermal Process Engineering			Zeiner
ST 2026	7260110	Thermal Process Engineering			Zeiner

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.88 Module component: Thermal Process Engineering II [T-CIWVT-114107]

Coordinators: Prof. Dr.-Ing. Tim Zeiner
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading	Version
Written examination	6 CP	graded	1

Courses					
ST 2026	2260150	Thermal Process Engineering II	2 SWS	Lecture / 🗣	Zeiner
ST 2026	2260151	Exercises on 2260150 Thermal Process Engineering II	2 SWS	Practice / 🗣	Zeiner, und Mitarbeitende
Exams					
WT 25/26	7260150	Thermal Process Engineering II			Zeiner
ST 2026	7260150	Thermal Process Engineering II			Zeiner

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None.

T 5.89 Module component: Thermodynamics I, Exam [T-CIWVT-101879]

Coordinators: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101129 - Thermodynamics I

Type	Credits	Grading	Version
Written examination	7 CP	graded	1

Courses					
WT 25/26	2250010	Thermodynamics I	3 SWS	Lecture / 🗣	Enders
WT 25/26	2250011	Thermodynamics I - Exercises	2 SWS	Practice / 🗣	Enders, und Mitarbeitende
WT 25/26	2250022	Tutorial Thermodynamics I and II	2 SWS	Tutorial (/ 🗣	Enders, und Mitarbeitende
Exams					
WT 25/26	7250010	Thermodynamics I Exam			Enders
ST 2026	7250010	Thermodynamics I Exam			Enders

Legend: 📱 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lastin 120 minutes.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-CIWVT-101878 - Thermodynamics I, Tutorial must have been passed.

T 5.90 Module component: Thermodynamics I, Tutorial [T-CIWVT-101878]

Coordinators: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101129 - Thermodynamics I

Type	Credits	Grading	Version
Coursework	0 CP	pass/fail	1

Courses					
WT 25/26	2250010	Thermodynamics I	3 SWS	Lecture / 🗣	Enders
WT 25/26	2250011	Thermodynamics I - Exercises	2 SWS	Practice / 🗣	Enders, und Mitarbeitende
WT 25/26	2250022	Tutorial Thermodynamics I and II	2 SWS	Tutorial (/ 🗣	Enders, und Mitarbeitende
Exams					
WT 25/26	7250011	Thermodynamics I, Tutorial			Enders

Legend: 🖥 Online, 💠 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

T 5.91 Module component: Thermodynamics II, Exam [T-CIWVT-101881]

Coordinators: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101130 - Thermodynamics II

Type	Credits	Grading	Version
Written examination	7 CP	graded	1

Courses					
ST 2026	2250020	Thermodynamics II	3 SWS	Lecture / 🗣	Enders
ST 2026	2250021	Thermodynamics II - Exercises	2 SWS	Practice / 🗣	Enders, und Mitarbeitende
ST 2026	2250022	Tutorial Thermodynamics I and II	2 SWS	Tutorial (/ 🗣	Enders, und Mitarbeitende
Exams					
WT 25/26	7250020	Thermodynamics II, Exam			Enders
ST 2026	7250020	Thermodynamics II, Exam			Enders

Legend: 📱 Online, 🌍 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lastin 120 minutes.

Prerequisites
Precondition for participation: 2 of 3 compulsory exercises have to be approved

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-CIWVT-101880 - Thermodynamics II, Tutorial must have been passed.

T 5.92 Module component: Thermodynamics II, Tutorial [T-CIWVT-101880]

Coordinators: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101130 - Thermodynamics II

Type	Credits	Grading	Version
Coursework	0 CP	pass/fail	1

Courses					
ST 2026	2250020	Thermodynamics II	3 SWS	Lecture / 🗣	Enders
ST 2026	2250021	Thermodynamics II - Exercises	2 SWS	Practice / 🗣	Enders, und Mitarbeitende
ST 2026	2250022	Tutorial Thermodynamics I and II	2 SWS	Tutorial (/ 🗣	Enders, und Mitarbeitende
Exams					
ST 2026	7250021	Thermodynamics II, Tutorial			Enders

Legend: 📱 Online, 💮 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
The learning control is a completed coursework; prerequisite for the written exam.

