Karlsruher Institut für Technologie

Module Handbook
Bachelor Program Mechanical Engineering (B.Sc.)

SPO 2016

Valid from Winter Term 2019/20

Date: 11.09.2019

KIT DEPARTMENT OF MECHANICAL ENGINEERING

Table Of Contents

1 About this handbook

1.1 Notes and rules

The program exists of several **subjects** (e.g. Fundamentals of Engineering). Every subject is split into **modules** and every module itself consists of one or more interrelated **module component exams**. The extent of every module is indicated by credit points (CP), which will be credited after the successful completion of the module. Some of the modules are **obligatory**. According to the interdisciplinary character of the program, a great variety of **individual specialization and deepening possibilities** exists for a large number of modules. This enables the student to customize content and time schedule of the program according to personal needs, interest and job perspective. The **module handbook** describes the modules belonging to the program. It describes particularly:

- the structure of the modules
- the extent (in CP),
- the dependencies of the modules,
- the learning outcomes,
- the assessment and examinations.

The module handbook serves as a necessary orientation and as a helpful guide throughout the studies. The module handbook does not replace the **course catalog**, which provides important information concerning each semester and variable course details (e.g. time and location of the course).

1.1.1 Begin and completion of a module

Each module and each examination can only be selected once. The decision on the assignment of an examination to a module (if, for example, an examination in several modules is selectable) is made by the student at the moment when he / she is registered for the appropriate examination. A module is completed or passed when the module examination is passed (grade 4.0 or better). For modules in which the module examination is carried out over several partial examinations, the following applies: The module is completed when all necessary module partial examinations have been passed. In the case of modules which offer alternative partial examinations, the module examination is concluded with the examination with which the required total credit points are reached or exceeded. The module grade, however, is combined with the weight of the predefined credit points for the module in the overall grade calculation.

1.1.2 Module versions

It is not uncommon for modules to be revised due to, for example, new courses or cancelled examinations. As a rule, a new module version is created, which applies to all students who are new to the module. On the other hand, students who have already started the module enjoy confidence and remain in the old module version. These students can complete the module on the same conditions as at the beginning of the module (exceptions are regulated by the examination committee). The date of the student's "`binding declaration"' on the choice of the module in the sense of �5(2) of the Study and Examination Regulation is decisive. This binding declaration is made by registering for the first examination in this module.

In the module handbook, all modules are presented in their current version. The version number is given in the module description. Older module versions can be accessed via the previous module handbooks in the archive.

1.1.3 General and partial examinations

Module examinations can be either taken in a general examination or in partial examinations. If the module examination is offered as a general examination, the entire learning content of the module will be examined in a single examamination. If the module examination is subdivided into partial examinations, the content of each course will be examined in corresponding partial examinations. Registration for examinations can be done online at the campus management portal. The following functions can be accessed on https://campus.studium.kit.edu/:

- Register/unregister for examinations
- Check for examination results
- Create transcript of records

For further and more detailed information, https://studium.kit.edu/Seiten/FAQ.aspx.

1.1.4 Types of exams

Exams are split into written exams, oral exams and alternative exam assessments. Exams are always graded. Non exam assessments can be repeated several times and are not graded.

1.1.5 Repeating exams

Principally, a failed written exam, oral exam or alternative exam assessment can repeated only once. If the repeat examination (including an eventually provided verbal repeat examination) will be failed as well, the examination claim is lost. A request for a second repetition has to be made in written form to the examination committee two months after loosing the examination claim.

1.1.6 Additional accomplishments

Additional accomplishments are voluntarily taken exams, which have no impact on the overall grade of the student and can take place on the level of single courses or on entire modules. It is also mandatory to declare an additional accomplishment as such at the time of registration for an exam.

1.1.7 Further information

More detailed information about the legal and general conditions of the program can be found in the examination regulation of the program (http://www.sle.kit.edu/amtlicheBekanntmachungen.php).

Studienplan der KIT-Fakultät für Maschinenbau für den Bachelorstudiengang Maschinenbau gemäß SPO 2015

Fassung vom 30. August 2019

Inhaltsverzeichnis

0 Abkürzungsverzeichnis

Semester:	WS	Wintersemester
	SS	Sommersemester
Schwerpunkte:	K, KP	Teilleistung im Kernbereich, ggf. Pflicht des Schwerpunkts
	E	Teilleistung im Ergänzungsbereich des Schwerpunkts
	EM	Teilleistung im Ergänzungsbereich ist nur im Masterstudiengang wählbar
	E(P), E/P	Teilleistung Praktikum im Ergänzungsbereich des Schwerpunkts, unbenotet
Lehrveranstaltung:	V	Vorlesung
	Ü	Übung
	P	Praktikum
	SWS	Semesterwochenstunden
Teilleistung:	LP	Leistungspunkte
	Pr	Prüfung
	Pr (h)	Prüfungsdauer in Stunden
	mPr	mündliche Prüfung
	sPr	schriftliche Prüfung
	PraA	Prüfungsleistung anderer Art
	Üschein	Übungsschein
	Pschein	Praktikumsschein
	Schein	unbenotete Modulleistung
	TL	Teilleistung
	Gew	Gewichtung einer Prüfungsleistung im Modul bzw. in der Gesamtnote
Sonstiges:	SPO	Studien- und Prüfungsordnung
	w	wählbar
	p	verpflichtend

1 Studienpläne, Module und Prüfungen

Die Angabe der Leistungspunkte (LP) erfolgt gemäß dem „European Credit Transfer and Accumulation System“ (ECTS) und basiert auf dem von den Studierenden zu absolvierenden Arbeitspensum.

1.1 Prüfungsmodalitäten

In jedem Semester wird für Prüfungen mindestens ein Prüfungstermin angeboten. Prüfungstermine sowie Termine, zu denen die Anmeldung zu den Prüfungen spätestens erfolgen muss, werden von der Prüfungskommission festgelegt. Die Anmeldung für die Prüfungen erfolgt in der Regel mindestens eine Woche vor der Prüfung. Anmelde- und Prüfungstermine werden rechtzeitig bekanntgegeben, bei schriftlichen Prüfungen mindestens sechs Wochen vor der Prüfung.

Über Hilfsmittel, die bei einer Prüfung benutzt werden dürfen, entscheidet der Prüfer. Eine Liste der zugelassenen Hilfsmittel wird gleichzeitig mit der Ankündigung des Prüfungstermins bekanntgegeben. Studienleistungen können solange beliebig oft wiederholt werden, bis diese erfolgreich bestanden wurden.

1.2 Module des Bachelorstudiums

Voraussetzung für die Zulassung zu den Modulprüfungen ist der Nachweis über die unten aufgeführten Studienleistungen. Schriftliche Prüfungen werden als Klausuren mit der angegebenen Prüfungsdauer in Stunden abgenommen. Prüfungsleistungen gehen mit dem angegebenen Gewicht (Gew) in die Modulnote bzw. die Gesamtnote ein.

Das in § 16 SPO beschriebene Fach „Überfachliche Qualifikationen“ bildet das Modul „Schlüsselqualifikationen“ mit einem Umfang von 6 Leistungspunkten.

Fach	Modul	LP/ Modul	Teilleistung	LP	Koordinator	Art der Erfolgskontrolle: Studienleistungen	Art der Erfolgskontrolle: Prüfungsleistungen	Pr (h)	Gew
Ingenieurwissenschaftliche Grundlagen	Höhere Mathematik	21	Höhere Mathematik I	7	Kirsch	Üschein	sPr	2	7
			Höhere Mathematik II	7		ÜSchein	sPr	2	7
			Höhere Mathematik III	7		ÜSchein	sPr	2	7
	Technische Mechanik	23	Technische Mechanik I	7	Böhlke	Üschein	sPr	1,5	7
			Technische Mechanik II	6		Üschein	sPr	1,5	6
			Technische Mechanik III & IV	10	Seemann	Üschein Üschein	sPr	3	10
	Werkstoffkunde	14	Werkstoffkunde I & II	11	Heilmaier		mPr	ca. 0,5	14
			Werkstoffkunde-Praktikum	3		Pschein			
	Technische Thermodynamik	15	Technische Thermo-dynamik und Wärmeübertragung I	8	Maas	Üschein	sPr	3	8
			Technische Thermodynamik und Wärmeübertragung II	7		Üschein	sPr	3	7
	Strömungslehre	8	Strömungslehre I & II	8	Frohnapfel		sPr	3	8
	Physik	5	Wellen- und Quantenphysik	5	Pilawa		sPr	2	5
	Elektrotechnik	8	Elektrotechnik und Elektronik	8	Becker		sPr	3	8
	Mess- und Regelungstechnik	7	Grundlagen der Mess- und Regelungstechnik	7	Stiller		sPr	2,5	7
	Informatik	6	Informatik im Maschinenbau	6	Ovtcharova	Pschein	sPr	3	6

Studienplan für den Bachelorstudiengang Maschinenbau gem. SPO 2015. Gültig ab 01.10.2019, auf Beschlussfassung des Fakultätsrats vom 18.07.2018, mit redaktionelle Änderungen vom 30.08.2019. Seite 3 von 7

Fach	Modul	LP/ Modul	Teilleistung	LP	Koordinator	Art der Erfolgskontrolle		Pr (h)	Gew
						Studien-leistungen	Prüfungs-leistungen		
	Maschinenkonstruktionslehre	20	Maschinenkonstruktionslehre I & II	7	Albers	Üschein Üschein	sPr	1	7
			Maschinenkonstruktionslehre III & IV	13		Üschein Üschein	sPr	4	13
	Maschinen und Prozesse	7	Maschinen und Prozesse	7	Kubach	Pschein	sPr	3	7
	Fertigungsprozesse	4	Grundlagen der Fertigungstechnik	4	Schulze		sPr	1	4
	Betriebliche Produktionswirtschaft	5	Betriebliche Produktionswirtschaft	3	Furmans		sPr	1,5	5
			Betriebliche Produktionswirtschaft Projekt	2			PraA		
Vertiefung im Maschinenbau	Schwerpunkt	12	Kern- und Ergänzungsbereich, wählbare TL siehe Modulhandbuch	12	SP-Verantwortlicher		mPr	ca. 0,7	12
							mPr	ca. 0,7	
	Wahlpflichtmodul	4	wählbare TL siehe Modulhandbuch	4	Heilmaier		mPr	ca. 0,4	4
Überfachliche Qualifikationen	Schlüsselqualifikationen	6	Arbeitstechniken im Maschinenbau	4	Deml	Schein			
			wählbare TL von HoC, ZAK bzw. siehe Modulhandbuch	2	N.N.	Schein			
Bachelorarbeit	Bachelorarbeit	15	Bachelorarbeit	12			PraA		30
			Präsentation	3					

Studienplan für den Bachelorstudiengang Maschinenbau gem. SPO 2015. Gültig ab 01.10.2019, auf Beschlussfassung des Fakultätsrats vom 18.07.2018, mit redaktionelle Änderungen vom 30.08.2019. Seite 4 von 7

1.3 Studienplan

Lehrveranstaltungen **1. bis 4. Semester** Angaben in Semesterwochenstunden (SWS)	WS 1. Sem.			SS 2. Sem.			WS 3. Sem.			SS 4. Sem.		
	V	Ü	P	V	Ü	P	V	Ü	P	V	Ü	P
Höhere Mathematik I-III	4	2		4	2		4	2				
Grundlagen der Fertigungstechnik	2											
Wellen- und Quantenphysik										2	1	
Technische Mechanik I-IV	3	2		3	2		2	2		2	2	
Werkstoffkunde I, II	4	1		2	1							
Werkstoffkunde-Praktikum[1]						2						
Technische Thermodynamik und Wärmeübertragung I, II							4	2		3	2	
Maschinenkonstruktionslehre I-IV	2	1		2	2		2	2	1	2	2	1
Informatik im Maschinenbau				2	2	2						
Elektrotechnik und Elektronik							4	2				
Strömungslehre I										2	1	
Arbeitstechniken Maschinenbau										1		1

Lehrveranstaltungen **5. bis 6. Semester** Angaben in Semesterwochenstunden (SWS)	WS 5. Sem.			SS 6. Sem.		
	V	Ü	P	V	Ü	P
Grundlagen der Mess- und Regelungstechnik	3	1				
Strömungslehre II	2	1				
Maschinen und Prozesse	4		1			
Betriebliche Produktionswirtschaft	3	1				
Schlüsselqualifikationen				2		
Wahlpflichtmodul	(2)			2		
Schwerpunkt (6 SWS, variabel)	3	( )	( )	3	( )	( )

1.4 Bachelorarbeit

Das Modul Bachelorarbeit besteht aus einer schriftlichen Ausarbeitung (Bachelorarbeit, 12 LP) sowie einer mündlichen Präsentation (3 LP). Die Präsentation soll spätestens sechs Wochen nach Abgabe der Bachelorarbeit erfolgen. Die Präsentation soll ca. 20 Minuten dauern und wird anschließend mit dem anwesenden Fachpublikum diskutiert.
Die Durchführung und Benotung der Bachelorarbeit ist in § 14 der SPO für den Bachelorstudiengang Maschinenbau sowie im Modulhandbuch unter „Modul Bachelorarbeit“ geregelt.

[1] Das Werkstoffkunde-Praktikum findet in der vorlesungsfreien Zeit zwischen SS und WS statt und beansprucht eine Woche.

2 Schwerpunkte

Folgende Schwerpunkte sind derzeit vom Fakultätsrat genehmigt (siehe Angaben im Modulhandbuch):

Schwerpunkt	Verantwortlicher	SP-Nr.
Antriebssysteme	Albers	2
Bahnsystemtechnik	Gratzfeld	50
Entwicklung und Konstruktion	Albers	10
Festigkeitslehre/Kontinuumsmechanik	Böhlke	13
Grundlagen der Energietechnik	Bauer	15
Informationsmanagement	Ovtcharova	17
Informationstechnik	Stiller	18
Kraftfahrzeugtechnik	Gauterin	12
Kraft- und Arbeitsmaschinen	Th. Koch	24
Materialwissenschaft und Werkstofftechnik	Heilmaier	26
Mechatronik	Hagenmeyer	31
Modellbildung und Simulation in der Dynamik	Seemann	61
Production Engineering	Lanza	52
Produktionssysteme	Schulze	38
Schwingungslehre	Fidlin	60
Technische Logistik	Furmans	44
Technik des Verbrennungsmotors	Th. Koch	57

Für den Schwerpunkt werden Teilleistungen im Umfang von 12 LP gewählt, davon werden mindestens 8 LP im Kernbereich (K) erworben. „KP“ bedeutet, dass die Teilleistung im Kernbereich Pflicht ist, sofern sie nicht bereits belegt wurde. Die übrigen 4 LP können aus dem Ergänzungsbereich kommen. Dabei dürfen im Rahmen von Praktika höchstens 4 LP erworben werden, die auch als unbenotete Modulleistung erbracht werden können.

Die im Ergänzungsbereich (E) angegebenen Teilleistungen verstehen sich als Empfehlung, andere Teilleistungen (auch aus anderen KIT-Fakultäten) können mit Genehmigung des jeweiligen Schwerpunktverantwortlichen gewählt werden. Dabei ist eine Kombination mit Teilleistungen aus den Bereichen Informatik, Elektrotechnik und Mathematik in einigen Schwerpunkten besonders willkommen. Mit „EM“ gekennzeichnete Teilleistungen stehen im Bachelorstudiengang nicht zur Wahl. Für manche Schwerpunkte wird die Belegung einer bestimmten Teilleistung im Rahmen des Wahlpflichtmoduls empfohlen (s. Empfehlungen im Modulhandbuch).

Ein Absolvieren des Schwerpunktmoduls mit mehr als 12 LP ist nur im Fall, dass die Addition innerhalb des Schwerpunktmoduls nicht auf 12 LP aufgeht, erlaubt. Nicht zulässig ist es jedoch, noch weitere Teilleistungen anzumelden, wenn bereits 12 LP erreicht oder überschritten wurden.

Für die Prüfungsleistungen in den Schwerpunkten gelten folgende Regeln:
Die Prüfungen werden grundsätzlich mündlich abgenommen, bei unvertretbar hohem Prüfungsaufwand kann eine mündlich durchzuführende Prüfung auch schriftlich abgenommen werden. Es wird empfohlen, die Kernbereichsprüfung im Block abzulegen. Bei mündlichen Prüfungen im Schwerpunkt soll die Prüfungsdauer fünf Minuten pro Leistungspunkt betragen. Erstreckt sich eine mündliche Prüfung über mehr als 12 LP, soll die Prüfungsdauer 60 Minuten betragen.

Die Bildung der Schwerpunktnote erfolgt anhand der mit Prüfungsleistungen abgeschlossenen Teilleistungen. Dabei werden alle Teilleistungen gemäß ihrer LP gewichtet. Bei der Bildung der Gesamtnote wird der Schwerpunkt mit 12 LP gewertet.

Die Beschreibung der Schwerpunkte hinsichtlich der jeweils darin enthaltenen Teilleistungen und den damit verbundenen Lehrveranstaltungen ist im aktuellen Modulhandbuch des Bachelorstudiengangs festgelegt.

3 Änderungshistorie (ab 20.07.2016)

20.07.2016	Sprachliche Anpassung an das Eckpunktepapier des KIT, Überarbeitung der Prüfungsmodalitäten
17.08.2016	Redaktionelle Änderungen, u.a. im Modul Physik
28.06.2017	Redaktionelle Änderungen, u.a. in den Modulen Technische Thermodynamik und Strömungslehre
13.07.2018	Anpassung der Schwerpunkte sowie redaktionelle Änderungen
30.08.2019	Redaktionelle Änderungen, u.a. in Punkt 1

WS 2019-2020	B.Sc. Maschinenbau: 1. Fachsemester, Ingenieurwissenschaftliche Grundlagen				
Zeit	**Montag**	**Dienstag**	**Mittwoch**	**Donnerstag**	**Freitag**
08:00 - 09:30					
09:45 - 11:15	**2161245** Technische Mechanik I Audimax		**2149658** Grundlagen der Fertigungstechnik Gerthsen		
11:30 - 13:00	**0131100** Höhere Mathematik I (Üb) Audimax	**0131000** Höhere Mathematik I Audimax	**2145185** Maschinenkonstruktionslehre I (Üb) HS. a.F.		
13:00 - 14:00					
14:00 - 15.30	**2173552** Werkstoffkunde I (Üb) HS a.F.	**2145178** Maschinenkonstruktionslehre I Daimler / Benz		**2161245** Technische Mechanik I Audimax	**2173550** Werkstoffkunde I Audimax
15:45 - 17:15		**2173550** Werkstoffkunde I Gerthsen		**0131000** Höhere Mathematik I Audimax	**2161246** Technische Mechanik I (Üb) Audimax / Daimler
17:30 - 19:00					

Stand: 04.09.2019

Vorlesung	Übung

WS 2019-2020	B.Sc. Maschinenbau: 3. Fachsemester, Ingenieurwissenschaftliche Grundlagen				
Zeit	**Montag**	**Dienstag**	**Mittwoch**	**Donnerstag**	**Freitag**
08:00 - 09:30			**0131400** Höhere Mathematik III Audimax		**2165502** Technische Thermodynamik und Wärmeübertragung I (Üb) Gerthsen
09:45 - 11:15	**2306339** Elektrotechnik und Elektronik (+Üb) Daimler			**2165501** Technische Thermodynamik und Wärmeübertragung I HS a.F.	**0131400** Höhere Mathematik III Gerthsen
11:30 - 13:00	**2161203** Technische Mechanik III HS a.F.	**2306339** Elektrotechnik und Elektronik (+Üb) Benz		**2145153** MKL III (Üb) Audimax	
13:00 - 14:00					
14:00 - 15.30	**2145154** Workshop zu MKL III Räume siehe Homepage	**2165501** Technische Thermodynamik und Wärmeübertragung I Gerthsen		**2161204** Technische Mechanik III (Üb) Daimler / Benz	**2145154** Workshop zu MKL III Räume siehe Homepage
15:45 - 17:15		**2145151** MKL III Daimler / Benz		**0131500** Höhere Mathematik III (Üb) Gerthsen	
17:30 - 19:00					

Stand: 04.09.2019

Vorlesung	Übung	Workshop

WS 2019-2020	B.Sc. Maschinenbau: 5. Fachsemester; Pflichtmodule, Wahlpflichtmodul				
Zeit	**Montag**	**Dienstag**	**Mittwoch**	**Donnerstag**	**Freitag**
08:00 - 09:30	2181612 Phys. GL der Lasertechnik (+Üb) Grashof 2114093 Fluidtechnik Gaede	2165515 GL der techn. Verbrennung I 30.41 HS 3 2105011 Einf. in die Mechatronik (+Üb) (14-tägl.) Hertz	2137301 GL der Mess- und Regelungstechnik (14-tägl.) Gerthsen	2185000 Maschinen und Prozesse (+Üb) HS a.F.	2105011 Einführung in die Mechatronik Hertz
09:45 - 11:15	2137303 GL der Mess- und Regelungstechnik (Tu) 50.31 R 106	2137303 GL der Mess- und Regelungstechnik (Tu) 50.31 R 106 2161254 MM der Kontinuums-mechanik 10.50 Großer HS	2153512 Strömungslehre II HS a.F.		2183702 Mikrostruktursimulation (+ Üb) Oberer HS 2137303 GL der MRT (Tu) 50.41 R -133
11:30 - 13:00	2137303 GL der MRT (Tu) 10.50 R 701.3; 50.41 R -108, -109, -134 2133123 Techn. GL des Verbr.-motors 10.50 Kl. HS	2183703 Modellierung und Simulation HsKA, AM001, Amalienstr. 81-87 2137303 GL der MRT (Tu) 10.50 R 602, 702; 10.91 R 228; 50.41 R -108, -109, -134	2183702 Mikrostruktursimulation (+ Üb, 14-tägl.) 30.48 R 017		2153512 Strömungslehre II HS a.F.
13:00 -14:00					
14:00 - 15.30	2121350 PLM HS I Chemie 2110085 Betriebliche Produktionswirt-schaft (+Üb) Daimler/Benz	2117095 GL der technischen Logistik (+Üb) Gaede	2181738 Wiss. Programmieren für Ingenieure Grashof 2137303 GL der MRT (Tu) 50.41 R -134	2137303 GL der Mess- und Regelungstechnik (Tu) 10.81 HS 62; 40.32 SR 032	2161206 MM der Dynamik Grashof 2110085 Betriebliche Produktions-wirtschaft (+Üb) HS a.F.
15:45 - 17:15	2137301 GL der Mess- und Regelungstechnik Audimax	2185000 Maschinen und Prozesse (+Üb) HS a.F.	2117095 GL d. techn. Logistik (+Üb) Tulla HS 2181612 Phys. GL der Lasertechnik (+Üb) Redt.	2137303 GL der MRT (Tu) 40.32 SR 032; 30.41 HS 2 2161212 Technische Schw. Lehre 30.33 MTI 2165512 Wärme- u. Stoff-übertragung Nusselt	2137303 GL der MRT (Tu) 10.50 R 701.3 2161255 MM der Kontinuums-mechanik (Üb) 10.50 Kl. HS
17:30 - 19:00	2183703 Modellierung und Simulation (bis 20:00 Uhr) 20.29 Pool C				

Stand: 05.09.2019

Pflichtfach	Übung / Tutorium	Wahlpflichtfach

WS 2019-2020	B.Sc. Maschinenbau: 5. Fachsemester; Wahlpflichtmodul				
Zeit	**Montag**	**Dienstag**	**Mittwoch**	**Donnerstag**	**Freitag**
08:00 - 09:30	2181612 Phys. GL der Lasertechnik (+Üb) Grashof 2114093 Fluidtechnik Gaede	2161207 MM der Dynamik (Üb) Grashof 2165515 GL der techn. Verbrenn. I 30.41HS 3 2105011 Einf. in die Mechatronik (14-tägl.) Hertz			2105011 Einführung in die Mechatronik Hertz
09:45 - 11:15		2161254 MM der Kontinuumsmechanik 10.50 Großer HS		2181739 Wiss. Programmieren für Ingenieure (Üb) 20.21 SCC-PC-Pool H	2183702 Mikrostruktur-simulation (+Üb) Oberer HS 2165513 Wärme- und Stoffüber. (Üb) Grashof
11:30 - 13:00	2114088 Fluidtechnik (Üb) 30.41 HS 3 2133123 Techn. GL des Verbr.-motors 10.50 Kleiner HS	2183703 Modellierung und Simulation HsKA, AM001, Amalienstr. 81-87	2183702 Mikrostruktursimulation (+ Üb, 14-tägl.) 30.48 R 017		
13:00 - 14:00					
14:00 - 15.30	2121350 PLM HS I Chemie	2117095 GL der techn. Logistik (+Üb) Gaede	2161213 Techn. Schwingungs-lehre (Üb) Tulla 2181738 Wiss. Programmieren für Ingenieure Grashof		2161206 MM der Dynamik Grashof 2181739 Wiss. Programmieren für Ingenieure (Üb) 20.21 SCC-PC-Pool A
15:45 - 17:15			2117095 GL der technischen Logistik (+Üb) Tulla HS 2181612 Physik. GL Lasertechnik (+Üb) 10.91 Redt.	2181739 Wiss. Program-mieren für Ingenieure (Üb) 20.21 SCC-PC-Pool A 2161212 Techn. Schwing.-lehre 30.33 MTI 2165512 Wärme- und Stoff-übertragung Nusselt	2161255 MM der Kontinuumsmechanik (Üb) 10.50 Kl. HS
17:30 - 19:00	2183703 Modellierung und Simulation (bis 20:00 Uhr) 20.29 Pool C				

Stand: 11.09.2019

Vorlesung	Übung

Karlsruher Institut für Technologie

Universität des Landes Baden-Württemberg und
nationales Forschungszentrum in der Helmholtz-Gemeinschaft

Amtliche Bekanntmachung

2015 **Ausgegeben Karlsruhe, den 06. August 2015** **Nr. 62**

I n h a l t **Seite**

Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Bachelorstudiengang Maschinenbau

vom 04. August 2015

Aufgrund von § 10 Absatz 2 Ziff. 5 und § 20 des Gesetzes über das Karlsruher Institut für Technologie (KIT-Gesetz - KITG) in der Fassung vom 14. Juli 2009 (GBl. S. 317 f), zuletzt geändert durch Artikel 5 des Dritten Gesetzes zur Änderung hochschulrechtlicher Vorschriften (3. Hochschulrechtsänderungsgesetz – 3. HRÄG) vom 01. April 2014 (GBl. S. 99, 167) und § 8 Absatz 5 des Gesetzes über die Hochschulen in Baden-Württemberg (Landeshochschulgesetz - LHG) in der Fassung vom 1. Januar 2005 (GBl. S. 1 f), zuletzt geändert durch Artikel 1 des 3. HRÄG vom 01. April 2014 (GBl. S. 99 ff.), hat der Senat des KIT am 20. Juli 2015 die folgende Studien- und Prüfungsordnung für den Bachelorstudiengang Maschinenbau beschlossen.

Der Präsident hat seine Zustimmung gemäß § 20 Absatz 2 KITG iVm. § 32 Absatz 3 Satz 1 LHG am 04. August 2015 erteilt.

Inhaltsverzeichnis

Präambel

Das KIT hat sich im Rahmen der Umsetzung des Bolognaprozesses zum Aufbau eines Europäischen Hochschulraumes zum Ziel gesetzt, dass am Abschluss des Studiums am KIT der Mastergrad stehen soll. Das KIT sieht daher die am KIT angebotenen konsekutiven Bachelor- und Masterstudiengänge als Gesamtkonzept mit konsekutivem Curriculum.

I. Allgemeine Bestimmungen

§ 1 Geltungsbereich

Diese Bachelorprüfungsordnung regelt Studienablauf, Prüfungen und den Abschluss des Studiums im Bachelorstudiengang Maschinenbau am KIT.

§ 2 Ziel des Studiums, Akademischer Grad

(1) Im Bachelorstudium sollen die wissenschaftlichen Grundlagen und die Methodenkompetenz der Fachwissenschaften vermittelt werden. Ziel des Studiums ist die Fähigkeit, einen konsekutiven Masterstudiengang erfolgreich absolvieren zu können sowie das erworbene Wissen berufsfeldbezogen anwenden zu können.

(2) Aufgrund der bestandenen Bachelorprüfung wird der akademische Grad „Bachelor of Science (B.Sc.)" für den Bachelorstudiengang Maschinenbau verliehen.

§ 3 Regelstudienzeit, Studienaufbau, Leistungspunkte

(1) Der Studiengang nimmt teil am Programm „Studienmodelle individueller Geschwindigkeit". Die Studierenden haben im Rahmen der dortigen Kapazitäten und Regelungen bis einschließlich drittem Fachsemester Zugang zu den Veranstaltungen des MINT-Kollegs Baden-Württemberg (im folgenden MINT-Kolleg).

(2) Die Regelstudienzeit beträgt sechs Semester. Bei einer qualifizierten Teilnahme am MINT-Kolleg bleiben bei der Anrechnung auf die Regelstudienzeit bis zu zwei Semester unberücksichtigt. Die konkrete Anzahl der Semester richtet sich nach § 8 Absatz 2 Satz 3 bis 5.

Eine qualifizierte Teilnahme liegt vor, wenn die Studierende Veranstaltungen des MINT- Kollegs für die Dauer von mindestens einem Semester im Umfang von mindestens zwei Fachkursen (Gesamtworkload 10 Semesterwochenstunden) belegt hat. Das MINT-Kolleg stellt hierüber eine Bescheinigung aus.

(3) Das Lehrangebot des Studiengangs ist in Fächer, die Fächer sind in Module, die jeweiligen Module in Lehrveranstaltungen gegliedert. Die Fächer und ihr Umfang werden in § 20 festgelegt. Näheres beschreibt das Modulhandbuch.

(4) Der für das Absolvieren von Lehrveranstaltungen und Modulen vorgesehene Arbeitsaufwand wird in Leistungspunkten (LP) ausgewiesen. Die Maßstäbe für die Zuordnung von Leistungspunkten entsprechen dem European Credit Transfer System (ECTS). Ein Leistungspunkt entspricht einem Arbeitsaufwand von etwa 30 Zeitstunden. Die Verteilung der Leistungspunkte auf die Semester hat in der Regel gleichmäßig zu erfolgen.

(5) Der Umfang der für den erfolgreichen Abschluss des Studiums erforderlichen Studien- und Prüfungsleistungen wird in Leistungspunkten gemessen und beträgt insgesamt 180 Leistungspunkte.

(6) Lehrveranstaltungen können nach vorheriger Ankündigung auch in englischer Sprache angeboten werden, sofern es deutschsprachige Wahlmöglichkeiten gibt.

§ 4 Modulprüfungen, Studien- und Prüfungsleistungen

(1) Die Bachelorprüfung besteht aus Modulprüfungen. Modulprüfungen bestehen aus einer oder mehreren Erfolgskontrollen.

Erfolgskontrollen gliedern sich in Studien- oder Prüfungsleistungen.

(2) Prüfungsleistungen sind:

1. schriftliche Prüfungen,
2. mündliche Prüfungen oder
3. Prüfungsleistungen anderer Art.

(3) Studienleistungen sind schriftliche, mündliche oder praktische Leistungen, die von den Studierenden in der Regel lehrveranstaltungsbegleitend erbracht werden. Die Bachelorprüfung darf nicht mit einer Studienleistung abgeschlossen werden.

(4) Von den Modulprüfungen sollen mindestens 70 % benotet sein.

(5) Bei sich ergänzenden Inhalten können die Modulprüfungen mehrerer Module durch eine auch modulübergreifende Prüfungsleistung (Absatz 2 Nr.1 bis 3) ersetzt werden.

§ 5 Anmeldung und Zulassung zu den Modulprüfungen und Lehrveranstaltungen

(1) Um an den Modulprüfungen teilnehmen zu können, müssen sich die Studierenden online im Studierendenportal zu den jeweiligen Erfolgskontrollen anmelden. In Ausnahmefällen kann eine Anmeldung schriftlich im Studierendenservice oder in einer anderen, vom Studierendenservice autorisierten Einrichtung erfolgen. Für die Erfolgskontrollen können durch die Prüfenden Anmeldefristen festgelegt werden. Die Anmeldung der Bachelorarbeit ist im Modulhandbuch geregelt.

(2) Sofern Wahlmöglichkeiten bestehen, müssen Studierende, um zu einer Prüfung in einem bestimmten Modul zugelassen zu werden, vor der ersten Prüfung in diesem Modul mit der Anmeldung zu der Prüfung eine bindende Erklärung über die Wahl des betreffenden Moduls und dessen Zuordnung zu einem Fach abgeben. Auf Antrag des/der Studierenden an den Prüfungsausschuss kann die Wahl oder die Zuordnung nachträglich geändert werden. Sofern bereits ein Prüfungsverfahren in einem Modul begonnen wurde, ist die Änderung der Wahl oder der Zuordnung erst nach Beendigung des Prüfungsverfahrens zulässig; dies gilt nur für Prüfungsleistungen.

(3) Zu einer Erfolgskontrolle ist zuzulassen, wer

1. in den Bachelorstudiengang Maschinenbau am KIT eingeschrieben ist; die Zulassung beurlaubter Studierender ist auf Prüfungsleistungen beschränkt; und

2. nachweist, dass er die im Modulhandbuch für die Zulassung zu einer Erfolgskontrolle festgelegten Voraussetzungen erfüllt und

3. nachweist, dass er in dem Bachelorstudiengang Maschinenbau den Prüfungsanspruch nicht verloren hat.

(4) Nach Maßgabe von § 30 Abs. 5 LHG kann die Zulassung zu einzelnen Pflichtveranstaltungen beschränkt werden. Der/die Prüfende entscheidet über die Auswahl unter den Studierenden, die sich rechtzeitig bis zu dem von dem/der Prüfenden festgesetzten Termin angemeldet haben unter Berücksichtigung des Studienfortschritts dieser Studierenden und unter Beachtung von § 13 Abs. 1 Satz 1 und 2, sofern ein Abbau des Überhangs durch andere oder zusätzliche Veranstaltungen nicht möglich ist. Für den Fall gleichen Studienfortschritts sind durch die KIT-Fakultäten weitere Kriterien festzulegen. Das Ergebnis wird den Studierenden rechtzeitig bekannt gegeben.

(5) Die Zulassung ist abzulehnen, wenn die in Absatz 3 und 4 genannten Voraussetzungen nicht erfüllt sind.

§ 6 Durchführung von Erfolgskontrollen

(1) Erfolgskontrollen werden studienbegleitend, in der Regel im Verlauf der Vermittlung der Lehrinhalte der einzelnen Module oder zeitnah danach, durchgeführt.

(2) Die Art der Erfolgskontrolle (§ 4 Abs. 2 Nr. 1 bis 3, Abs. 3) wird von der/dem Prüfenden der betreffenden Lehrveranstaltung in Bezug auf die Lerninhalte der Lehrveranstaltung und die Lernziele des Moduls festgelegt. Die Art der Erfolgskontrolle, ihre Häufigkeit, Reihenfolge und Gewichtung sowie gegebenenfalls die Bildung der Modulnote müssen mindestens sechs Wochen vor Vorlesungsbeginn im Modulhandbuch bekannt gemacht werden. Im Einvernehmen von Prüfendem und Studierender bzw. Studierendem können die Art der Prüfungsleistung sowie die Prüfungssprache auch nachträglich geändert werden; im ersten Fall ist jedoch § 4 Abs. 5 zu berücksichtigen. Bei der Prüfungsorganisation sind die Belange Studierender mit Behinderung oder chronischer Erkrankung gemäß § 13 Abs. 1 zu berücksichtigen. § 13 Abs. 1 Satz 3 und 4 gelten entsprechend.

(3) Bei unvertretbar hohem Prüfungsaufwand kann eine schriftlich durchzuführende Prüfungsleistung auch mündlich, oder eine mündlich durchzuführende Prüfungsleistung auch schriftlich abgenommen werden. Diese Änderung muss mindestens sechs Wochen vor der Prüfungsleistung bekannt gegeben werden.

(4) Bei Lehrveranstaltungen in englischer Sprache (§ 3 Abs. 6) können die entsprechenden Erfolgskontrollen in dieser Sprache abgenommen werden. § 6 Abs. 2 gilt entsprechend.

(5) *Schriftliche Prüfungen* (§ 4 Abs. 2 Nr. 1) sind in der Regel von einer/einem Prüfenden nach § 18 Abs. 2 oder 3 zu bewerten. Sofern eine Bewertung durch mehrere Prüfende erfolgt, ergibt sich die Note aus dem arithmetischen Mittel der Einzelbewertungen. Entspricht das arithmetische Mittel keiner der in § 7 Abs. 2 Satz 2 definierten Notenstufen, so ist auf die nächstliegende Notenstufe auf- oder abzurunden. Bei gleichem Abstand ist auf die nächstbessere Notenstufe zu runden. Das Bewertungsverfahren soll sechs Wochen nicht überschreiten. Schriftliche Prüfungen dauern mindestens 60 und höchstens 300 Minuten.

(6) *Mündliche Prüfungen* (§ 4 Abs. 2 Nr. 2) sind von mehreren Prüfenden (Kollegialprüfung) oder von einer/m Prüfenden in Gegenwart einer oder eines Beisitzenden als Gruppen- oder Einzelprüfungen abzunehmen und zu bewerten. Vor der Festsetzung der Note hört die/der Prüfende die anderen an der Kollegialprüfung mitwirkenden Prüfenden an. Mündliche Prüfungen dauern in der Regel mindestens 15 Minuten und maximal 60 Minuten pro Studierenden.

Die wesentlichen Gegenstände und Ergebnisse der *mündlichen Prüfung* sind in einem Protokoll festzuhalten. Das Ergebnis der Prüfung ist den Studierenden im Anschluss an die mündliche Prüfung bekannt zu geben.

Studierende, die sich in einem späteren Semester der gleichen Prüfung unterziehen wollen, werden entsprechend den räumlichen Verhältnissen und nach Zustimmung des Prüflings als Zuhörerinnen und Zuhörer bei mündlichen Prüfungen zugelassen. Die Zulassung erstreckt sich nicht auf die Beratung und Bekanntgabe der Prüfungsergebnisse.

(7) Für *Prüfungsleistungen anderer Art* (§ 4 Abs. 2 Nr. 3) sind angemessene Bearbeitungsfristen einzuräumen und Abgabetermine festzulegen. Dabei ist durch die Art der Aufgabenstellung und durch entsprechende Dokumentation sicherzustellen, dass die erbrachte Prüfungsleistung dem/der Studierenden zurechenbar ist. Die wesentlichen Gegenstände und Ergebnisse einer solchen Erfolgskontrolle sind in einem Protokoll festzuhalten.

Bei *mündlich* durchgeführten *Prüfungsleistungen anderer Art* muss neben der/dem Prüfenden ein/e Beisitzende/r anwesend sein, die/der zusätzlich zum/zur Prüfenden das Protokoll zeichnet.

Schriftliche Arbeiten im Rahmen einer *Prüfungsleistung anderer Art* haben dabei die folgende Erklärung zu tragen: „Ich versichere wahrheitsgemäß, die Arbeit selbstständig angefertigt, alle benutzten Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht zu haben, was aus Arbeiten anderer unverändert oder mit Abänderungen entnommen wurde.“ Trägt die Arbeit diese Erklärung nicht, wird sie nicht angenommen. Die wesentlichen Gegenstände und Ergebnisse der Erfolgskontrolle sind in einem Protokoll festzuhalten.

§ 6 a Erfolgskontrollen im Antwort-Wahl-Verfahren

Das Modulhandbuch regelt, ob und in welchem Umfang Erfolgskontrollen im Wege des *Antwort-Wahl-Verfahrens* abgelegt werden können

§ 6 b Computergestützte Erfolgskontrollen

(1) Erfolgskontrollen können computergestützt durchgeführt werden. Dabei wird die Antwort bzw. Lösung der/des Studierenden elektronisch übermittelt und, sofern möglich, automatisiert ausgewertet. Die Prüfungsinhalte sind von einer/einem Prüfenden zu erstellen.

(2) Vor der computergestützten Erfolgskontrolle hat die/der Prüfende sicherzustellen, dass die elektronischen Daten eindeutig identifiziert und unverwechselbar und dauerhaft den Studierenden zugeordnet werden können. Der störungsfreie Verlauf einer computergestützten Erfolgskontrolle ist durch entsprechende technische und fachliche Betreuung zu gewährleisten. Alle Prüfungsaufgaben müssen während der gesamten Bearbeitungszeit zur Bearbeitung zur Verfügung stehen.

(3) Im Übrigen gelten für die Durchführung von computergestützten Erfolgskontrollen die §§ 6 bzw. 6 a.

§ 7 Bewertung von Studien- und Prüfungsleistungen

(1) Das Ergebnis einer Prüfungsleistung wird von den jeweiligen Prüfenden in Form einer Note festgesetzt.

(2) Folgende Noten sollen verwendet werden:

sehr gut (very good)	:	hervorragende Leistung,
gut (good)	:	eine Leistung, die erheblich über den durchschnittlichen Anforderungen liegt,
befriedigend (satisfactory)	:	eine Leistung, die durchschnittlichen Anforderungen entspricht,
ausreichend (sufficient)	:	eine Leistung, die trotz ihrer Mängel noch den Anforderungen genügt,
nicht ausreichend (failed)	:	eine Leistung, die wegen erheblicher Mängel nicht den Anforderungen genügt.

Zur differenzierten Bewertung einzelner Prüfungsleistungen sind nur folgende Noten zugelassen:

1,0; 1,3	:	sehr gut
1,7; 2,0; 2,3	:	gut
2,7; 3,0; 3.3	:	befriedigend
3,7; 4,0	:	ausreichend
5,0	:	nicht ausreichend

(3) Studienleistungen werden mit „bestanden“ oder mit „nicht bestanden“ gewertet.

(4) Bei der Bildung der gewichteten Durchschnitte der Modulnoten, der Fachnoten und der Gesamtnote wird nur die erste Dezimalstelle hinter dem Komma berücksichtigt; alle weiteren Stellen werden ohne Rundung gestrichen.

(5) Jedes Modul und jede Erfolgskontrolle darf in demselben Studiengang nur einmal gewertet werden.

(6) Eine Prüfungsleistung ist bestanden, wenn die Note mindestens „ausreichend“ (4,0) ist.