Prerequisites
None

T 5.93 Module component: Thermodynamics III [T-CIWVT-106033]

Coordinators: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading	Version
Written examination	6 CP	graded	1

Courses					
WT 25/26	2250030	Thermodynamics III	2 SWS	Lecture / 🗣	Enders
WT 25/26	2250031	Thermodynamics III - Exercises	1 SWS	Practice / 🗣	Enders, und Mitarbeitende
Exams					
WT 25/26	7250030	Thermodynamics III			Enders
ST 2026	7250030	Thermodynamics III			Enders

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Assessment
Learning control is a written examination lasting 90 minutes.

Prerequisites
None

T 5.94 Module component: Tutorial Advanced Mathematics I [T-MATH-100525]

Coordinators: PD Dr. Tilo Arens
Prof. Dr. Roland Griesmaier
PD Dr. Frank Hettlich

Organisation: KIT Department of Mathematics

Part of: M-CIWVT-100874 - Orientation Exam
M-MATH-100280 - Advanced Mathematics I

Type	Credits	Grading	Term offered	Version
Coursework (written)	0 CP	pass/fail	Each winter term	2

Courses					
WT 25/26	0131100	Übungen zu 0131000 (Höhere Mathematik I für Mach/Geod/Matwerk/IngPaed)	2 SWS	Practice	Arens
WT 25/26	0131300	Übungen zu 0131200 (Höhere Mathematik I für Ciw/Biw/Mit)	2 SWS	Practice	Arens
Exams					
WT 25/26	6700005	Problem Class for Advanced Mathematics I			Arens, Griesmaier, Hettlich

Assessment
Learning assessment is carried out by written assigments (pre-requesite). Exact requirements will be communicated in the lectures.

Prerequisites
None.

T 5.95 Module component: Tutorial Advanced Mathematics II [T-MATH-100526]

Coordinators: PD Dr. Tilo Arens
Prof. Dr. Roland Griesmaier
PD Dr. Frank Hettlich

Organisation: KIT Department of Mathematics

Part of: M-MATH-100281 - Advanced Mathematics II

Type	Credits	Grading	Term offered	Version
Coursework (written)	0 CP	pass/fail	Each summer term	3

Courses					
ST 2026	0180900	Übungen zu 0180800 (Höhere Mathematik II für Mach/Geod/Matwerk/IngPaed)	2 SWS	Practice	Hettlich
ST 2026	0181100	Übungen zu 0181000 (Höhere Mathematik II für Ciw/Biw/Mit)	2 SWS	Practice	Hettlich
Exams					
ST 2026	7700024	Problem Class for Advanced Mathematics II			Hettlich, Arens, Griesmaier

Assessment
Learning assessment is carried out by written assigments (pre-requesite). Exact requirements will be communicated in the lectures.

Prerequisites
None.

T 5.96 Module component: Tutorial Advanced Mathematics III [T-MATH-100527]

Coordinators: PD Dr. Tilo Arens
Prof. Dr. Roland Griesmaier
PD Dr. Frank Hettlich

Organisation: KIT Department of Mathematics

Part of: M-MATH-100282 - Advanced Mathematics III

Type	Credits	Grading	Term offered	Version
Coursework (written)	0 CP	pass/fail	Each winter term	2

Courses					
WT 25/26	0131500	Übungen zu 0131400 (Höhere Mathematik III für Mach/Matwerk/Ciw/Biw/Mit)	2 SWS	Practice	Hettlich
Exams					
WT 25/26	6700006	Tutorial Advanced Mathematics III			Arens, Griesmaier, Hettlich

Assessment
Learning assessment is carried out by written assigments (pre-requesite). Exact requirements will be communicated in the lectures.

Prerequisites
None.