(7) Die Modulprüfung ist bestanden, wenn alle erforderlichen Erfolgskontrollen bestanden sind. Die Modulprüfung und die Bildung der Modulnote sollen im Modulhandbuch geregelt werden. Sofern das Modulhandbuch keine Regelung über die Bildung der Modulnote enthält, errechnet sich die Modulnote aus einem nach den Leistungspunkten der einzelnen Teilmodule gewichteter Notendurchschnitt. Die differenzierten Noten (Absatz 2) sind bei der Berechnung der Modulnoten als Ausgangsdaten zu verwenden.

(8) Die Ergebnisse der Erfolgskontrollen sowie die erworbenen Leistungspunkte werden durch den Studierendenservice des KIT verwaltet.

(9) Die Noten der Module eines Faches gehen in die Fachnote mit einem Gewicht proportional zu den ausgewiesenen Leistungspunkten der Module ein.

(10) Die Gesamtnote der Bachelorprüfung, die Fachnoten und die Modulnoten lauten:

		bis	1,5	=	sehr gut
von	1,6	bis	2,5	=	gut
von	2,6	bis	3,5	=	befriedigend
von	3,6	bis	4,0	=	ausreichend

§ 8 Orientierungsprüfungen, Verlust des Prüfungsanspruchs

(1) Die Teilmodulprüfungen Höhere Mathematik I, Technische Mechanik I, Technische Mechanik II in den Modulen Höhere Mathematik und Technische Mechanik sind bis zum Ende des Prüfungszeitraums des zweiten Fachsemesters abzulegen (Orientierungsprüfungen).

(2) Wer die Orientierungsprüfungen einschließlich etwaiger Wiederholungen bis zum Ende des Prüfungszeitraums des dritten Fachsemesters nicht erfolgreich abgelegt hat, verliert den Prüfungsanspruch im Studiengang, es sei denn, dass die Fristüberschreitung nicht selbst zu vertreten ist; hierüber entscheidet der Prüfungsausschuss auf Antrag der oder des Studierenden. Eine zweite Wiederholung der Orientierungsprüfungen ist ausgeschlossen.

Die Fristüberschreitung hat die/der Studierende insbesondere dann nicht zu vertreten, wenn eine qualifizierte Teilnahme am MINT-Kolleg im Sinne von § 3 Abs. 2 vorliegt. Ohne ausdrückliche Genehmigung des Vorsitzenden des Prüfungsausschusses gilt eine Fristüberschreitung von

1. einem Semester als genehmigt, wenn die/der Studierende eine qualifizierte Teilnahme am MINT-Kolleg gemäß § 3 Abs. 2 im Umfang von einem Semester nachweist oder
2. zwei Semestern als genehmigt, wenn die/der Studierende eine qualifizierte Teilnahme am MINT-Kolleg gemäß § 3 Abs. 2 im Umfang von zwei Semestern nachweist.

Als Nachweis gilt die vom MINT-Kolleg gemäß § 3 Abs. 2 auszustellende Bescheinigung, die beim Studierendenservice des KIT einzureichen ist. Im Falle von Nr. 1 kann der Vorsitzende des Prüfungsausschusses auf Antrag der Studierenden die Frist um ein weiteres Semester verlängern, wenn dies aus studienorganisatorischen Gründen für das fristgerechte Ablegen der Orientierungsprüfung erforderlich ist, insbesondere weil die Module, die Bestandteil der Orientierungsprüfung sind, nur einmal jährlich angeboten werden.

(3) Ist die Bachelorprüfung bis zum Ende des Prüfungszeitraums des neunten Fachsemesters einschließlich etwaiger Wiederholungen nicht vollständig abgelegt, so erlischt der Prüfungsanspruch im Studiengang Maschinenbau, es sei denn, dass die Fristüberschreitung nicht selbst zu vertreten ist. Die Entscheidung über eine Fristverlängerung und über Ausnahmen von der Fristregelung trifft der Prüfungsausschuss unter Beachtung der in § 32 Abs. 6 LHG genannten Tätigkeiten auf Antrag des/der Studierenden. Der Antrag ist schriftlich in der Regel bis sechs Wochen vor Ablauf der in Satz 1 genannten Studienhöchstdauer zu stellen. *Absatz 2 Satz 3 bis 5 gelten entsprechend.*

(4) Der Prüfungsanspruch geht auch verloren, wenn eine nach dieser Studien- und Prüfungsordnung erforderliche Studien- oder Prüfungsleistung endgültig nicht bestanden ist oder eine Wiederholungsprüfung nach § 9 Abs. 6 nicht rechtzeitig erbracht wurde, es sei denn die Fristüberschreitung ist nicht selbst zu vertreten.

§ 9 Wiederholung von Erfolgskontrollen, endgültiges Nichtbestehen

(1) Studierende können eine nicht bestandene schriftliche Prüfung (§ 4 Absatz 2 Nr. 1) einmal wiederholen. Wird eine schriftliche Wiederholungsprüfung mit „nicht ausreichend“ (5,0) bewertet, so findet eine mündliche Nachprüfung im zeitlichen Zusammenhang mit dem Termin der nicht bestandenen Prüfung statt. In diesem Falle kann die Note dieser Prüfung nicht besser als „ausreichend“ (4,0) sein.

(2) Studierende können eine nicht bestandene mündliche Prüfung (§ 4 Absatz 2 Nr. 2) einmal wiederholen.

(3) Wiederholungsprüfungen nach Absatz 1 und 2 müssen in Inhalt, Umfang und Form (mündlich oder schriftlich) der ersten entsprechen. Ausnahmen kann der zuständige Prüfungsausschuss auf Antrag zulassen.

(4) Prüfungsleistungen anderer Art (§ 4 Absatz 2 Nr. 3) können einmal wiederholt werden.

(5) Studienleistungen können mehrfach wiederholt werden.

(6) Die Wiederholung von Prüfungsleistungen hat spätestens bis zum Ende des Prüfungszeitraumes des übernächsten Semesters zu erfolgen.

(7) Die Prüfungsleistung ist endgültig nicht bestanden, wenn die mündliche Nachprüfung im Sinne des Absatzes 1 mit „nicht ausreichend“ (5,0) bewertet wurde. Die Prüfungsleistung ist ferner endgültig nicht bestanden, wenn die mündliche Prüfung im Sinne des Absatzes 2 oder die Prüfungsleistung anderer Art gemäß Absatz 4 zweimal mit „nicht bestanden“ bewertet wurde.

(8) Das Modul ist endgültig nicht bestanden, wenn eine für sein Bestehen erforderliche Prüfungsleistung endgültig nicht bestanden ist.

(9) Eine zweite Wiederholung derselben Prüfungsleistung gemäß § 4 Abs. 2 ist nur in Ausnahmefällen auf Antrag des/der Studierenden zulässig („Antrag auf Zweitwiederholung“). Der Antrag ist schriftlich beim Prüfungsausschuss in der Regel bis zwei Monate nach Bekanntgabe der Note zu stellen.

Über den ersten Antrag eines/einer Studierenden auf Zweitwiederholung entscheidet der Prüfungsausschuss, wenn er den Antrag genehmigt. Wenn der Prüfungsausschuss diesen Antrag ablehnt, entscheidet ein Mitglied des Präsidiums. Über weitere Anträge auf Zweitwiederholung entscheidet nach Stellungnahme des Prüfungsausschusses ein Mitglied des Präsidiums. Wird der Antrag genehmigt, hat die Zweitwiederholung spätestens zum übernächsten Prüfungstermin zu erfolgen. Absatz 1 Satz 2 und 3 gelten entsprechend.

(10) Die Wiederholung einer bestandenen Prüfungsleistung ist nicht zulässig.

(11) Die Bachelorarbeit kann bei einer Bewertung mit „nicht ausreichend“ (5,0) einmal wiederholt werden. Eine zweite Wiederholung der Bachelorarbeit ist ausgeschlossen.

§ 10 Abmeldung; Versäumnis, Rücktritt

(1) Studierende können ihre Anmeldung zu *schriftlichen Prüfungen* ohne Angabe von Gründen bis zur Ausgabe der Prüfungsaufgaben widerrufen (Abmeldung). Eine Abmeldung kann online im Studierendenportal bis 24:00 Uhr des Vortages der Prüfung oder in begründeten Ausnahmefällen beim Studierendenservice innerhalb der Geschäftszeiten erfolgen. Erfolgt die Abmeldung gegenüber dem/der Prüfenden hat diese/r Sorge zu tragen, dass die Abmeldung im Campus Management System verbucht wird.

(2) Bei *mündlichen Prüfungen* muss die Abmeldung spätestens drei Werktage vor dem betreffenden Prüfungstermin gegenüber dem/der Prüfenden erklärt werden. Der Rücktritt von einer mündlichen Prüfung weniger als drei Werktage vor dem betreffenden Prüfungstermin ist nur unter den Voraussetzungen des Absatzes 5 möglich. Der Rücktritt von mündlichen Nachprüfungen im Sinne von § 9 Abs. 1 ist grundsätzlich nur unter den Voraussetzungen von Absatz 5 möglich.

(3) Die Abmeldung von *Prüfungsleistungen anderer Art* sowie von *Studienleistungen* ist im Modulhandbuch geregelt.

(4) Eine Erfolgskontrolle gilt als mit „nicht ausreichend" (5,0) bewertet, wenn die Studierenden einen Prüfungstermin ohne triftigen Grund versäumen oder wenn sie nach Beginn der Erfolgskontrolle ohne triftigen Grund von dieser zurücktreten. Dasselbe gilt, wenn die Bachelorarbeit nicht innerhalb der vorgesehenen Bearbeitungszeit erbracht wird, es sei denn, der/die Studierende hat die Fristüberschreitung nicht zu vertreten.

(5) Der für den Rücktritt nach Beginn der Erfolgskontrolle oder das Versäumnis geltend gemachte Grund muss dem Prüfungsausschuss unverzüglich schriftlich angezeigt und glaubhaft gemacht werden. Bei Krankheit des/der Studierenden oder eines allein zu versorgenden Kindes oder pflegebedürftigen Angehörigen kann die Vorlage eines ärztlichen Attestes verlangt werden.

§ 11 Täuschung, Ordnungsverstoß

(1) Versuchen Studierende das Ergebnis ihrer Erfolgskontrolle durch Täuschung oder Benutzung nicht zugelassener Hilfsmittel zu beeinflussen, gilt die betreffende Erfolgskontrolle als mit „nicht ausreichend" (5,0) bewertet.

(2) Studierende, die den ordnungsgemäßen Ablauf einer Erfolgskontrolle stören, können von der/dem Prüfenden oder der Aufsicht führenden Person von der Fortsetzung der Erfolgskontrolle ausgeschlossen werden. In diesem Fall gilt die betreffende Erfolgskontrolle als mit „nicht ausreichend" (5,0) bewertet. In schwerwiegenden Fällen kann der Prüfungsausschuss diese Studierenden von der Erbringung weiterer Erfolgskontrollen ausschließen.

(3) Näheres regelt die Allgemeine Satzung des KIT zur Redlichkeit bei Prüfungen und Praktika in der jeweils gültigen Fassung.

§ 12 Mutterschutz, Elternzeit, Wahrnehmung von Familienpflichten

(1) Auf Antrag sind die Mutterschutzfristen, wie sie im jeweils gültigen Gesetz zum Schutz der erwerbstätigen Mutter (Mutterschutzgesetz - MuSchG) festgelegt sind, entsprechend zu berücksichtigen. Dem Antrag sind die erforderlichen Nachweise beizufügen. Die Mutterschutzfristen unterbrechen jede Frist nach dieser Prüfungsordnung. Die Dauer des Mutterschutzes wird nicht in die Frist eingerechnet.

(2) Gleichfalls sind die Fristen der Elternzeit nach Maßgabe des jeweils gültigen Gesetzes (Bundeselterngeld- und Elternzeitgesetz - BEEG) auf Antrag zu berücksichtigen. Der/die Studierende muss bis spätestens vier Wochen vor dem Zeitpunkt, von dem an die Elternzeit angetreten werden soll, dem Prüfungsausschuss, unter Beifügung der erforderlichen Nachweise schriftlich mitteilen, in welchem Zeitraum die Elternzeit in Anspruch genommen werden soll. Der Prüfungsausschuss hat zu prüfen, ob die gesetzlichen Voraussetzungen vorliegen, die bei einer Arbeitnehmerin bzw. einem Arbeitnehmer den Anspruch auf Elternzeit auslösen würden, und teilt dem/der Studierenden das Ergebnis sowie die neu festgesetzten Prüfungszeiten unverzüglich mit. Die Bearbeitungszeit der Bachelorarbeit kann nicht durch Elternzeit unterbrochen werden. Die gestellte Arbeit gilt als nicht vergeben. Nach Ablauf der Elternzeit erhält der/die Studierende ein neues Thema, das innerhalb der in § 14 festgelegten Bearbeitungszeit zu bearbeiten ist.

(3) Der Prüfungsausschuss entscheidet auf Antrag über die flexible Handhabung von Prüfungsfristen entsprechend den Bestimmungen des Landeshochschulgesetzes, wenn Studierende Familienpflichten wahrzunehmen haben. Absatz 2 Satz 4 bis 6 gelten entsprechend.

§ 13 Studierende mit Behinderung oder chronischer Erkrankung

(1) Bei der Gestaltung und Organisation des Studiums sowie der Prüfungen sind die Belange Studierender mit Behinderung oder chronischer Erkrankung zu berücksichtigen. Insbesondere ist Studierenden mit Behinderung oder chronischer Erkrankung bevorzugter Zugang zu teilnahmebegrenzten Lehrveranstaltungen zu gewähren und die Reihenfolge für das Absolvieren bestimmter Lehrveranstaltungen entsprechend ihrer Bedürfnisse anzupassen. Studierende sind gemäß Bundesgleichstellungsgesetz (BGG) und Sozialgesetzbuch Neuntes Buch (SGB IX) behindert, wenn ihre körperliche Funktion, geistige Fähigkeit oder seelische Gesundheit mit hoher Wahrscheinlichkeit länger als sechs Monate von dem für das Lebensalter typischen Zustand abweichen und daher ihre Teilhabe am Leben in der Gesellschaft beeinträchtigt ist. Der Prüfungsausschuss entscheidet auf Antrag der/des Studierenden über das Vorliegen der Voraussetzungen nach Satz 2 und 3. Die/der Studierende hat die entsprechenden Nachweise vorzulegen.

(2) Weisen Studierende eine Behinderung oder chronische Erkrankung nach und folgt daraus, dass sie nicht in der Lage sind, Erfolgskontrollen ganz oder teilweise in der vorgeschriebenen Zeit oder Form abzulegen, kann der Prüfungsausschuss gestatten, die Erfolgskontrollen in einem anderen Zeitraum oder einer anderen Form zu erbringen. Insbesondere ist behinderten Studierenden zu gestatten, notwendige Hilfsmittel zu benutzen.

(3) Weisen Studierende eine Behinderung oder chronische Erkrankung nach und folgt daraus, dass sie nicht in der Lage sind, die Lehrveranstaltungen regelmäßig zu besuchen oder die gemäß § 20 erforderlichen Studien- und Prüfungsleistungen zu erbringen, kann der Prüfungsausschuss auf Antrag gestatten, dass einzelne Studien- und Prüfungsleistungen nach Ablauf der in dieser Studien- und Prüfungsordnung vorgesehenen Fristen absolviert werden können.

§ 14 Modul Bachelorarbeit

(1) Voraussetzung für die Zulassung zum Modul Bachelorarbeit ist, dass die/der Studierende Modulprüfungen im Umfang von 120 LP erfolgreich abgelegt hat. Über Ausnahmen entscheidet der Prüfungsausschuss auf Antrag der/des Studierenden.

(1 a) Dem Modul Bachelorarbeit sind 15 LP zugeordnet. Es besteht aus der Bachelorarbeit und einer Präsentation. Die Präsentation hat spätestens sechs Wochen nach Abgabe der Bachelorarbeit zu erfolgen.

(2) Die Bachelorarbeit kann von Hochschullehrer/innen und leitenden Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG vergeben werden. Darüber hinaus kann der Prüfungsausschuss weitere Prüfende gemäß § 18 Abs. 2 und 3 zur Vergabe des Themas berechtigen. Den Studierenden ist Gelegenheit zu geben, für das Thema Vorschläge zu machen. Soll die Bachelorarbeit außerhalb der KIT-Fakultät für Maschinenbau angefertigt werden, so bedarf dies der Genehmigung durch den Prüfungsausschuss. Die Bachelorarbeit kann auch in Form einer Gruppenarbeit zugelassen werden, wenn der als Prüfungsleistung zu bewertende Beitrag der einzelnen Studierenden aufgrund objektiver Kriterien, die eine eindeutige Abgrenzung ermöglichen, deutlich unterscheidbar ist und die Anforderung nach Absatz 4 erfüllt. In Ausnahmefällen sorgt die/der Vorsitzende des Prüfungsausschusses auf Antrag der oder des Studierenden dafür, dass die/der Studierende innerhalb von vier Wochen ein Thema für die Bachelorarbeit erhält. Die Ausgabe des Themas erfolgt in diesem Fall über die/den Vorsitzende/n des Prüfungsausschusses.

(3) Thema, Aufgabenstellung und Umfang der Bachelorarbeit sind von dem Betreuer bzw. der Betreuerin so zu begrenzen, dass sie mit dem in Absatz 4 festgelegten Arbeitsaufwand bearbeitet werden kann.

(4) Die Bachelorarbeit soll zeigen, dass die Studierenden in der Lage sind, ein Problem aus ihrem Studienfach selbstständig und in begrenzter Zeit nach wissenschaftlichen Methoden zu bearbeiten. Der Umfang der Bachelorarbeit entspricht 12 Leistungspunkten. Die maximale Bearbeitungsdauer beträgt drei Monate. Thema und Aufgabenstellung sind an den vorgesehenen Umfang anzupassen. Der Prüfungsausschuss legt fest, in welchen Sprachen die Bachelorarbeit geschrieben werden kann. Auf Antrag des Studierenden kann der/die Prüfende genehmigen, dass die Bachelorarbeit in einer anderen Sprache als Deutsch geschrieben wird.

(5) Bei der Abgabe der Bachelorarbeit haben die Studierenden schriftlich zu versichern, dass sie die Arbeit selbstständig verfasst und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt haben, die wörtlich oder inhaltlich übernommenen Stellen als solche kenntlich gemacht und die Satzung des KIT zur Sicherung guter wissenschaftlicher Praxis in der jeweils gültigen Fassung beachtet haben. Wenn diese Erklärung nicht enthalten ist, wird die Arbeit nicht angenommen. Die Erklärung kann wie folgt lauten: „Ich versichere wahrheitsgemäß, die Arbeit selbstständig verfasst, alle benutzten Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht zu haben, was aus Arbeiten anderer unverändert oder mit Abänderungen entnommen wurde sowie die Satzung des KIT zur Sicherung guter wissenschaftlicher Praxis in der jeweils gültigen Fassung beachtet zu haben." Bei Abgabe einer unwahren Versicherung wird die Bachelorarbeit mit „nicht ausreichend" (5,0) bewertet.

(6) Der Zeitpunkt der Ausgabe des Themas der Bachelorarbeit ist durch die Betreuerin/den Betreuer und die/den Studierenden festzuhalten und dies beim Prüfungsausschuss aktenkundig zu machen. Der Zeitpunkt der Abgabe der Bachelorarbeit ist durch den/die Prüfende/n beim Prüfungsausschuss aktenkundig zu machen. Das Thema kann nur einmal und nur innerhalb des ersten Monats der Bearbeitungszeit zurückgegeben werden. Macht der oder die Studierende einen triftigen Grund geltend, kann der Prüfungsausschuss die in Absatz 3 festgelegte Bearbeitungszeit auf Antrag der oder des Studierenden um höchstens einen Monat verlängern. Wird die Bachelorarbeit nicht fristgerecht abgeliefert, gilt sie als mit „nicht ausreichend" (5,0) bewertet, es sei denn, dass die Studierenden dieses Versäumnis nicht zu vertreten haben.

(7) Die Bachelorarbeit wird von mindestens einem/einer Hochschullehrer/in oder einem/einer leitenden Wissenschaftler/in gemäß § 14 abs. 3 Ziff. 1 KITG und einem/einer weiteren Prüfenden bewertet. In der Regel ist eine/r der Prüfenden die Person, die die Arbeit gemäß Absatz 2 vergeben hat. Bei nicht übereinstimmender Beurteilung dieser beiden Personen setzt der Prüfungsausschuss im Rahmen der Bewertung dieser beiden Personen die Note der Bachelorarbeit fest; er kann auch einen weiteren Gutachter bestellen. Die Bewertung hat innerhalb von sechs Wochen nach Abgabe der Bachelorarbeit zu erfolgen.

§ 15 Zusatzleistungen

(1) Es können auch weitere Leistungspunkte (Zusatzleistungen) im Umfang von höchstens 30 LP aus dem Gesamtangebot des KIT erworben werden. § 3 und § 4 der Prüfungsordnung bleiben davon unberührt. Diese Zusatzleistungen gehen nicht in die Festsetzung der Gesamt- und Modulnoten ein. Die bei der Festlegung der Modulnote nicht berücksichtigten LP werden als Zusatzleistungen im Transcript of Records aufgeführt und als Zusatzleistungen gekennzeichnet. Auf Antrag der/des Studierenden werden die Zusatzleistungen in das Bachelorzeugnis aufgenommen und als Zusatzleistungen gekennzeichnet. Zusatzleistungen werden mit den nach § 7 vorgesehenen Noten gelistet.

(2) Die Studierenden haben bereits bei der Anmeldung zu einer Prüfung in einem Modul diese als Zusatzleistung zu deklarieren.

§ 15 a Mastervorzug

Studierende, die im Bachelorstudium bereits mindestens 120 LP erworben haben, können zusätzlich zu den in § 15 Abs. 1 genannten Zusatzleistungen Leistungspunkte aus einem konsekutiven Masterstudiengang am KIT im Umfang von höchstens 30 LP erwerben (Mastervorzugsleistungen). § 3 und § 4 der Prüfungsordnung bleiben davon unberührt. Die Mastervorzugsleistungen gehen nicht in die Festsetzung der Gesamt-, Fach- und Modulnoten ein. Sie werden im Transcript of Records aufgeführt und als solche gekennzeichnet sowie mit den nach § 7 vorgesehenen Noten gelistet. § 15 Absatz 2 gilt entsprechend.

§ 16 Überfachliche Qualifikationen

Neben der Vermittlung von fachlichen Qualifikationen ist der Auf- und Ausbau überfachlicher Qualifikationen im Umfang von mindestens 6 LP Bestandteil eines Bachelorstudiums. Überfachliche Qualifikationen können additiv oder integrativ vermittelt werden.

§ 17 Prüfungsausschüsse

(1) Für den Bachelorstudiengang werden Prüfungsausschüsse gebildet. Sie bestehen jeweils aus vier stimmberechtigten Mitgliedern: zwei Hochschullehrer/innen / leitenden Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG / Privatdozentinnen bzw. -dozenten, zwei akademischen Mitarbeiterinnen und Mitarbeitern nach § 52 LHG / wissenschaftlichen Mitarbeiter/innen gemäß § 14 Abs. 3 Ziff. 2 KITG und einer bzw. einem Studierenden mit beratender Stimme. Im Falle der Einrichtung eines gemeinsamen Prüfungsausschusses für den Bachelor- und den Masterstudiengang Maschinenbau erhöht sich die Anzahl der Studierenden auf zwei Mitglieder mit beratender Stimme, wobei je eine bzw. einer dieser Beiden aus dem Bachelor- und aus dem Masterstudiengang stammt. Die Amtszeit der nichtstudentischen Mitglieder beträgt zwei Jahre, die des studentischen Mitglieds ein Jahr.

(2) Die/der Vorsitzende, ihre/sein Stellvertreter/in, die weiteren Mitglieder des jeweiligen Prüfungsausschusses sowie deren Stellvertreter/innen werden von dem KIT-Fakultätsrat bestellt, die akademischen Mitarbeiter/innen nach § 52 LHG, die wissenschaftlichen Mitarbeiter gemäß § 14 Abs. 3 Ziff. 2 KITG und die Studierenden auf Vorschlag der Mitglieder der jeweiligen Gruppe; Wiederbestellung ist möglich. Die/der Vorsitzende und deren/dessen Stellvertreter/in müssen Hochschullehrer/innen oder leitende Wissenschaftler/innen § 14 Abs. 3 Ziff. 1 KITG sein. Die/der Vorsitzende des jeweiligen Prüfungsausschusses nimmt die laufenden Geschäfte wahr und wird durch das jeweilige Prüfungssekretariat unterstützt.

(3) Der jeweilige Prüfungsausschuss achtet auf die Einhaltung der Bestimmungen dieser Studien- und Prüfungsordnung und fällt die Entscheidungen in Prüfungsangelegenheiten. Er entscheidet über die Anerkennung von Studienzeiten sowie Studien- und Prüfungsleistungen und trifft die Feststellung gemäß § 19 Absatz 1 Satz 1. Er berichtet der KIT-Fakultät regelmäßig über die Entwicklung der Prüfungs- und Studienzeiten, einschließlich der Bearbeitungszeiten für die Bachelorarbeiten und die Verteilung der Modul- und Gesamtnoten. Er ist zuständig für Anregungen zur Reform der Studien- und Prüfungsordnung und zu Modulbeschreibungen. Der Prüfungsausschuss entscheidet mit der Mehrheit seiner Stimmen. Bei Stimmengleichheit entscheidet der Vorsitzende des Prüfungsausschusses.

(4) Der Prüfungsausschuss kann die Erledigung seiner Aufgaben für alle Regelfälle auf die/den Vorsitzende/n des Prüfungsausschusses übertragen. In dringenden Angelegenheiten, deren Erledigung nicht bis zu der nächsten Sitzung des Prüfungsausschusses warten kann, entscheidet die/der Vorsitzende des Prüfungsausschusses.

(5) Die Mitglieder des Prüfungsausschusses haben das Recht, der Abnahme von Prüfungen beizuwohnen. Die Mitglieder des Prüfungsausschusses, die Prüfenden und die Beisitzenden unterliegen der Verschwiegenheit. Sofern sie nicht im öffentlichen Dienst stehen, sind sie durch die/den Vorsitzende/n zur Verschwiegenheit zu verpflichten.

(6) In Angelegenheiten des Prüfungsausschusses, die eine an einer anderen KIT-Fakultät zu absolvierende Prüfungsleistung betreffen, ist auf Antrag eines Mitgliedes des Prüfungsausschusses eine fachlich zuständige und von der betroffenen KIT-Fakultät zu nennende prüfungsberechtigte Person hinzuzuziehen.

(7) Belastende Entscheidungen des Prüfungsausschusses sind schriftlich mitzuteilen. Sie sind zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen. Vor einer Entscheidung ist Gelegenheit zur Äußerung zu geben. Widersprüche gegen Entscheidungen des Prüfungsausschusses sind innerhalb eines Monats nach Zugang der Entscheidung schriftlich oder zur Niederschrift beim Präsidium des KIT einzulegen.

§ 18 Prüfende und Beisitzende

(1) Der Prüfungsausschuss bestellt die Prüfenden. Er kann die Bestellung der/dem Vorsitzenden übertragen.

(2) Prüfende sind Hochschullehr/innen sowie leitende Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG, habilitierte Mitglieder und akademische Mitarbeiter/innen gemäß § 52 LHG, welche der KIT-Fakultät angehören und denen die Prüfungsbefugnis übertragen wurde; desgleichen kann wissenschaftlichen Mitarbeitern gemäß § 14 Abs. 3 Ziff. 2 KITG die Prüfungsbefugnis übertragen werden. Bestellt werden darf nur, wer mindestens die dem jeweiligen Prüfungsgegenstand entsprechende fachwissenschaftliche Qualifikation erworben hat.

(3) Soweit Lehrveranstaltungen von anderen als den unter Absatz 2 genannten Personen durchgeführt werden, sollen diese zu Prüfenden bestellt werden, sofern die KIT-Fakultät eine Prüfungsbefugnis erteilt hat und sie die gemäß Absatz 2 Satz 2 vorausgesetzte Qualifikation nachweisen können.

(4) Die Beisitzenden werden durch die Prüfenden benannt. Zu Beisitzenden darf nur bestellt werden, wer einen akademischen Abschluss in einem mathematisch-naturwissenschaftlichen oder ingenieurwissenschaftlichen Studiengang oder einen gleichwertigen akademischen Abschluss erworben hat.

§ 19 Anerkennung von Studien- und Prüfungsleistungen, Studienzeiten

(1) Studien- und Prüfungsleistungen sowie Studienzeiten, die in Studiengängen an staatlichen oder staatlich anerkannten Hochschulen und Berufsakademien der Bundesrepublik Deutschland oder an ausländischen staatlichen oder staatlich anerkannten Hochschulen erbracht wurden, werden auf Antrag der Studierenden anerkannt, sofern hinsichtlich der erworbenen Kompetenzen kein wesentlicher Unterschied zu den Leistungen oder Abschlüssen besteht, die ersetzt werden sollen. Dabei ist kein schematischer Vergleich, sondern eine Gesamtbetrachtung vorzunehmen. Bezüglich des Umfangs einer zur Anerkennung vorgelegten Studienleistung bzw. Prüfungsleistung (Anrechnung) werden die Grundsätze des ECTS herangezogen.

(2) Die Studierenden haben die für die Anerkennung erforderlichen Unterlagen vorzulegen. Studierende, die neu in den Studiengang Maschinenbau immatrikuliert wurden, haben den Antrag mit den für die Anerkennung erforderlichen Unterlagen innerhalb eines Semesters nach Immatrikulation zu stellen. Bei Unterlagen, die nicht in deutscher oder englischer Sprache vorliegen, kann eine amtlich beglaubigte Übersetzung verlangt werden. Die Beweislast dafür, dass der Antrag die Voraussetzungen für die Anerkennung nicht erfüllt, liegt beim Prüfungsausschuss.

(3) Werden Leistungen angerechnet, die nicht am KIT erbracht wurden, werden sie im Zeugnis als „anerkannt“ ausgewiesen. Liegen Noten vor, werden die Noten, soweit die Notensysteme vergleichbar sind, übernommen und in die Berechnung der Modulnoten und der Gesamtnote einbezogen. Sind die Notensysteme nicht vergleichbar, können die Noten umgerechnet werden. Liegen keine Noten vor, wird der Vermerk „bestanden“ aufgenommen.

(4) Bei der Anerkennung von Studien- und Prüfungsleistungen, die außerhalb der Bundesrepublik Deutschland erbracht wurden, sind die von der Kultusministerkonferenz und der Hochschulrektorenkonferenz gebilligten Äquivalenzvereinbarungen sowie Absprachen im Rahmen der Hochschulpartnerschaften zu beachten.

(5) Außerhalb des Hochschulsystems erworbene Kenntnisse und Fähigkeiten werden angerechnet, wenn sie nach Inhalt und Niveau den Studien- und Prüfungsleistungen gleichwertig sind, die ersetzt werden sollen und die Institution, in der die Kenntnisse und Fähigkeiten erworben wurden, ein genormtes Qualitätssicherungssystem hat. Die Anrechnung kann in Teilen versagt werden, wenn mehr als 50 Prozent des Hochschulstudiums ersetzt werden soll.

(6) Zuständig für Anerkennung und Anrechnung ist der jeweilige Prüfungsausschuss. Im Rahmen der Feststellung, ob ein wesentlicher Unterschied im Sinne des Absatz 1 vorliegt, sind die zuständigen Fachvertreter/innen zu hören. Der jeweilige Prüfungsausschuss entscheidet in Abhängigkeit von Art und Umfang der anzurechnenden Studien- und Prüfungsleistungen über die Einstufung in ein höheres Fachsemester.

II. Bachelorprüfung

§ 20 Umfang und Art der Bachelorprüfung

(1) Die Bachelorprüfung besteht aus den Modulprüfungen nach Absatz 2 sowie dem Modul Bachelorarbeit (§ 14).

(2) Es sind Modulprüfungen in folgenden Pflichtfächern abzulegen:

1. Ingenieurwissenschaftliche Grundlagen: Modul(e) im Umfang von 143 LP,
2. Vertiefung im Maschinenbau: Modul(e) im Umfang von 16 LP,
3. Überfachliche Qualifikationen im Umfang von 6 LP gemäß § 16.

Die Festlegung der zur Auswahl stehenden Module und deren Fachzuordnung werden im Modulhandbuch getroffen.

§ 21 Bestehen der Bachelorprüfung, Bildung der Gesamtnote

(1) Die Bachelorprüfung ist bestanden, wenn alle in § 20 genannten Modulprüfungen mindestens mit „ausreichend“ bewertet wurden.

(2) Die Gesamtnote der Bachelorprüfung errechnet sich als ein mit Leistungspunkten gewichteter Notendurchschnitt der Fachnoten sowie des Moduls Bachelorarbeit.

Dabei wird die Note des Moduls Bachelorarbeit mit dem doppelten Gewicht gegenüber den Noten der übrigen Fächer berücksichtigt.

(3) Haben Studierende die Bachelorarbeit mit der Note 1,0 und die Bachelorprüfung mit einem Durchschnitt von 1,2 oder besser abgeschlossen, so wird das Prädikat „mit Auszeichnung“ (with distinction) verliehen.

§ 22 Bachelorzeugnis, Bachelorurkunde, Diploma Supplement und Transcript of Records

(1) Über die Bachelorprüfung werden nach Bewertung der letzten Prüfungsleistung eine Bachelorurkunde und ein Zeugnis erstellt. Die Ausfertigung von Bachelorurkunde und Zeugnis soll nicht später als drei Monate nach Ablegen der letzten Prüfungsleistung erfolgen. Bachelorurkunde und Bachelorzeugnis werden in deutscher und englischer Sprache ausgestellt. Bachelorurkunde und Zeugnis tragen das Datum der erfolgreichen Erbringung der letzten Prüfungsleistung. Diese Dokumente werden den Studierenden zusammen ausgehändigt. In der Bachelorurkunde wird die Verleihung des akademischen Bachelorgrades beurkundet. Die Bachelorurkunde wird von dem Präsidenten und der KIT-Dekanin/ dem KIT-Dekan der KIT-Fakultät unterzeichnet und mit dem Siegel des KIT versehen.

(2) Das Zeugnis enthält die Fach- und Modulnoten sowie die den Modulen und Fächern zugeordnete Leistungspunkte und die Gesamtnote. Sofern gemäß § 7 Abs. 2 Satz 2 eine differenzierte Bewertung einzelner Prüfungsleitungen vorgenommen wurde, wird auf dem Zeugnis auch die entsprechende Dezimalnote ausgewiesen; § 7 Abs. 4 bleibt unberührt. Das Zeugnis ist von der KIT-Dekanin/ dem KIT-Dekan der KIT-Fakultät und von der/dem Vorsitzenden des jeweiligen Prüfungsausschusses zu unterzeichnen.

(3) Mit dem Zeugnis erhalten die Studierenden ein Diploma Supplement in deutscher und englischer Sprache, das den Vorgaben des jeweils gültigen ECTS Users' Guide entspricht, sowie ein Transcript of Records in deutscher und englischer Sprache.

(4) Das Transcript of Records enthält in strukturierter Form alle erbrachten Studien- und Prüfungsleistungen. Dies beinhaltet alle Fächer und Fachnoten samt den zugeordneten Leistungspunkten, die dem jeweiligen Fach zugeordneten Module mit den Modulnoten und zugeordneten Leistungspunkten sowie die den Modulen zugeordneten Erfolgskontrollen samt Noten und zugeordneten Leistungspunkten. Absatz 2 Satz 2 gilt entsprechend. Aus dem Transcript of Records soll die Zugehörigkeit von Lehrveranstaltungen zu den einzelnen Modulen deutlich erkennbar sein. Angerechnete Studien- und Prüfungsleistungen sind im Transcript of Records aufzunehmen. Alle Zusatzleistungen werden im Transcript of Records aufgeführt.

(5) Die Bachelorurkunde, das Bachelorzeugnis und das Diploma Supplement einschließlich des Transcript of Records werden vom Studierendenservice des KIT ausgestellt.

III. Schlussbestimmungen

§ 23 Bescheinigung von Prüfungsleistungen

Haben Studierende die Bachelorprüfung endgültig nicht bestanden, wird ihnen auf Antrag und gegen Vorlage der Exmatrikulationsbescheinigung eine schriftliche Bescheinigung ausgestellt, die die erbrachten Studien- und Prüfungsleistungen und deren Noten enthält und erkennen lässt, dass die Prüfung insgesamt nicht bestanden ist. Dasselbe gilt, wenn der Prüfungsanspruch erloschen ist.

§ 24 Aberkennung des Bachelorgrades

(1) Haben Studierende bei einer Prüfungsleistung getäuscht und wird diese Tatsache nach der Aushändigung des Zeugnisses bekannt, so können die Noten der Modulprüfungen, bei denen getäuscht wurde, berichtigt werden. Gegebenenfalls kann die Modulprüfung für „nicht ausreichend" (5,0) und die Bachelorprüfung für „nicht bestanden" erklärt werden.

(2) Waren die Voraussetzungen für die Zulassung zu einer Prüfung nicht erfüllt, ohne dass Studierende darüber täuschen wollte, und wird diese Tatsache erst nach Aushändigung des Zeugnisses bekannt, wird dieser Mangel durch das Bestehen der Prüfung geheilt. Hat die/der Studierende die Zulassung vorsätzlich zu Unrecht erwirkt, so kann die Modulprüfung für „nicht ausreichend" (5,0) und die Bachelorprüfung für „nicht bestanden" erklärt werden.

(3) Vor einer Entscheidung des Prüfungsausschusses ist Gelegenheit zur Äußerung zu geben.

(4) Das unrichtige Zeugnis ist zu entziehen und gegebenenfalls ein neues zu erteilen. Mit dem unrichtigen Zeugnis ist auch die Bachelorurkunde einzuziehen, wenn die Bachelorprüfung aufgrund einer Täuschung für „nicht bestanden" erklärt wurde.

(5) Eine Entscheidung nach Absatz 1 und Absatz 2 Satz 2 ist nach einer Frist von fünf Jahren ab dem Datum des Zeugnisses ausgeschlossen.

(6) Die Aberkennung des akademischen Grades richtet sich nach § 36 Abs. 7 LHG.

§ 25 Einsicht in die Prüfungsakten

(1) Nach Abschluss der Bachelorprüfung wird den Studierenden auf Antrag innerhalb eines Jahres Einsicht in das Prüfungsexemplar ihrer Bachelorarbeit, die darauf bezogenen Gutachten und in die Prüfungsprotokolle gewährt.

(2) Für die Einsichtnahme in die schriftlichen Modulprüfungen, schriftlichen Modulteilprüfungen bzw. Prüfungsprotokolle gilt eine Frist von einem Monat nach Bekanntgabe des Prüfungsergebnisses.

(3) Der/die Prüfende bestimmt Ort und Zeit der Einsichtnahme.

(4) Prüfungsunterlagen sind mindestens fünf Jahre aufzubewahren.

§ 26 Inkrafttreten, Übergangsvorschriften

(1) Diese Studien- und Prüfungsordnung tritt am 01. Oktober 2016 in Kraft.

(2) Gleichzeitig tritt die Studien- und Prüfungsordnung des KIT für den Bachelorstudiengang Maschinenbau vom 28. Februar 2008 (Amtliche Bekanntmachung des KIT Nr. 78 vom 09. September 2008), zuletzt geändert durch Satzung vom 24. September 2014 (Amtliche Bekanntmachung des KIT Nr. 53 vom 01. Oktober 2014), außer Kraft.

(3) Studierende, die auf Grundlage der Studien- und Prüfungsordnung für den Bachelorstudiengang Maschinenbau vom 28. Februar 2008 (Amtliche Bekanntmachung des KIT Nr. 78 vom 09. September 2008), zuletzt geändert durch Satzung vom 24. September 2014 (Amtliche Bekanntmachung des KIT Nr. 53 vom 01. Oktober 2014), ihr Studium am KIT aufgenommen haben, können Prüfungen auf Grundlage dieser Studien- und Prüfungsordnung letztmalig am 30. September 2021 ablegen.

(4) Studierende, die auf Grundlage der Studien- und Prüfungsordnung für den Bachelorstudiengang Maschinenbau vom 28. Februar 2008 (Amtliche Bekanntmachung des KIT Nr. 78 vom 09. September 2008), zuletzt geändert durch Satzung vom 24. September 2014 (Amtliche Bekanntmachung des KIT Nr. 53 vom 01. Oktober 2014), ihr Studium am KIT aufgenommen haben, können auf Antrag ihr Studium nach der vorliegenden Studien- und Prüfungsordnung fortsetzen.

(5) Die Prüfungsordnung für den Diplomstudiengang Maschinenbau vom 27. Juli 2000 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 18 vom 15. August 2000, S. 107 ff.) bleibt außer Kraft. Studierende, die auf Grundlage der Prüfungsordnung für den Diplomstudiengang Maschinenbau vom 27. Juli 2000 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 18 vom 15. August 2000, S. 107 ff.) ihr Studium an der Universität Karlsruhe (TH) aufgenommen haben, können die Diplomprüfung einschließlich etwaiger Wiederholungen letztmalig bis zum 30. September 2017 ablegen.

Karlsruhe, den 04. August 2015

Professor Dr.-Ing. Holger Hanselka
(Präsident)

Karlsruher Institut für Technologie

Die Forschungsuniversität in der Helmholtz-Gemeinschaft

Amtliche Bekanntmachung

2019 **Ausgegeben Karlsruhe, den 26. Februar 2019** **Nr. 03**

I n h a l t **Seite**

Satzung zur Änderung der Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Bachelorstudiengang Maschinenbau

vom 21. Februar 2019

Aufgrund von § 10 Absatz 2 Ziff. 5 und § 20 Absatz 2 Satz 1 des Gesetzes über das Karlsruher Institut für Technologie (KIT-Gesetz - KITG) in der Fassung vom 14. Juli 2009 (GBl. S. 317 f), zuletzt geändert durch Artikel 2 des Gesetzes zur Weiterentwicklung des Hochschulrechts (HRWeitEG) vom 13. März 2018 (GBl S. 85, 94), und § 32 Absatz 3 Satz 1 des Gesetzes über die Hochschulen in Baden-Württemberg (Landeshochschulgesetz - LHG) in der Fassung vom 1. Januar 2005 (GBl. S. 1 f), zuletzt geändert durch Artikel 1 des Gesetzes zur Weiterentwicklung des Hochschulrechts (HRWeitEG) vom 13. März 2018 (GBl. S. 85) hat der KIT-Senat am 18. Februar 2019 die folgende Satzung zur Änderung der Studien- und Prüfungsordnung für den Bachelorstudiengang Maschinenbau vom 04. August 2015 (Amtliche Bekanntmachung des Karlsruher Instituts für Technologie (KIT) Nr. 62 vom 06. August 2015) beschlossen.

Der Präsident hat seine Zustimmung gemäß § 20 Absatz 2 Satz 1 KITG i.V.m. § 32 Absatz 3 Satz 1 LHG am 21. Februar 2019 erteilt.

Artikel 1 – Änderung der Studien- und Prüfungsordnung

1. § 9 Absatz 11 werden folgende Sätze 3 und 4 angefügt:

„Die Präsentation nach § 14 Absatz 1 a ist eine Studienleistung und kann bei einer Bewertung mit „nicht bestanden (not passed)“ (im Gegensatz zu anderen Studienleistungen) nur einmal wiederholt werden. Die Präsentation ist endgültig nicht bestanden, wenn sie zweimal mit „nicht bestanden“ (not passed) bewertet wurde.“

2. § 12 Absatz 1 wird wie folgt geändert:

a) Satz 1 wird wie folgt gefasst:

„Es gelten die Vorschriften des Gesetzes zum Schutz von Müttern bei der Arbeit, in der Ausbildung und im Studium (Mutterschutzgesetz – MuSchG) in seiner jeweils geltenden Fassung.“

b) Satz 2 wird aufgehoben.

c) Die bisherigen Sätze 3 und 4 werden die Sätze 2 und 3

3. § 14 wird wie folgt geändert:

a) In Absatz 1 a Satz 2 wird nach dem Wort „Bachelorarbeit“ die Angabe „mit 12 LP“ und nach dem Wort „Präsentation“ die Angabe „mit 3 LP“ eingefügt.

b) In Absatz 2 Satz 1 werden nach den Wörtern „Hochschullehrer/innen“ das Wort “und“ durch ein Komma ersetzt und nach der Angabe „§ 14 Abs. 3 Ziff. 1 KITG“ die Wörter „und habilitierten Mitgliedern der KIT-Fakultät für Maschinenbau“ eingefügt.

c) In Absatz 7 Satz 1 werden nach den Wörtern „Hochschullehrer/innen“ das Wort “oder“ durch ein Komma ersetzt und nach der Angabe „§ 14 Abs. 3 Ziff. 1 KITG“ die Wörter „oder einem habilitierten Mitglied der KIT-Fakultät für Maschinenbau“ eingefügt.

4. § 17 wird wie folgt geändert:

a) In Absatz 1 Satz 3 wird das Wort „stammt“ durch die Wörter „stammen soll“ ersetzt.

b) In Absatz 7 Satz 4 werden nach dem Wort „Entscheidung“ die Wörter „schriftlich oder zur Niederschrift“ gestrichen.

5. § 18 Absatz 3 wird wie folgt geändert:

Nach dem Wort „sofern“ werden die Wörter „die KIT-Fakultät eine Prüfungsbefugnis erteilt hat und“ gestrichen.

6. § 26 Absatz 5 wird aufgehoben und folgender neuer Absatz 5 eingefügt:

„(5) Für Studierende, die

1. ihr Studium im Bachelorstudiengang Maschinenbau vor dem Wintersemester 2018/2019 aufgenommen haben oder
2. ihr Studium im Bachelorstudiengang Maschinenbau ab dem Wintersemester 2018/2019 in einem höheren Fachsemester aufgenommen haben bzw. aufnehmen sofern das Fachsemester über dem Jahrgang der Studienanfänger zum Wintersemester 2018/2019 liegt,

finden § 9 Abs. 11 und § 14 Abs. 1 a in der Fassung der Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Bachelorstudiengang Maschinenbau vom 04. August 2015 (Amtliche Bekanntmachung des KIT Nr. 62 vom 06. August 2015) weiterhin Anwendung.

Studierende nach Satz 1 Ziffer 1 und Ziffer 2, können das Modul Bachelorarbeit auf Grundlage der Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Bachelorstudiengang Maschinenbau in der Fassung vom 04. August 2015 (Amtliche Bekanntmachung des KIT Nr. 62 vom 06. August 2015) letztmalig bis zum 31. März 2023 ablegen“

Artikel 2 – Inkrafttreten

Diese Änderungssatzung tritt zum 01. April 2019 in Kraft.

Karlsruhe, den 21. Februar 2019

gez. Prof. Dr.-Ing. Holger Hanselka
(Präsident)

6 Field of study structure

Mandatory	
Orientation Exam	
Bachelor Thesis	15 CR
Fundamentals of Engineering	143 CR
Specialization in Mechanical Engineering	16 CR
Interdisciplinary Qualifications	6 CR

6.1 Orientation Exam

Mandatory		
M-MACH-104624	Orientation Exam	0 CR

6.2 Bachelor Thesis

Credits
15

Mandatory		
M-MACH-104494	Bachelor Thesis	15 CR

6.3 Fundamentals of Engineering

Credits
143

Mandatory		
M-MATH-102859	Advanced Mathematics	21 CR
M-MACH-102572	Engineering Mechanics	23 CR
M-MACH-102562	Materials Science	14 CR
M-MACH-102574	Technical Thermodynamics	15 CR
M-MACH-102565	Fluid Mechanics	8 CR
M-PHYS-104030	Physics	5 CR
M-ETIT-104801	Electrical Engineering *First usage possible from 3/8/2019.*	8 CR
M-MACH-102564	Measurement and Control Systems	7 CR
M-MACH-102563	Computer Science	6 CR
M-MACH-102573	Mechanical Design	20 CR
M-MACH-102566	Machines and Processes	7 CR
M-MACH-102549	Manufacturing Processes	4 CR
M-MACH-100297	Production Operations Management	5 CR

6.4 Specialization in Mechanical Engineering

Credits
16

Mandatory		
M-MACH-102746	Compulsory Elective Module	4 CR
Election block: Schwerpunkt (1 item)		
M-MACH-102812	Major Field: Powertrain Systems	12 CR
M-MACH-102638	Major Field: Rail System Technology	12 CR
M-MACH-102815	Major Field: Engineering Design	12 CR
M-MACH-102582	Major Field: Continuum Mechanics	12 CR
M-MACH-102816	Major Field: Fundamentals of Energy Technology	12 CR
M-MACH-102583	Major Field: Information Management	12 CR
M-MACH-102817	Major Field: Information Technology	12 CR
M-MACH-102818	Major Field: Vehicle Technology	12 CR
M-MACH-102838	Major Field: Energy Converting Engines	12 CR
M-MACH-102819	Major Field: Materials Science and Engineering	12 CR
M-MACH-102820	Major Field: Mechatronics	12 CR
M-MACH-104430	Major Field: Modeling and Simulation in Dynamics	12 CR
M-MACH-102644	Major Field: Production Engineering	12 CR
M-MACH-102589	Major Field: Production Systems	12 CR
M-MACH-104442	Major Field: Vibration Theory	12 CR
M-MACH-102645	Major Field: Combustion Engine Techniques	12 CR
M-MACH-102821	Major Field: Technical Logistics	12 CR

6.5 Interdisciplinary Qualifications

Credits
6

Mandatory		
M-MACH-102576	Key Competences	6 CR

7 Modules

M 7.1 Module: Advanced Mathematics [M-MATH-102859]

Responsible: Prof. Dr. Roland Griesmaier
Organisation: KIT Department of Mathematics
Part of: Fundamentals of Engineering

Credits	Recurrence	Language	Level	Version
21	Annual	German	3	1

Mandatory			
T-MATH-100525	Tutorial Advanced Mathematics I	0 CR	Arens, Griesmaier, Hettlich
T-MATH-100526	Tutorial Advanced Mathematics II	0 CR	Arens, Griesmaier, Hettlich
T-MATH-100527	Tutorial Advanced Mathematics III	0 CR	Arens, Griesmaier, Hettlich
T-MATH-100275	Advanced Mathematics I	7 CR	Arens, Griesmaier, Hettlich
T-MATH-100276	Advanced Mathematics II	7 CR	Arens, Griesmaier, Hettlich
T-MATH-100277	Advanced Mathematics III	7 CR	Arens, Griesmaier, Hettlich

Competence Certificate
Learning assessment is carried by three written examinations of length 120 minutes each and by three sets of homework assignments (pre-requesites). A "pass" result on a pre-requesites in Advanced Mathematics I, II and III, respectively, is a requirement for registration for the corresponding written examination.

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.

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.

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.

Prerequisites
None.

Content
Fundamentals, sequences and convergence, functions and continuity, series, differential calculus of one real variable, integral calculus, vector spaces, linear maps, eigenvalues, Fourier series, differential equations, Laplace transform, multidimensional calculus, domain integrals, vector calculus, partial differential equations, stochastics

Workload
In class: 270 hours

- lectures, tutorials and examinations

Independent study: 360 hours

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

Learning type
Lecture, problem classes, tutorials

M 7.2 Module: Bachelor Thesis [M-MACH-104494]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering
Part of: Bachelor Thesis

Credits	Language	Level	Version
15	German	3	1

Mandatory			
T-MACH-109188	Bachelor Thesis	12 CR	Heilmaier
T-MACH-109189	Presentation	3 CR	Heilmaier

Competence Certificate
The module Bachelor Thesis consists of a written bachelor thesis and an oral presentation of a scientific subject chosen by the student himself/herself or given by the supervisor. The bachelor thesis is designed to show that the student is able to deal with a problem of his/her subject area in an independent manner and within the given period of time using scientific methods.
The work load of the bachelor thesis corresponds to 12 ECTS. The maximal processing time of the bachelor thesis takes three months.
The date of issue of the subject has to be fixed by the supervisor and the student and to be put on record at the examination board. The subject of the bachelor thesis may be only returned once and only within the first month of processing time.
On a reasoned request of the student, the examination board can extend the processing time by up to one month. If the bachelor thesis is not completed in time, this examination is "failed" (5,0), unless the student is not responsible.
The bachelor thesis is to be evaluated by not less than a professor or a senior scientist according to § 14 Abs. 3 Ziff. 1 KITGor habilitated members of the KIT Faculty of Mechanical Engineering and another examiner. Generally, one of the two examiners is the person who has assigned the thesis. If the examiners do not agree, the bachelor thesis is graded by the examination board within this assessment; another expert can be appointed too. The bachelor thesis has to be graded within a period of six weeks after the submission.
The colloquium presentation must be held within 6 weeks after the submission of the bachelor thesis. The presentation should last around 20 minutes, corresponds to 3 ECTS, and is followed by a scientific discussion with the present expert audience.

Competence Goal
The student is able to work independently on a defined, subject-relevant theme based on scientific criteria within a given period of time. The student is able to do research, to analyze information, to abstract as well as collect and recognize basic principles and regularities on the basis of less structured information. He/she overviews a question, is able to choose scientific methods and techniques, and use them to solve the question or to identify other potentials. In general, this will be carried out in consideration of social and/or ethical aspects.

The student can interpret, evaluate, and if needed plot the results obtained. He/she is able to clearly structure a scientific work and (a) to communicate it in written form using technical terminology as well as (b) to present it in oral form and discuss it with experts.

Prerequisites
The requirement for admission to the bachelor thesis module are 120 ECTS. As to exceptions, the examination board decides on a request of the student (see § 14 (1) SPO).

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to earn at least 120 credits in the following fields:
    - Fundamentals of Engineering
    - Interdisciplinary Qualifications
    - Specialization in Mechanical Engineering

Content
The student shall be allowed to make suggestions for the topic of his/her bachelor thesis. The topic is set by the supervisor of the thesis in accordance with § 14 (3) SPO.

Workload
The workload for the preparation and presentation of the bachelor thesis is about 450 hours.

M 7.3 Module: Compulsory Elective Module (BSc-Modul WPF) [M-MACH-102746]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (mandatory)

Credits	Language	Level	Version
4	German	3	2

Election block: Wahlpflichtmodul (1 item)			
T-MACH-105381	Virtual Engineering (Specific Topics)	4 CR	Ovtcharova
T-MACH-105212	CAE-Workshop	4 CR	Albers, Matthiesen
T-MACH-100535	Introduction into Mechatronics	6 CR	Böhland, Lorch, Reischl
T-MACH-105209	Introduction into the Multi-Body Dynamics	5 CR	Seemann
T-MACH-102093	Fluid Power Systems	4 CR	Geimer, Pult
T-MACH-102163	Basics of Technical Logistics	6 CR	Mittwollen, Oellerich
T-MACH-105213	Fundamentals of Combustion I	4 CR	Maas, Sommerer
T-MACH-110377	Advanced Methods in Strength of Materials	4 CR	Böhlke, Frohnapfel
T-MACH-105210	Machine Dynamics	5 CR	Proppe
T-MACH-105452	Mathématiques appliquées aux sciences de l'ingénieur	5 CR	Dantan
T-MACH-105293	Mathematical Methods in Dynamics	6 CR	Proppe
T-MACH-110375	Mathematical Methods in Continuum Mechanics	4 CR	Böhlke
T-MACH-105294	Mathematical Methods of Vibration Theory	6 CR	Seemann
T-MACH-105295	Mathematical Methods in Fluid Mechanics	6 CR	Frohnapfel
T-MACH-105303	Modelling of Microstructures	5 CR	August, Nestler
T-MACH-100300	Modelling and Simulation	5 CR	Gumbsch, Nestler
T-MACH-100530	Physics for Engineers	5 CR	Dienwiebel, Gumbsch, Nesterov-Müller, Weygand
T-MACH-102102	Physical Basics of Laser Technology	5 CR	Schneider
T-MACH-105147	Product Lifecycle Management	4 CR	Ovtcharova
T-MACH-105970	Structural Analysis of Composite Laminates	4 CR	Kärger
T-MACH-100531	Systematic Materials Selection	4 CR	Dietrich
T-MACH-105652	Fundamentals of Combustion Engine Technology	5 CR	Bernhardt, Kubach, Pfeil, Toedter, Wagner
T-MACH-102083	Integrated Information Systems for Engineers	4 CR	Ovtcharova
T-MACH-105290	Vibration Theory	5 CR	Fidlin, Seemann
T-MACH-105292	Heat and Mass Transfer	4 CR	Bockhorn, Maas
T-MACH-100532	Scientific Computing for Engineers	5 CR	Gumbsch, Weygand
Election block: Wahlpflichtmodul (Ü) ()			
T-MACH-110333	Tutorial Continuum Mechanics of solids and fluids	1 CR	Böhlke, Frohnapfel
T-MACH-110376	Tutorial Mathematical Methods in Continuum Mechanics	1 CR	Böhlke

Competence Certificate
oral/written exam

Competence Goal
The elective course serves as a comprehensive, in-depth analysis of fundamentals in selected areas of mechanical engineering.
The specific learning outcomes are defined by the respective coordinator of the course.

Prerequisites
None

Annotation
Compulsory elective subjects have to be chosen from the corresponding catalogues as displayed in the bachelor´s program with an amount of 4 credit points (see Studienplan or Module Handbook)

Workload
The work load is about 120 hours, corresponding to 4 credit points.The work load varies from lecture to lecture, for example a lecture consisting of 4 credit points includes 28 h of presence during the lecture and 92 h preparation and rework time at home, 120 hours in total.

Learning type
Lectures, Tutorials

M 7.4 Module: Computer Science (BSc-Modul 09, Inf) [M-MACH-102563]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Engineering

Credits	Duration	Language	Level	Version
6	2 term	German/English	3	2

Mandatory			
T-MACH-105205	Computer Science for Engineers	6 CR	Ovtcharova
T-MACH-105206	Computer Science for Engineers	0 CR	Ovtcharova

Competence Certificate
Written examination "Computer Science for Engineers", 100%, 180 minutes; Examination prerequisite: passed lap course.

Competence Goal
Students can identify and explain fundamental terms, problems and concepts of computer science. They can apply the basic methods of the OO modeling with UML and implement the object-oriented programming (OOP) with the programming language JAVA.

Module grade calculation
Examination result "Computer Science for Engineers" 100%

Prerequisites
None

Content
Basics: Information representation- and processing, terms and definitions: alphabet, data, signals, information, numeral systems, propositional logic and Boolean algebra, computer architectures, programming paradigms.
Object Orientation: Definition and important characteristics of object orientation, Object-oriented modeling with UML.
Data Structures: Definition, properties and application of graphs, trees, linked lists, queues and stacks.
Algorithms: Characteristics of algorithms, complexity analysis, design methods, important examples.
Database management systems: Relational data model, relational algebra, declarative language SQL. Basics and concepts of JAVA. Introduction to programming using JAVA.

Annotation
For the Bachelor's program Mechanical Engineering the module (including all brick details, exams and courses) is offered in German.

For the Bachelor's program Mechanical Engineering (International) the module (including all brick details, exams and courses) is offered in English.

Workload
Attendance time: 63 hours

Self-study: 117 hours

Learning type
Lecture and Lab Course

M 7.5 Module: Electrical Engineering [M-ETIT-104801]

Responsible: Dr.-Ing. Klaus-Peter Becker
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: Fundamentals of Engineering (Usage from 3/8/2019)

Credits	Language	Level	Version
8	German	3	1

Mandatory			
T-ETIT-109820	Electrical Engineering and Electronics	8 CR	Becker

M 7.6 Module: Engineering Mechanics (BSc-Modul 03, TM) [M-MACH-102572]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Prof. Dr.-Ing. Wolfgang Seemann

Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Engineering

Credits	Duration	Language	Level	Version
23	4 term	German/English	3	1

Mandatory			
T-MACH-100282	Engineering Mechanics I	7 CR	Böhlke, Langhoff
T-MACH-100283	Engineering Mechanics II	6 CR	Böhlke, Langhoff
T-MACH-105201	Engineering Mechanics III & IV	10 CR	Seemann
T-MACH-100528	Tutorial Engineering Mechanics I	0 CR	Böhlke, Langhoff
T-MACH-100284	Tutorial Engineering Mechanics II	0 CR	Böhlke, Langhoff
T-MACH-105202	Tutorial Engineering Mechanics III	0 CR	Seemann
T-MACH-105203	Tutorial Engineering Mechanics IV	0 CR	Seemann

Competence Certificate
prerequisites EM I, II (see T-MACH-100528 "Engineering Mechanics I (Tutorial)" as well as T-MACH-100284 "Engineering Mechanics II (Tutorial)"): they consist of solving problems of the work sheets in four categories: written mandatory homework, written homework, computational homework, colloquia.

prerequisites EM III, IV

"Engineering Mechanics I", written exam, 90 minutes; graded:
"Engineering Mechanics II", written exam, 90 minutes; graded;
"Engineering Mechanics III/IV", written exam, 180 Minutes; graded;

The final grade of this module is computed as ECTS-based weighted sum of the included exams.

Competence Goal
After having finished the lectures EM I and EM II the students can

- assess stress and strain distributions for the basic load cases within the framework of elasticity and thermoelasticity
- compute and evaluate 3D stress and strain states
- apply the principle of virtual displacements
- apply energy methods and evaluate approximate solutions
- evaluate the stability of equilibrium positions
- solve worksheet problems to topics of the lecture using the computer algebra system MAPLE

In EM III and EM IV the students learn to analyse the motion of points and systems. Based on the axioms of Newton and Euler they know how to derive equations of motion. Besides the synthetic methods they get familiar with analytical methods which are based on energy expressions and can be applied efficiently and formalised. These methods are introduced in the scope of systems of mechanical engineering so that students can determine and analyse motions and the forces which are generated by these motions.

Prerequisites
None

Content
This Module consists of the courses "Engineering Mechanics I (lecture)" up to "Engineering Mechanics IV (lecture)" as well as "Engineering Mechanics I (Tutorial)" up to "Engineering Mechanics IV (Tutorial)"

Contents of "Engineering Mechanics I": basics of vector calculus; force systems; statics of rigid bodies; internal forces and moments in bars and beams; friction; centre of gravity, centre of mass; work, energy, principle of virtual work; statics of inextensible ropes; elastostatics of tension-compression-bars

Contents of "Engineering Mechanics II": bending; shear; torsion; stress and strain state in 3D; Hooke's law in 3D; elasticity theors in 3D; energy methods in elastostatics; approximation methods; stability

Contents of "Engineering Mechanics III":

Kinematics: Cartesian, cylindrical and natural coordinates. Time derivatives in moving reference frames, angular velocities of reference frames.

Kinetics of a particle:
Newton's axiom, Principle of d'Alembert, work of a force, kinetic and potential energies, principle of linear momentum, principle of moment of momentum, kinetics in moving reference systems

Systems of particles:
Principle of center of mass, Principle of moment of momentum, impacts between particles, systems with variable mass, applications.

Plain motion of rigid bodies:
Pure translation, pure rotation, general plain motion. Instantaneous center of rotation, Kinetics, moment of momentum, principle of work and principle of energy conservation for a rotation around a space-fixed axis. Mass moment of inertia, parallel-axis-theorem.Principle of linear momentum and principle of moment of momentum for arbitrary plain motion. Principle of d'Alembert for plain motion. Principles of linear and moment of momentum in integral form. Applications for impact problems.

Contents of "Engineering Mechanics IV":

Spatial kinematics of a rigid body, Euler angles, angular velocity using Euler angles, Euler's equations, inertia tensor, kinetic energy of a rigid body, free gyroscopes, forced gyroscopes, systems of rigid bodies, principle of d'Alembert, Lagrange's equations of the first and second kind, generalized coordinates, free and forced vibration of one degree of freedom systems, frequency response, vibration of multi degree of freedom systems, vibration absorption

Annotation
For the Bachelor’s program Mechanical Engineering the module (including all brick details, exams and courses) is offered in German.

For the Bachelor’s program Mechanical Engineering (International) the module (including all brick details, exams and courses) is offered in English.

Workload
lectures and exercises: 204h

homework and preparation of examination: 486h

Learning type
Lectures, Tutorials, Lab course groups, attestation of solved work sheets, colloquiua, consultation hours (optional)

M 7.7 Module: Fluid Mechanics (BSc-Modul 12, SL) [M-MACH-102565]

Responsible: Prof. Dr.-Ing. Bettina Frohnapfel
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Engineering

Credits	Duration	Language	Level	Version
8	2 term	German/English	3	1

Mandatory			
T-MACH-105207	Fluid Mechanics 1&2	8 CR	Frohnapfel

Competence Certificate
Common examination of "Fluid Mechanics I" and "Fluid Mechanics II"; written exam, 3 hours (graded)

Competence Goal
After having completed this module the student is capable of deriving the mathematical equations that describe the motion of fluids and can determine flow quantities for generic problems. He/she can name characteristic properties of fluids and distinguish different flow states. The student is capable of determining fluid quantities in fundamental applications. This includes the calculation of

- static and dynamic forces acting from the fluid onto the solid
- two-dimensional viscous flows
- one-dimensional incompressible and compressible flows without losses
- lossy flows through pipes

Module grade calculation
result of exam

Prerequisites
none

Content
properties of fluids, surface tension, hydro- and aerostatics, kinematics, stream tube theory (compressible and incompressible), losses in pipeline systems, dimensional analysis, dimensionless numbers

tensor notation, fluid elements in continuum, Reynolds transport theorem, conservation of mass and momentum, continuity equation, constitutive law for Newtonian fluids, Navier-Stokes equations, angular momentum and energy conservation, integral form of the conservation equations, forces between fluids and solids, analytical solutions of the Navier-Stokes equations

Annotation
For the Bachelor's program Mechanical Engineering the module (including all brick details, exams and courses) is offered in German.

For the Bachelor's program Mechanical Engineering (International) the module (including all brick details, exams and courses) is offered in English.

Workload
regular attendance: 64 hoursself-study: 176 hours

Learning type
Lectures + tutorials

Literature
Zirep J., Bühler, K.: Grundzüge der Strömungslehre, Grundlagen, Statik und Dynamik der Fluide, Springer Vieweg

Kuhlmann, H.: Strömungsmechanik, Pearson Studium

Spurk, J.H.: Strömungslehre, Einführung in die Theorieder Strömungen, Springer-Verlag

Kundu, P.K., Cohen, K.M.: Fluid Mechanics, Elsevier 2008

7.8 Module: Key Competences (BSc-Modul 07, SQL) [M-MACH-102576]

Responsible: Prof. Dr.-Ing. Barbara Deml
Prof. Dr.-Ing. Martin Heilmaier

Organisation: KIT Department of Mechanical Engineering

Part of: Interdisciplinary Qualifications

Credits	Recurrence	Duration	Level	Version
6	Once	2 term	3	1

Mandatory			
T-MACH-105296	Working Methods in Mechanical Engineering	4 CR	Deml
Election block: Schlüsselqualifikationen wählbare LV von HoC, ZAK (at least 2 credits)			
T-MACH-106375	Value stream within enterprises – The value chain at Bosch	2 CR	Maier

Competence Certificate
Success is monitored within the framework of academic achievements.

Amount, type and scope of the success control can vary according to the individually choice.

Competence Goal
After completing the module Key Competences students can

- determine and coordinate work steps, projects and goals, proceed systematically and purposefully, set priorities as well as assess the feasibility of a task,
- apply methods for the planning of a specific task under given framework conditions in a goal- and resource-oriented way,
- describe methods for scientific research and selection of technical information according to pre-established quality criteria and apply them to given problems,
- discuss empirical methods and apply them to selected examples,
- present technical information in a clear, readable, and convincingly argued manner in various forms of presentation (e.g. poster, exposé, abstract) in writing and appropriately visualize it graphically (e.g. engineering drawings, flowcharts),
- present and stand up for technical content in a convincing and appealing way,
- work as a team in a task-oriented manner, handle any conflicts on their own and take responsibility for themselves and others,
- communicate as a team in an objective, goal-oriented and interpersonal manner, represent their own interests, reflect and take into account the interests of others in their own words, and successfully organize the course of the conversation.

Module grade calculation
non graded

Prerequisites
none

Content
The module Key Competences consists "Working Methods in Mechanical Engineering" and a freely selectable courses offered by the KIT-House of Competence (HoC), the KIT Language Centre (SPZ) and the Centre for Cultural and General Studies (ZAK) with a work load corresponding to a total of 2 ECTS. Upon request, the examination board may approve further courses as freely selectable subjects in the module "Key Competences".

Annotation
Only HoC/SPZ/ZAK courses can be chosen.

Workload
The work load is about 180 hours, corresponding to 6 credit points in the Bachelor of Science program.

Learning type

The teaching and learning methods depend on the respectively chosen courses. The courses can be lectures, seminars, tutorials, or lab courses.

M 7.9 Module: Machines and Processes (mach13BSc-Modul 13, MuP) [M-MACH-102566]

Responsible: Dr.-Ing. Heiko Kubach
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Engineering

Credits	Duration	Language	Level	Version
7	1 term	German/English	3	2

Mandatory			
T-MACH-105208	Machines and Processes	7 CR	Bauer, Kubach, Maas, Pritz
T-MACH-105232	Machines and Processes, Prerequisite	0 CR	Bauer, Kubach, Maas, Pritz

Competence Certificate
written exam (2 h)

Competence Goal
The students can name and describe basic energy conversion processes and energy converting machines. They can explain the application of these energy conversion processes in various machines. They can analyze and evaluate the processes and machines in terms of functionality and efficiency and they are able to solve basic technical problems in terms of operating the machines.

Module grade calculation
Grade out of written exam (100%)

Prerequisites
None.

Content

- Internal combsution engines
- Hydraulic fluid machinery
- Thermal turbo machines
- Thermodynamics

Annotation
For the Bachelor's program Mechanical Engineering the module (including all brick details, exams and courses) is offered in German.

For the Bachelor's program Mechanical Engineering (International) the module (including all brick details, exams and courses) is offered in English.

Workload
regular attendance: 48 h

self-study: 162 h

Learning type
Lecture+Tutorial

Lab Course

M 7.10 Module: Major Field: Combustion Engine Techniques (SP 57) [M-MACH-102645]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Language	Level	Version
12	Once	German	3	2

Mandatory			
T-MACH-105652	Fundamentals of Combustion Engine Technology	5 CR	Bernhardt, Kubach, Pfeil, Toedter, Wagner
Election block: Technik des Verbrennungsmotors (K) (at least 3 credits)			
T-MACH-105173	Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines	4 CR	Gohl
T-MACH-105184	Fuels and Lubricants for Combustion Engines	4 CR	Kehrwald, Kubach
T-MACH-105169	Engine Measurement Techniques	4 CR	Bernhardt
Election block: Technik des Verbrennungsmotors (E) ()			
T-MACH-105655	Alternative Powertrain for Automobiles	4 CR	Noreikat
T-MACH-105451	Drive Systems and Possibilities to Increase Efficiency	2 CR	Kollmeier
T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment	4 CR	Deutschmann, Grunwaldt, Kubach, Lox
T-MACH-105985	Ignition systems	4 CR	Toedter
Election block: Technik des Verbrennungsmotors (P) (at most 4 credits)			
T-MACH-105337	Engine Laboratory	4 CR	Wagner

Competence Certificate
oral exam, written exam, lab course reports (see description of bricks)

Competence Goal
After completition of this „Schwerpunkt“ students are able to

- Describe and explain the working principal of different engine types
- Name the challenges in engine development
- Describe the correlations between engine operation, application parameters and emissions

Prerequisites
None

Content
The focus of this “Schwerpunkt” are the basic design and the working principle of internal combustion engines. Different types of engines such as gasoline engine, diesel engine and gas engine are subject. The fundamental thermodynamic aspects as well as the mechanical aspects are discussed. The influence of application parameters and the correlation of engine concepts, fuels and emissions are addressed.

Workload
The work load is 360 hours, corresponding to 12 credit points.

Learning type
Lectures, Exercises, Lab Courses

M 7.11 Module: Major Field: Continuum Mechanics (SP 13) [M-MACH-102582]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Language	Level	Version
12	Once	German	3	3

Election notes
In the core area of each Major Field at least 8 ECTS have to be chosen.

Mandatory			
T-MACH-110377	Advanced Methods in Strength of Materials	4 CR	Böhlke, Frohnapfel
T-MACH-110333	Tutorial Continuum Mechanics of solids and fluids	1 CR	Böhlke, Frohnapfel
T-MACH-110375	Mathematical Methods in Continuum Mechanics	4 CR	Böhlke
T-MACH-110376	Tutorial Mathematical Methods in Continuum Mechanics	1 CR	Böhlke
Election block: Kontinuumsmechanik (E) (at most 6 credits)			
T-MACH-105320	Introduction to the Finite Element Method	4 CR	Böhlke, Langhoff
T-MACH-110330	Tutorial Introduction to the Finite Element Method	1 CR	Böhlke, Langhoff
T-MACH-110362	Introduction to Computational Fluid Dynamics	5 CR	Frohnapfel, Stroh

Competence Certificate
see different bricks

Competence Goal
After having finished this major field the students can

- list important concepts and models of continuum mechanics
- analyse and evaluate models for describing the material behaviour
- apply these models in given problems
- formulate field equations and boundary conditions

Prerequisites
none

Content
Courses to be chosen: see module handbook

Recommendation
Students of Mechanical Engineering (Bachelor) having chosen the Major Field "Continuum Mechanics" are recommended to chose one of the following courses as Compulsory Elective Course: "Scientific Computing for Engineers" (Prof. Gumbsch, Dr. Weygand, winter term) or "Introduction into Python" (Dr. Weiß, summer term)

Annotation
Due to capacity reasons, it can not be guaranteed that all students taking part in the courses "Continuum Mechanics of Solids and Fluids" and "Introduction to the finite element method" can also take part in the corresponding computer tutorials.

All students having chosen the Major Field "Continuum Mechanics" (No 13) will be allowed to

Workload
see different bricks

Learning type
lectures, tutorials, computer tutorial, consultation hours

Literature
see different bricks

M 7.12 Module: Major Field: Energy Converting Engines [M-MACH-102838]

Responsible: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Language	Level	Version
12	Once	German	3	2

Election block: Kraft- und Arbeitsmaschinen (K) (at least 8 credits)			
T-MACH-105326	Hydraulic Fluid Machinery	8 CR	Pritz
T-MACH-105363	Thermal Turbomachines I	6 CR	Bauer
T-MACH-102194	Combustion Engines I	4 CR	Koch, Kubach
Election block: Kraft- und Arbeitsmaschinen (E) ()			
T-CIWVT-105780	Design of a jet engine combustion chamber	6 CR	Zarzalis
T-MACH-105184	Fuels and Lubricants for Combustion Engines	4 CR	Kehrwald, Kubach
T-MACH-102093	Fluid Power Systems	4 CR	Geimer, Pult
T-MACH-105533	Gasdynamics	4 CR	Magagnato
T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment	4 CR	Deutschmann, Grunwaldt, Kubach, Lox
T-MACH-105213	Fundamentals of Combustion I	4 CR	Maas, Sommerer
T-MACH-105325	Fundamentals of Combustion II	4 CR	Maas
T-MACH-105338	Numerical Fluid Mechanics	4 CR	Magagnato
T-MACH-105441	Development of Oil-Hydraulic Powertrain Systems	4 CR	Ays, Geerling
T-MACH-107447	Reliability Engineering 1	3 CR	Konnov
T-MACH-105364	Thermal Turbomachines II	6 CR	Bauer
T-MACH-105366	Turbo Jet Engines	4 CR	Bauer
T-MACH-105234	Windpower	4 CR	Lewald
Election block: Kraft- und Arbeitsmaschinen (P) (at most 4 credits)			
T-MACH-105515	Introduction to Numerical Fluid Dynamics	4 CR	Pritz

Competence Certificate
refer to different brick descriptions of SP24

Competence Goal
Die Studierenden erwerben in den grundlagenorientierten Kernfächern des Schwerpunktes breite und fundierte Kenntnisse der wissenschaftlichen Theorien, Prinzipien und Methoden der Kraft- und Arbeitsmaschinen, um diese entwerfen, einsetzen und bewerten zu können.

Darauf aufbauend vertiefen die Studierenden in den Ergänzungsfächern ausgewählte Anwendungsfelder, sodass sie im Anschluss in der Lage sind, Probleme aus diesem Anwendungsfeld selbstständig zu analysieren, zu bewerten und hierauf aufbauend Lösungsansätze zu entwickeln.

Die Studierenden können nach Abschluss des Schwerpunkts insbesondere

- Funktion und Einsatz von Kraft- und Arbeitsmaschinen benennen,
- den Stand der Technik und daraus resultierende Anwendungsfelder der Kraft- und Arbeitsmaschinen beschreiben und am Beispiel anzuwenden,
- grundlegende Theorien, Methoden und Eigenschaften für die verschiedenen Anwendungsfelder der Kraft- und Arbeitsmaschinen benennen und diese einsetzen und bewerten.

Prerequisites
None

Content
refer to different brick descriptions of SP24

Recommendation
Recommended compulsory optional subject: Heat and mass transfer

Workload
The work load is 360 hours, corresponding to 12 credit points.

Learning type
Lectures and Exercises

7.13 Module: Major Field: Engineering Design (SP 10) [M-MACH-102815]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Language	Level	Version
12	Once	German/English	3	3

Election block: Entwicklung und Konstruktion (K) (at least 8 credits)			
T-MACH-105233	Powertrain Systems Technology A: Automotive Systems	4 CR	Albers, Matthiesen, Ott
T-MACH-105216	Powertrain Systems Technology B: Stationary Machinery	4 CR	Albers, Matthiesen, Ott
T-MACH-105221	Lightweight Engineering Design	4 CR	Albers, Burkardt
Election block: Entwicklung und Konstruktion (E) ()			
T-MACH-105215	Applied Tribology in Industrial Product Development	4 CR	Albers, Lorentz, Matthiesen
T-MACH-105311	Design and Development of Mobile Machines	4 CR	Geimer, Siebert
T-MACH-105212	CAE-Workshop	4 CR	Albers, Matthiesen
T-MACH-108374	Vehicle Ergonomics	4 CR	Heine
T-MACH-102105	Manufacturing Technology	8 CR	Schulze, Zanger
T-MACH-100092	Automotive Engineering I	8 CR	Gauterin, Unrau
T-MACH-102116	Fundamentals for Design of Motor-Vehicle Bodies I	2 CR	Bardehle
T-MACH-102119	Fundamentals for Design of Motor-Vehicle Bodies II	2 CR	Bardehle
T-MACH-105160	Fundamentals in the Development of Commercial Vehicles I	2 CR	Zürn
T-MACH-105161	Fundamentals in the Development of Commercial Vehicles II	2 CR	Zürn
T-MACH-105162	Fundamentals of Automobile Development I	2 CR	Frech
T-MACH-105163	Fundamentals of Automobile Development II	2 CR	Frech
T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars	4 CR	Schlichtenmayer
T-MACH-105330	Design with Plastics	4 CR	Liedel
T-MACH-105231	Leadership and Management Development	4 CR	Albers, Matthiesen, Ploch
T-MACH-105440	Leadership and Conflict Management	4 CR	Hatzl
T-MACH-105441	Development of Oil-Hydraulic Powertrain Systems	4 CR	Ays, Geerling
T-MACH-105347	Project Management in Global Product Engineering Structures	4 CR	Albers, Gutzmer, Matthiesen
T-MACH-102107	Quality Management	4 CR	Lanza
T-MACH-105171	Safety Engineering	4 CR	Kany
T-MACH-105696	Strategic product development - identification of potentials of innovative products	3 CR	Albers, Matthiesen, Siebe
T-MACH-110396	Strategic product development - identification of potentials of innovative products - Case Study	1 CR	Albers, Matthiesen, Siebe
T-MACH-105358	Sustainable Product Engineering	4 CR	Albers, Matthiesen, Ziegahn
T-MACH-105361	Technical Design in Product Development	4 CR	Albers, Matthiesen, Schmid
T-MACH-109055	Machine Tools and Industrial Handling	8 CR	Fleischer
Election block: Entwicklung und Konstruktion (P) (at most 4 credits)			

T-MACH-105370	Laboratory Mechatronics	4 CR	Lorch, Seemann, Stiller
Election block: Entwicklung und Konstruktion (Ü) ()			
T-MACH-108887	Design and Development of Mobile Machines - Advance	0 CR	Geimer, Siebert

Competence Goal
The students are able to transfer their knowledge und abilities in product engineering to mechanical systems in research and industrial practice.

Prerequisites
None

Workload
The work load is about 360 hours, corresponding to 12 credit points.

Learning type
lectures
auditorium exercises
workshops

M 7.14 Module: Major Field: Fundamentals of Energy Technology [M-MACH-102816]

Responsible: Prof. Dr.-Ing. Hans-Jörg Bauer
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Level	Version
12	Once	3	1

Mandatory			
T-MACH-105220	Fundamentals of Energy Technology	8 CR	Badea, Cheng
Election block: Grundlagen der Energietechnik (K) ()			
T-MACH-105525	Introduction to Nuclear Energy	4 CR	Cheng
T-MACH-105325	Fundamentals of Combustion II	4 CR	Maas
T-MACH-105326	Hydraulic Fluid Machinery	8 CR	Pritz
Election block: Grundlagen der Energietechnik (E) ()			
T-MACH-105462	Selected Problems of Applied Reactor Physics and Exercises	4 CR	Dagan
T-MACH-105151	Energy Efficient Intralogistic Systems	4 CR	Braun, Schönung
T-MACH-105952	Energy Storage and Network Integration	4 CR	Jäger, Stieglitz
T-MACH-105408	Energy Systems I: Renewable Energy	6 CR	Dagan
T-MACH-105533	Gasdynamics	4 CR	Magagnato
T-MACH-105557	Microenergy Technologies	4 CR	Kohl
T-ETIT-101939	Photovoltaics	6 CR	Powalla
T-MACH-105537	Physical and Chemical Principles of Nuclear Energy in View of Reactor Accidents and Back-End of Nuclear Fuel Cycle	2 CR	Dagan
T-MACH-106493	Solar Thermal Energy Systems	4 CR	Dagan
T-MACH-105403	Flows and Heat Transfer in Energy Technology	4 CR	Cheng
T-MACH-105225	Thermal Solar Energy	4 CR	Stieglitz
T-MACH-105234	Windpower	4 CR	Lewald
T-MACH-105338	Numerical Fluid Mechanics	4 CR	Magagnato
Election block: Grundlagen der Energietechnik (P) (at most 4 credits)			
T-MACH-105331	Laboratory Exercise in Energy Technology	4 CR	Bauer, Maas, Wirbser
T-MACH-106707	Workshop on computer-based flow measurement techniques	4 CR	Bauer

Competence Goal
After completion of SP 15 students are able:

- to describe the elements of an energy system and their complex interactions,
- to list different conventional energy sources and assess their static range,
- to name the fluctuating supply of renewable energies such as wind, solar radiation, ocean currents and tides etc. and describe its effects on the energy system,
- to assess the effects of external and internal economic, ecological and technical boundary conditions of energy systems and to derive approaches for an optimal mix of different energy technologies,
- to explain the operational principle of well-established power plants as well as of power plants based on renewable energies.

Prerequisites
None

M 7.15 Module: Major Field: Information Management (SP 17) [M-MACH-102583]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Language	Level	Version
12	German	3	1

Election block: Informationsmanagement (K) (at least 8 credits)			
T-MACH-106457	I4.0 Systems platform	4 CR	Maier, Ovtcharova
T-MACH-105147	Product Lifecycle Management	4 CR	Ovtcharova
T-MACH-102083	Integrated Information Systems for Engineers	4 CR	Ovtcharova
Election block: Informationsmanagement (E) ()			
T-MACH-106744	Agile Product Innovation Management - Value-driven Planning of new Products	4 CR	Kläger
T-MACH-105212	CAE-Workshop	4 CR	Albers, Matthiesen
T-MACH-102209	Information Engineering	3 CR	Ovtcharova
T-MACH-102128	Information Systems and Supply Chain Management	3 CR	Kilger
T-MACH-105187	IT-Fundamentals of Logistics	3 CR	Thomas
T-MACH-105442	Intellectual Property Rights and Strategies in Industrial Companies	4 CR	Albers, Matthiesen, Zacharias
T-MACH-102181	PLM for Product Development in Mechatronics	4 CR	Eigner
T-MACH-102155	Product, Process and Resource Integration in the Automotive Industry	4 CR	Mbang
T-MACH-105347	Project Management in Global Product Engineering Structures	4 CR	Albers, Gutzmer, Matthiesen
T-MACH-105181	Supply Chain Management	6 CR	Alicke
T-MACH-105358	Sustainable Product Engineering	4 CR	Albers, Matthiesen, Ziegahn
Election block: Informationsmanagement (P) (at most 4 credits)			
T-MACH-102185	CATIA CAD Training Course	2 CR	Ovtcharova
T-MACH-102187	CAD-NX Training Course	2 CR	Ovtcharova
T-MACH-102153	PLM-CAD Workshop	4 CR	Ovtcharova
T-MACH-102149	Virtual Reality Practical Course	4 CR	Ovtcharova

Competence Certificate
Examination of other kind and oral and/or written examination: duration 2 hours.

Competence Goal
The students should:

Understand the relevance of information management in product development in consideration of increasing product and process complexity.

Gain basic knowledge in handling information, which is generated by product development activities along the lifecycle.

Prerequisites
None

Content
Generation and management of information

Architecture and functionality of information systems

CAX-systems

Workload
360 hours

M 7.16 Module: Major Field: Information Technology [M-MACH-102817]

Responsible: Prof. Dr.-Ing. Christoph Stiller
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Language	Level	Version
12	Once	German/English	3	1

Election block: Informationstechnik (K) (at least 8 credits)			
T-MACH-105314	Computational Intelligence	4 CR	Jakob, Mikut, Reischl
T-MACH-105694	Data Analytics for Engineers	5 CR	Ludwig, Mikut, Reischl
T-MACH-105317	Digital Control	4 CR	Knoop
T-MACH-105223	Machine Vision	8 CR	Lauer, Stiller
T-MACH-105335	Measurement II	4 CR	Stiller
T-MACH-105360	Computer Engineering	6 CR	Keller, Lorch
Election block: Informationstechnik (E) ()			
T-MACH-105218	Automotive Vision	6 CR	Lauer, Stiller
T-MACH-102150	BUS-Controls	4 CR	Becker, Geimer
T-MACH-102128	Information Systems and Supply Chain Management	3 CR	Kilger
T-MACH-105328	Information Processing in Mechatronic Systems	4 CR	Kaufmann
T-MACH-105187	IT-Fundamentals of Logistics	3 CR	Thomas
T-MACH-105169	Engine Measurement Techniques	4 CR	Bernhardt
T-MACH-107447	Reliability Engineering 1	3 CR	Konnov
T-MACH-105185	Control Technology	4 CR	Gönnheimer
T-MACH-105367	Behaviour Generation for Vehicles	4 CR	Stiller, Werling
T-INFO-101466	Information Processing in Sensor Networks	6 CR	Hanebeck
Election block: Informationstechnik (P) (at most 4 credits)			
T-MACH-105370	Laboratory Mechatronics	4 CR	Lorch, Seemann, Stiller
T-MACH-105341	Lab Computer-Aided Methods for Measurement and Control	4 CR	Stiller
T-MACH-108889	BUS-Controls - Advance	0 CR	Daiß, Geimer

Competence Certificate
Oral exams: duration approx 5 min. per credit point.

However, amount, type and scope of the success control can vary according to the individually choice.

Competence Goal
Students are able to

- explain fundamentals of information technology for given problems in mechanical engineering an mechatronics.
- explain major methods for acquisition, processing and exploitation of information in technical systems.
- outline and to explain alternative methods to determine and to represent measurement uncertainties and their propagation in technical systems.
- explain information filters and fusion methods and understand their application to given problems.

Prerequisites
none

Content

- Techniques of information and data processing in mechanical engeneering
- Techniques of sensor data processing
- Concepts of controll theory
- Electronic devices for data processing

Workload
The work load is about 360 hours, corresponding to 12 credit points.

Learning type
lecture, practical training, exercise, prakticat training in laboratory

7.17 Module: Major Field: Materials Science and Engineering (SP 26) [M-MACH-102819]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Language	Level	Version
12	Once	German/English	3	3

Election notes
In the core area of Major Field at least 8 ECTS have to be chosen.

Mandatory			
T-MACH-105301	Materials Science and Engineering III	8 CR	Heilmaier
Election block: Materialwissenschaft und Werkstofftechnik (E) ()			
T-MACH-105308	Atomistic Simulations and Molecular Dynamics	4 CR	Brandl, Gumbsch, Schneider
T-MACH-102141	Constitution and Properties of Wearresistant Materials	4 CR	Ulrich
T-MACH-105157	Foundry Technology	4 CR	Wilhelm
T-MACH-102111	Principles of Ceramic and Powder Metallurgy Processing	4 CR	Schell
T-MACH-100287	Introduction to Ceramics	6 CR	Hoffmann
T-MACH-105330	Design with Plastics	4 CR	Liedel
T-MACH-105164	Laser in Automotive Engineering	4 CR	Schneider
T-MACH-105333	Mechanics and Strength of Polymers	4 CR	von Bernstorff
T-MACH-105303	Modelling of Microstructures	5 CR	August, Nestler
T-MACH-102137	Polymer Engineering I	4 CR	Elsner
T-MACH-105724	Failure Analysis	4 CR	Greiner, Schneider
T-MACH-105170	Welding Technology	4 CR	Farajian
T-MACH-105354	Fatigue of Metallic Materials	4 CR	Guth, Lang
T-MACH-105362	Technology of Steel Components	4 CR	Schulze
T-MACH-102139	Failure of Structural Materials: Fatigue and Creep	4 CR	Gruber, Gumbsch
T-MACH-102140	Failure of Structural Materials: Deformation and Fracture	4 CR	Gumbsch, Weygand
T-MACH-107684	Materials Characterization	4 CR	Gibmeier
T-MACH-105211	Materials of Lightweight Construction	4 CR	Liebig
T-MACH-105970	Structural Analysis of Composite Laminates	4 CR	Kärger
Election block: Materialwissenschaft und Werkstofftechnik (P) (at most 4 credits)			
T-MACH-105447	Metallographic Lab Class	4 CR	Hauf
T-MACH-102154	Laboratory Laser Materials Processing	4 CR	Schneider
T-MACH-105651	Biomechanics: design in nature and inspired by nature	4 CR	Mattheck
Election block: Materialwissenschaft und Werkstofftechnik (Ü) ()			
T-MACH-107685	Exercises for Materials Characterization	2 CR	Gibmeier

Competence Certificate
Oral exams: duration approx. 5 min. per credit point.

However, amount, type and scope of the success control can vary according to the individual choice.

Competence Goal
As part of a major field a specific subdomain of mechanical engineering is made accessible in breadth and depth. Students gain comprehensive knowledge in the core subjects and detailed knowledge in the supplementary subjects of the selected subdomain. They are able to generate new (scientific) solutions within this subdomain.

The specific learning outcomes are defined by the respective coordinator of the major field.

Prerequisites
None

Content
The comprehensive topic of the major field are the thermodynamical and kinetic basics of materials science that the students acquire within the core area (8 credit points). Moreover, there is a supplementary area of materials science and engineering which offers different subjects according to the students' interests.

Annotation
The module Materials Science and Engineering consists of 12 credit points in the bachelor´s program. Within that module, the students have to take lectures from a core area (8 credit points) and can select from a broad variation of courses within the supplementary area. For the bachelor´s program, a reduced catalogue exists (see Studienplan).

Workload
The work load is about 360 hours in the Bachelor of Science program, whereof the presence time is 66 h.

Learning type
In the core area of the major field Materials Science and Engineering the students choose from a small number of lectures and tutorials (obligatory).

Within the supplementary area students can choose not only lectures and tutorials but also lab courses and seminars.

M 7.18 Module: Major Field: Mechatronics (SP 31) [M-MACH-102820]

Responsible: Prof. Dr. Veit Hagenmeyer
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Language	Level	Version
12	Once	German/English	3	3

Election block: Mechatronik (K) (at least 8 credits)			
T-MACH-105314	Computational Intelligence	4 CR	Jakob, Mikut, Reischl
T-MACH-105694	Data Analytics for Engineers	5 CR	Ludwig, Mikut, Reischl
T-MACH-100535	Introduction into Mechatronics	6 CR	Böhland, Lorch, Reischl
T-MACH-105209	Introduction into the Multi-Body Dynamics	5 CR	Seemann
T-MACH-105218	Automotive Vision	6 CR	Lauer, Stiller
T-MACH-105539	Modern Control Concepts I	4 CR	Groell, Matthes
T-MACH-105367	Behaviour Generation for Vehicles	4 CR	Stiller, Werling
Election block: Mechatronik (E) ()			
T-MACH-108844	Automated Manufacturing Systems	8 CR	Fleischer
T-MACH-105217	Automation Systems	4 CR	Kaufmann
T-MACH-102150	BUS-Controls	4 CR	Becker, Geimer
T-MACH-105212	CAE-Workshop	4 CR	Albers, Matthiesen
T-MACH-105317	Digital Control	4 CR	Knoop
T-MACH-105514	Experimental Dynamics	5 CR	Fidlin
T-ETIT-100784	Hybrid and Electric Vehicles	4 CR	Becker
T-MACH-105187	IT-Fundamentals of Logistics	3 CR	Thomas
T-MACH-105210	Machine Dynamics	5 CR	Proppe
T-MACH-105224	Machine Dynamics II	4 CR	Proppe
T-MACH-105294	Mathematical Methods of Vibration Theory	6 CR	Seemann
T-MACH-105334	Mechanics in Microtechnology	4 CR	Greiner, Gruber
T-INFO-101266	Human-Machine-Interaction	6 CR	Beigl
T-MACH-105335	Measurement II	4 CR	Stiller
T-MACH-105557	Microenergy Technologies	4 CR	Kohl
T-MACH-108809	Micro- and nanosystem integration for medical, fluidic and optical applications	4 CR	Gengenbach, Hagenmeyer, Koker, Sieber
T-MACH-102152	Novel Actuators and Sensors	4 CR	Kohl, Sommer
T-MACH-105442	Intellectual Property Rights and Strategies in Industrial Companies	4 CR	Albers, Matthiesen, Zacharias
T-MACH-105347	Project Management in Global Product Engineering Structures	4 CR	Albers, Gutzmer, Matthiesen
T-INFO-108014	Robotics I - Introduction to Robotics	6 CR	Asfour
T-ETIT-109313	Signals and Systems	6 CR	Puente León
T-MACH-105372	Theory of Stability	6 CR	Fidlin
T-MACH-105358	Sustainable Product Engineering	4 CR	Albers, Matthiesen, Ziegahn
T-MACH-105521	Theoretical Description of Mechatronic Systems	4 CR	Seemann
T-MACH-105555	System Integration in Micro- and Nanotechnology	4 CR	Gengenbach
T-MACH-105290	Vibration Theory	5 CR	Fidlin, Seemann

Election block: Mechatronik (P) (at most 4 credits)			
T-MACH-105370	Laboratory Mechatronics	4 CR	Lorch, Seemann, Stiller
T-MACH-108878	Laboratory Production Metrology	4 CR	Häfner
T-MACH-105373	Practical Training in Measurement of Vibrations	4 CR	Fidlin
T-MACH-102149	Virtual Reality Practical Course	4 CR	Ovtcharova
Election block: Mechatronik (Ü) ()			
T-MACH-108889	BUS-Controls - Advance	0 CR	Daiß, Geimer
T-INFO-106257	Human-Machine-Interaction Pass	0 CR	Beigl

Competence Goal
Students of the topic mechatronics know the future-oriented procedures. They are able to individually and creatively solve interdisciplinary questions and learn to effectively combine tools from the individual disciplines.

Prerequisites
none

Content
The topic mechatronics offers a broad, multidisciplinary body of knowledge. The graduates are qualified to solve essential mechatronic questions. In particular the following disciplines are covered by the major mechatronics:

§ Mechanics and fluidics

§ Electronics

§ Information processing

§ Automation.

Workload
The work load is about 360 hours, corresponding to 12 credit points.

Learning type
The contents of this major field are taught in form of lectures, exercises and practical experiences.

7.19 Module: Major Field: Modeling and Simulation in Dynamics (SP 61) [M-MACH-104430]

Responsible: Prof. Dr.-Ing. Wolfgang Seemann
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Language	Level	Version
12	German	3	3

Election block: Modellbildung und Simulation in der Dynamik (K) (at least 8 credits)			
T-MACH-105209	Introduction into the Multi-Body Dynamics	5 CR	Seemann
T-MACH-105210	Machine Dynamics	5 CR	Proppe
T-MACH-105293	Mathematical Methods in Dynamics	6 CR	Proppe
T-MACH-105226	Dynamics of the Automotive Drive Train	5 CR	Fidlin
T-MACH-105290	Vibration Theory	5 CR	Fidlin, Seemann
Election block: Modellbildung und Simulation in der Dynamik (E) (at most 5 credits)			
T-MACH-105308	Atomistic Simulations and Molecular Dynamics	4 CR	Brandl, Gumbsch, Schneider
T-MACH-105514	Experimental Dynamics	5 CR	Fidlin
T-MACH-105224	Machine Dynamics II	4 CR	Proppe
T-MACH-105294	Mathematical Methods of Vibration Theory	6 CR	Seemann
T-MACH-105349	Computational Dynamics	4 CR	Proppe
T-MACH-105350	Computational Vehicle Dynamics	4 CR	Proppe
T-MACH-105384	Computerized Multibody Dynamics	4 CR	Seemann
T-MACH-105172	Simulation of Coupled Systems	4 CR	Geimer, Xiang
T-MACH-108888	Simulation of Coupled Systems - Advance	0 CR	Geimer, Xiang

Competence Certificate
oral examination

Competence Goal
The module provides modeling competences and continues thus the compulsory courses in dynamics. To this end analytical methods for the modeling and examination of dynamical systems are presented. The simulation of the systems enables the students to do simulation studies in typical applications in dynamical systems of mechanical engineering to be able to evaluate and interpret the results.

Prerequisites
None

Workload
360 h

Learning type
Lectures, tutorials

M 7.20 Module: Major Field: Powertrain Systems (SP 02) [M-MACH-102812]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Language	Level	Version
12	Once	German/English	3	2

Election notes
In the core area of each Major Field at least 8 ECTS have to be chosen.

Election block: Antriebssysteme (K) (at least 8 credits)			
T-MACH-105307	Drive Train of Mobile Machines	4 CR	Geimer, Wydra
T-MACH-105233	Powertrain Systems Technology A: Automotive Systems	4 CR	Albers, Matthiesen, Ott
T-MACH-105216	Powertrain Systems Technology B: Stationary Machinery	4 CR	Albers, Matthiesen, Ott
T-MACH-105226	Dynamics of the Automotive Drive Train	5 CR	Fidlin
Election block: Antriebssysteme (E) ()			
T-MACH-105215	Applied Tribology in Industrial Product Development	4 CR	Albers, Lorentz, Matthiesen
T-MACH-105536	Dimensioning and Optimization of Power Train System	4 CR	Albers, Faust, Kirchner, Matthiesen
T-MACH-105209	Introduction into the Multi-Body Dynamics	5 CR	Seemann
T-MACH-105151	Energy Efficient Intralogistic Systems	4 CR	Braun, Schönung
T-ETIT-100784	Hybrid and Electric Vehicles	4 CR	Becker
T-MACH-105187	IT-Fundamentals of Logistics	3 CR	Thomas
T-MACH-105231	Leadership and Management Development	4 CR	Albers, Matthiesen, Ploch
T-MACH-105210	Machine Dynamics	5 CR	Proppe
T-MACH-105224	Machine Dynamics II	4 CR	Proppe
T-MACH-102152	Novel Actuators and Sensors	4 CR	Kohl, Sommer
T-MACH-105442	Intellectual Property Rights and Strategies in Industrial Companies	4 CR	Albers, Matthiesen, Zacharias
T-MACH-105441	Development of Oil-Hydraulic Powertrain Systems	4 CR	Ays, Geerling
T-MACH-105347	Project Management in Global Product Engineering Structures	4 CR	Albers, Gutzmer, Matthiesen
T-MACH-105185	Control Technology	4 CR	Gönnheimer
T-MACH-105696	Strategic product development - identification of potentials of innovative products	3 CR	Albers, Matthiesen, Siebe
T-MACH-110396	Strategic product development - identification of potentials of innovative products - Case Study	1 CR	Albers, Matthiesen, Siebe
T-MACH-105358	Sustainable Product Engineering	4 CR	Albers, Matthiesen, Ziegahn
T-MACH-105531	Tribology	8 CR	Dienwiebel, Scherge
T-MACH-102194	Combustion Engines I	4 CR	Koch, Kubach
T-MACH-102140	Failure of Structural Materials: Deformation and Fracture	4 CR	Gumbsch, Weygand
Election block: Antriebssysteme (Ü) ()			
T-MACH-109303	Exercices - Tribology	0 CR	Dienwiebel

Competence Goal

The students know and understand the technical and physical basics and systematic connections of drive systems. The lecture deals vehicle drive systems as well as drive systems for stationary and mobile work machines.

They are able to choose, describe and use complex dimensioning- and design methods for drive systems under consideration of the interactions of the system.

Prerequisites

none

Workload

The work load is about 360 hours, corresponding to 12 credit points.

Learning type

lectures
auditorium exercises
workshops

7.21 Module: Major Field: Production Engineering (SP 52) [M-MACH-102644]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Language	Level	Version
12	Once	English	3	1

Election block: Production Engineering (K) (at least 8 credits)			
T-MACH-106731	Global Production Engineering (MEI)	4 CR	Lanza
T-MACH-105379	Global Logistics	4 CR	Furmans
Election block: Production Engineering (E) ()			
T-MACH-106732	Automated Production Systems (MEI)	4 CR	Fleischer
T-MACH-106733	SmartFactory@Industry (MEI)	4 CR	Lanza

Competence Certificate
Oral exams: duration approx. 5 min per credit point
Amount, type and scope of the success control can vary according to the individually choice.

Competence Goal
After completion of this module, the students are able

- to analyse and solve planning and layout problems on the level of the enterprise, production, processes and work tasks,
- to plan and control a production,
- to evaluate and configure the quality and efficiency of production, processes and products.

Prerequisites
none

Content
The students acquire in the compulsory core subjects profound knowledge about the scientific theories, principles and methods of Production Engineering. Afterwards they are able to evaluate and design complex production systems according to problems of manufacturing and process technologies, materials handling, handling techniques, information engineering as well as production organisation and management.

Workload
The work load is about 360 hours, corresponding to 12 credit points.

Learning type
Lectures, seminars, workshops, excursions

M 7.22 Module: Major Field: Production Systems (SP 38) [M-MACH-102589]

Responsible: Prof. Dr.-Ing. Volker Schulze
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Language	Level	Version
12	Once	German	3	2

Election block: Produktionssysteme (K) (at least 8 credits)			
T-MACH-105518	Human Factors Engineering I	4 CR	Deml
T-MACH-105519	Human Factors Engineering II	4 CR	Deml
T-MACH-102105	Manufacturing Technology	8 CR	Schulze, Zanger
T-MACH-108849	Integrated Production Planning in the Age of Industry 4.0	8 CR	Lanza
T-MACH-102151	Material Flow in Logistic Systems	9 CR	Furmans
T-MACH-109055	Machine Tools and Industrial Handling	8 CR	Fleischer
Election block: Produktionssysteme (E) ()			
T-MACH-102162	Automated Manufacturing Systems	9 CR	Fleischer
T-MACH-105165	Automotive Logistics	4 CR	Furmans
T-MACH-105147	Product Lifecycle Management	4 CR	Ovtcharova
T-MACH-102107	Quality Management	4 CR	Lanza
T-MACH-102083	Integrated Information Systems for Engineers	4 CR	Ovtcharova
Election block: Produktionssysteme (P) (at most 4 credits)			
T-MACH-108878	Laboratory Production Metrology	4 CR	Häfner

Competence Certificate
Oral exams: duration approx. 5 min per credit point

Written exams: duration approx. 20 - 25 min per credit point

Amount, type and scope of the success control can vary according to the individually choice.

Competence Goal
The students...

- are able to choose methods of production science target-oriented in familiar situations and are able to justify their selection.
- are able to describe and compare production processes exemplarily.
- are able to transfer known solutions to given problems in the field of production science under consideration of scientific theories, principles and methods.
- are able to solve tasks in the field of production science team oriented and proceed responsible and adequate to the situation.
- are able to integrate results of others at the solution of given problems.
- have the ability to present their own results in written form and are able to interpret them.
- are able to identify, dissect and develop further systems and processes and apply given sets of criteria under consideration of technical, economic and social conditions.

Prerequisites
None

Content
Within this module the students will get to know and learn about production science. Manifold lectures and excursions as part of several lectures provide specific insights into the field of production science.

Workload
The work load is about 360 hours, corresponding to 12 credit points.

Learning type
Lectures, seminars, workshops, excursions

M 7.23 Module: Major Field: Rail System Technology (SP 50) [M-MACH-102638]

Responsible: Prof. Dr.-Ing. Peter Gratzfeld
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Language	Level	Version
12	Once	German	3	1

Mandatory			
T-MACH-106424	Rail System Technology	4 CR	Gratzfeld
T-MACH-105353	Rail Vehicle Technology	4 CR	Gratzfeld
Election block: Bahnsystemtechnik (E) ()			
T-MACH-105540	Railways in the Transportation Market	4 CR	Gratzfeld
T-MACH-102121	Electric Rail Vehicles	4 CR	Gratzfeld
T-MACH-105237	Vehicle Lightweight Design - Strategies, Concepts, Materials	4 CR	Henning
T-MACH-105218	Automotive Vision	6 CR	Lauer, Stiller
T-MACH-105535	Composite Manufacturing - Polymers, Fibers, Semi-Finished Products, Manufacturing Technologies	4 CR	Henning
T-MACH-104599	Project Management in Rail Industry	4 CR	Gratzfeld
T-MACH-105350	Computational Vehicle Dynamics	4 CR	Proppe
T-MACH-108692	Seminar for Rail System Technology	3 CR	Gratzfeld

Competence Certificate
Oral exams: duration approx. 5 minutes per credit point.

However, amount, type and scope of the success control can vary according the individual choice.

Competence Goal

- The students understand relations and interdependencies between rail vehicles, infrastructure and operation in a rail system.
- Based on operating requirements and legal framework they derive the requirements concerning a capable infrastructure and suitable concepts of rail vehicles.
- They recognize the impact of alignment, understand the important function of the wheel-rail-contact and estimate the impact of driving dynamics on the operating program.
- They evaluate the impact of operating concepts on safety and capacity of a rail system.
- They know the infrastructure to provide power supply to rail vehicles with different drive systems.

- The students learn the role of rail vehicles and understand their classification. They understand the basic structure und know the functions of the main systems. They understand the overall tasks of vehicle system technology.
- They learn functions and requirements of car bodies and jugde advantages and disadvantages of design principles. They know the functions of the car body's interfaces.
- They know about the basics of running dynamics and bogies.
- The students learn about advantages and disadvantages of different types of traction drives and judge, which one fits best for each application.
- They understand brakes from a vehicular and an operational point of view. They assess the fitness of different brake systems.
- They know the basic setup of train control management system and understand the most important functions.
- They specify and define suitable vehicle concepts based on requirements for modern rail vehicles.

- Supplementary lectures present further major aspects of a rail system.

Prerequisites
None

Content

1. Railway System: railway as system, subsystems and interdependencies, definitions, laws, rules, railway and environment, economic impact
2. Operation: Transportation, public transport, regional transport, long-distance transport, freight service, scheduling
3. Infrastructure: rail facilities, track alignment, railway stations, clearance diagram
4. Wheel-rail-contact: carrying of vehicle mass, adhesion, wheel guidance, current return
5. Vehicle dynamics: tractive and brake effort, driving resistance, inertial force, load cycles
6. Signaling and Control: operating procedure, succession of trains, European Train Control System, blocking period, automatic train control
7. Traction power supply: power supply of rail vehicles, power networks, filling stations
8. Vehicle system technology: structure and main systems of rail vehicles
9. Car body: functions, requirements, design principles, crash elements, interfaces
10. Bogies: forces, running gears, axle configuration
11. Drives: vehicle with/without contact wire, dual-mode vehicle
12. Brakes: tasks, basics, principles, blending, brake control
13. Train control management system: definitions, networks, bus systems, components, examples
14. Vehicle concepts: trams, metros, regional trains, intercity trains, high speed trains, double deck coaches, locomotives, freight wagons
15. History (optional)
16. Further contents in supplementary lectures

Annotation

A bibliography is available for download (Ilias-platform).

Workload

- Total effort at 12 ECTS (B.Sc.): about 360 hours
- Regular attendance: 63 hours
- Self-study: 63 hours
- Exam and preparation: 234 hours

Learning type

Lectures in the core part.

Lectures and seminars are offered in the supplementary part.

7.24 Module: Major Field: Technical Logistics (SP 44) [M-MACH-102821]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Language	Level	Version
12	Once	German	3	1

Mandatory			
T-MACH-102163	Basics of Technical Logistics	6 CR	Mittwollen, Oellerich
Election block: Technische Logistik (K) (at least 2 credits)			
T-MACH-102160	Selected Applications of Technical Logistics	4 CR	Milushev, Mittwollen
T-MACH-102159	Elements and Systems of Technical Logistics	4 CR	Fischer, Mittwollen
T-MACH-108946	Elements and Systems of Technical Logistics - Project	2 CR	Fischer, Mittwollen
T-MACH-108945	Selected Applications of Technical Logistics - Project	2 CR	Milushev, Mittwollen
Election block: Technische Logistik (E) (at most 1 item)			
T-MACH-108844	Automated Manufacturing Systems	8 CR	Fleischer
T-MACH-105151	Energy Efficient Intralogistic Systems	4 CR	Braun, Schönung
T-MACH-105378	Cognitive Automobiles - Laboratory	6 CR	Kitt, Lauer, Stiller
T-MACH-105174	Warehousing and Distribution Systems	3 CR	Furmans
T-MACH-102151	Material Flow in Logistic Systems	9 CR	Furmans
T-WIWI-103091	Production and Logistics Controlling	3 CR	Rausch
T-MACH-102107	Quality Management	4 CR	Lanza
T-MACH-105171	Safety Engineering	4 CR	Kany
T-MACH-105367	Behaviour Generation for Vehicles	4 CR	Stiller, Werling

Competence Certificate
Oral exams: duration approx. 5 min. per credit point.

However, amount, type and scope of the success control can vary according to the individually choice.

Competence Goal
Students are able to:

- Describe main functional elements of of technical logistics,
- Determine the main parameters necessary for functionality,
- Combines those functional elements to solve material handling tasks appropriate, and
- Evalute resulting material handling installations.

Prerequisites
None

Content
The emphasis module *Technical Logistics* provides in-depth basics on the main topics of technical logistics. The module focuses on technical characteristics of material handling technology. To gain a deeper understanding, the course is accompanied by exercises.

Annotation
If LV 2117095 (basics of technical logistics) has been already examined sucessfully outside this emphasis module, another lecture from core-section can be chosen.

Workload
The work load is about 360 hours, corresponding to 12 credit points.

Learning type
Lectures and practices; self-study

M 7.25 Module: Major Field: Vehicle Technology (SP 12) [M-MACH-102818]

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Recurrence	Language	Level	Version
12	Once	German/English	3	3

Election block: Kraftfahrzeugtechnik (K) (at least 8 credits)			
T-MACH-100092	Automotive Engineering I	8 CR	Gauterin, Unrau
Election block: Kraftfahrzeugtechnik (E) ()			
T-MACH-105655	Alternative Powertrain for Automobiles	4 CR	Noreikat
T-MACH-105233	Powertrain Systems Technology A: Automotive Systems	4 CR	Albers, Matthiesen, Ott
T-MACH-105536	Dimensioning and Optimization of Power Train System	4 CR	Albers, Faust, Kirchner, Matthiesen
T-MACH-105226	Dynamics of the Automotive Drive Train	5 CR	Fidlin
T-MACH-105152	Handling Characteristics of Motor Vehicles I	4 CR	Unrau
T-MACH-105153	Handling Characteristics of Motor Vehicles II	4 CR	Unrau
T-MACH-108374	Vehicle Ergonomics	4 CR	Heine
T-MACH-105154	Vehicle Comfort and Acoustics I	4 CR	Gauterin
T-MACH-105155	Vehicle Comfort and Acoustics II	4 CR	Gauterin
T-MACH-105237	Vehicle Lightweight Design - Strategies, Concepts, Materials	4 CR	Henning
T-MACH-105156	Vehicle Mechatronics I	4 CR	Ammon
T-MACH-102207	Tires and Wheel Development for Passenger Cars	4 CR	Leister
T-MACH-105218	Automotive Vision	6 CR	Lauer, Stiller
T-MACH-105535	Composite Manufacturing - Polymers, Fibers, Semi-Finished Products, Manufacturing Technologies	4 CR	Henning
T-MACH-102117	Automotive Engineering II	4 CR	Gauterin, Unrau
T-MACH-105044	Fundamentals of Catalytic Exhaust Gas Aftertreatment	4 CR	Deutschmann, Grunwaldt, Kubach, Lox
T-MACH-102116	Fundamentals for Design of Motor-Vehicle Bodies I	2 CR	Bardehle
T-MACH-102119	Fundamentals for Design of Motor-Vehicle Bodies II	2 CR	Bardehle
T-MACH-105160	Fundamentals in the Development of Commercial Vehicles I	2 CR	Zürn
T-MACH-105161	Fundamentals in the Development of Commercial Vehicles II	2 CR	Zürn
T-MACH-105162	Fundamentals of Automobile Development I	2 CR	Frech
T-MACH-105163	Fundamentals of Automobile Development II	2 CR	Frech
T-ETIT-100784	Hybrid and Electric Vehicles	4 CR	Becker
T-MACH-105375	Industrial Aerodynamics	4 CR	Breitling, Frohnapfel
T-MACH-105188	Integrative Strategies in Production and Development of High Performance Cars	4 CR	Schlichtenmayer
T-MACH-105221	Lightweight Engineering Design	4 CR	Albers, Burkardt
T-MACH-105164	Laser in Automotive Engineering	4 CR	Schneider
T-MACH-105442	Intellectual Property Rights and Strategies in Industrial Companies	4 CR	Albers, Matthiesen, Zacharias
T-MACH-102155	Product, Process and Resource Integration in the Automotive Industry	4 CR	Mbang

T-MACH-102156	Project Workshop: Automotive Engineering	6 CR	Frey, Gauterin, Gießler
T-MACH-105441	Development of Oil-Hydraulic Powertrain Systems	4 CR	Ays, Geerling
T-MACH-105347	Project Management in Global Product Engineering Structures	4 CR	Albers, Gutzmer, Matthiesen
T-MACH-105350	Computational Vehicle Dynamics	4 CR	Proppe
T-MACH-105696	Strategic product development - identification of potentials of innovative products	3 CR	Albers, Matthiesen, Siebe
T-MACH-105358	Sustainable Product Engineering	4 CR	Albers, Matthiesen, Ziegahn
T-MACH-102194	Combustion Engines I	4 CR	Koch, Kubach
T-MACH-105367	Behaviour Generation for Vehicles	4 CR	Stiller, Werling
T-MACH-102148	Gear Cutting Technology	4 CR	Klaiber
T-MACH-108844	Automated Manufacturing Systems	8 CR	Fleischer
T-MACH-110318	Product- and Production-Concepts for modern Automobiles	4 CR	Kienzle, Steegmüller
T-MACH-110396	Strategic product development - identification of potentials of innovative products - Case Study	1 CR	Albers, Matthiesen, Siebe

Competence Certificate
Valid for all degree programmes, for which no value is indicated in the following.

The assessment is carried out as partial exams of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. Amount, type and scope of the success controll can vary according to the individually choice. Oral exams: duration approx. 5 min. per credit point. Within the scope of lab courses maximum 4 credits may be aquired.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student

- knows the most important components of a vehicle,
- knows and understands the functioning and the interaction of the individual components,
- knows the basics of dimensioning the components,
- knows and understands the procedures in automobile development,
- knows and understands the technical specifications at the development procedures,
- is aware of notable boundaries like legislation,
- is ready to analyze and judge vehicle concepts and to participate competently in the development of vehicles.

Prerequisites
None

Content
In the module Automotive Technology the basics are taught, which are important for the development, the design, the production and the operation of vehicles. Particularly the primary important aggregates like engine, gear, drive train, chasis and auxiliary equipment are explained, but also all technical equipment, which make the operation safer and easier. Additionally the interior equipment is examined, which shall provide a preferably comfortable, optimum ambience to the user.

In the module Automotive Technology the focus is on passenger cars and commercial vehicles, which are designed for road applications.

Workload
The work load is about 360 hours, corresponding to 12 credit points.

Learning type
The teaching and learning procedures (lecture, lab course, workshop) are described for each course of the module separately.

7.26 Module: Major Field: Vibration Theory [M-MACH-104442]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering

Part of: Specialization in Mechanical Engineering (Schwerpunkt)

Credits	Language	Level	Version
12	German	3	1

Election block: Schwingungslehre (K) (at least 8 credits)			
T-MACH-105290	Vibration Theory	5 CR	Fidlin, Seemann
T-MACH-105210	Machine Dynamics	5 CR	Proppe
T-MACH-105294	Mathematical Methods of Vibration Theory	6 CR	Seemann
T-MACH-105372	Theory of Stability	6 CR	Fidlin
T-MACH-105439	Introduction to Nonlinear Vibrations	7 CR	Fidlin
Election block: Schwingungslehre (E) (at most 1 item)			
T-MACH-105224	Machine Dynamics II	4 CR	Proppe
T-MACH-105443	Wave Propagation	4 CR	Seemann
T-MACH-105226	Dynamics of the Automotive Drive Train	5 CR	Fidlin
T-MACH-105514	Experimental Dynamics	5 CR	Fidlin
T-MACH-105154	Vehicle Comfort and Acoustics I	4 CR	Gauterin
T-MACH-105155	Vehicle Comfort and Acoustics II	4 CR	Gauterin
T-MACH-105349	Computational Dynamics	4 CR	Proppe
Election block: Schwingungslehre (P) (at most 4 credits)			
T-MACH-105373	Practical Training in Measurement of Vibrations	4 CR	Fidlin

Competence Certificate
oral examination

Prerequisites
None

Content
The students know different methods which may be applied for the analysis of investigation of vibration problems. They are able to treat one or multiple degree of freedom systems as well as vibrating continua. The goal is to establish a chain from physical modeling via mathematical solution to an interpretation of the results. Based on the courses which are chosen the knowledge has emphasis on theoretical investigations, approximation methods or experimental methods and applications in automotive engineering.

M 7.27 Module: Manufacturing Processes [M-MACH-102549]

Responsible: Prof. Dr.-Ing. Volker Schulze
Dr.-Ing. Frederik Zanger

Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Engineering

Credits	Language	Level	Version
4	German	3	1

Mandatory			
T-MACH-105219	Basics of Manufacturing Technology	4 CR	Schulze, Zanger

Competence Certificate
written exam (duration: 60 min)

Competence Goal
The students ...

- are able to classify the manufacturing processes by their general functionality according to the specific main groups (DIN 8580).
- have the ability to declare and explain the function of the significant manufacturing processes of the main groups (DIN 8580).
- are enabled to describe the characteristic process features (geometry, materials, accuracy, tools, machines) of the significant manufacturing processes of the main groups (DIN 8580).
- have the ability to derive the relevant process specific technical advantages and disadvantages of the characteristic process features.
- are enabled to perform a selection of suitable manufacturing processes for given components.
- are enabled to classify the required manufacturing processes in the expiry of a process chain for the production of given sample products.

Prerequisites
none

Content
The objective of the lecture is to classify the manufacturing technology within the wider context of production engineering, to provide an overview of the different manufacturing processes and to establish basic process knowledge of the common processes. The lecture conveys the basic principles of manufacturing technology and deals with the manufacturing processes based on example components according to their classification into main groups regarding technical and economic aspects.

The following topics will be covered:

- Primary processing (casting, plastics engineering, sintering, additive manufacturing processes)
- Forming (sheet-metal forming, massive forming)
- Cutting (machining with geometrically defined and geometrically undefined cutting edges, separating, abrading)
- Joining
- Coating
- Heat treatment and surface treatment

Workload
regular attendance: 21 hoursself-study: 99 hours

Learning type
Lecture

M 7.28 Module: Materials Science (BSc-Modul 04, WK) [M-MACH-102562]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Engineering

Credits	Duration	Language	Level	Version
14	2 term	German/English	3	2

Mandatory			
T-MACH-105145	Materials Science I & II	11 CR	Gibmeier, Heilmaier, Weidenmann
T-MACH-105146	Materials Science Lab Course	3 CR	Heilmaier, Möslang, Weidenmann

Competence Certificate
not graded: participation in 10 lab experiments, introductory colloquia must be passed and 1 short presentation must be presented. The lab course must be finished successfully prior to the registration for the oral exam;

graded: oral exam covering the whole module, about 25 minutes.

Competence Goal
Within this Module the students should

- gain knowledge of basics about structural and functional materials
- be able to draw relationships between atomic structure, microstructure and properties
- be able to apply appropriate methods to determine mechanical and other relevant properties as well as to characterize the microstructure of materials
- be able to assess material properties and corresponding applications

Prerequisites
none

Content
WK I

Structure of atoms and atomic bonding

Crystalline solids

Defects in crystalline solids

Amorphous and partially crystalline solids

Constitution of alloys and materials

Diffusion and phase transformation in the solid state

Microscopic characterization method

Characterization with X-Rays and neutrons

Non-destructive Testing

Mechanical Testing

WK II

Iron based alloys

Non-iron based alloys

Ceramics

Glases

Polymers

Composite Materials

Annotation

For the Bachelor’s program Mechanical Engineering the module (including all brick details, exams and courses) is offered in German.

For the Bachelor’s program Mechanical Engineering (International) the module (including all brick details, exams and courses) is offered in English.

Workload

The work load of the module is about 420 hours.

The workload for the lab course Materials Science is 90 h in total and consists of the presence during the 10 experiments (one week half-time, 4 hours per day) as well as preparation and rework time at home.

The workload for the lecture Materials Science I & II is 165 h per semester and consists of the presence during the lectures (WS: 4 SWS, SS: 2SWS) and the exercises (1 SWS per WS and 1 SWS per SS) as well as preparation and rework time at home.

Learning type

The module "Materials Science" consists of the lectures "Materials Science I and II" with additional tutorials for small groups and a one week materials science laboratory course.

M 7.29 Module: Measurement and Control Systems (BSc-Modul 11, MRT) [M-MACH-102564]

Responsible: Prof. Dr.-Ing. Christoph Stiller
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Engineering

Credits	Duration	Language	Level	Version
7	1 term	German/English	3	2

Mandatory			
T-MACH-104745	Basics in Measurement and Control Systems	7 CR	Stiller

Competence Certificate
Type of Examination: written exam

Duration of Examination: 150 minutes

Competence Goal

- Students are able to name, describe and explain control principles applied to physical quantities.
- They are able to name, analyze and assess system theoretic characteristics of dynamical systems.
- Students are able to represent real systems in a system theoretic model and to assess the suitability of a given model.
- Students are able to apply methods for controller design and to analyze their properties.
- Students are able to select appropriate principles of metrology and to model, analyze and assess measurement setups.
- Students are able to quantify and assess measurement uncertainties.

Module grade calculation
result of exam

Prerequisites
none

Content
1. Dynamic systems
2. Properties of important systems and modeling
3. Transfer characteristics and stability
4. Controller design
5. Fundamentals of measurement
6. Estimation
7. Sensors
8. Introduction to digital measurement

Annotation
For the Bachelor's program Mechanical Engineering the module (including all brick details, exams and courses) is offered in German.

For the Bachelor's program Mechanical Engineering (International) the module (including all brick details, exams and courses) is offered in English.

Workload
84 hours presence time, 126 hours selfstudies

Learning type
Lecture

Tutorials

M 7.30 Module: Mechanical Design (BSc-Modul 06, MKL) [M-MACH-102573]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Engineering

Credits	Language	Level	Version
20	German/English	3	2

Mandatory			
T-MACH-105286	Mechanical Design I & II	5 CR	Albers, Burkardt, Matthiesen
T-MACH-104810	Mechanical Design III & IV	13 CR	Albers, Burkardt, Matthiesen
T-MACH-105282	Mechanical Design I, prerequisites	1 CR	Albers, Matthiesen
T-MACH-105283	Mechanical Design II, prerequisites	1 CR	Albers, Matthiesen
T-MACH-105284	Mechanical Design III, Constructing the Team	0 CR	Albers, Matthiesen
T-MACH-105285	Mechanical Design IV, Constructing the Team	0 CR	Albers, Matthiesen

Competence Certificate

Mechanical Design I & II:

Preliminary examination: Successful participation in workshops in the field of mechanical Design I, as well as successful processing of output power in mechanical design II

Written examination in the field of mechanical engineering I and II: duration 60 min plus reading time

Mechanical Design III & IV:

Preliminary examination: Successful participation in workshops in the field of mechanical Design III & IV

- Examination in the field of mechanical Design III & IV consisting of
  written part with duration 60 min plus reading time and
- constructive part with duration 180 min plus reading ime

Competence Goal

Learning object springs:

- be able to recognize spring types and explain stress
- Identify and describe the properties of a resilient LSS in machine elements presented later on
- Understanding and explaining the principle of action
- Know and list areas of application for springs
- graphically illustrate the load and the resulting stresses
- be able to describe the degree of species usefulness as a means of lightweight construction
- be able to analyse different solution variants with regard to lightweight construction (use species efficiency)
- Being able to explain several springs as a circuit and calculate total spring stiffness

Learning objects Technical Systems:

- Being able to explain what a technical system is
- "Thinking in systems."
- Using system technology as an abstraction tool for handling complexity
- Recognizing functional relationships of technical systems
- Getting to know the concept of function
- be able to use C&C²-A as a means of system technology

Learning objects Visualization:

- Ability to create and interpret schematics
- Using freehand technical drawing as a means of communication
- To be able to apply the technical basics of freehand drawing
- Derivation of 2D representations into different perspective representations of technical structures and vice versa
- Master reading of technical drawings
- Dedicated dimensioning of technical drawings
- Create sectional views of technical systems as a technical sketch

Learning objects Bearings:

- be able to recognize bearings in machine systems and explain their basic functions
- name bearings (type/type/function) and recognize them in machine systems and technical drawings
- Being able to name areas of application and selection criteria for the various bearings and bearing arrangements and explain interrelationships
- Ability to functionally explain the design of the bearing definitions in different directions radially/axially and circumferentially
- Know and describe selection as an iterative process as an example
- be able to perform dimensioning of bearing arrangements as an example of the engineer's approach to dimensioning machine elements
- Develop first ideas for probabilities in predicting the life of machine elements
- Recognise from the damage pattern whether static or dynamic overload was the cause of material failure
- Calculate equivalent static and dynamic bearing loads from the catalogue and given external forces on the bearing
- Being able to name, explain and transfer the basic equation of the dimensioning to the bearing dimensioning

Learning objectives seals:

The students...

- can discuss the basic functions of seals
- can describe the physical causes for mass transfer
- can apply the C&C-Model on seals
- can name, describe and apply the three most important classification criteria of seals
- can explain the function of a contacting seal and a non-contacting seal.
- can differentiate the seal types and organize them to the classification criteria.
- can discuss the structure and the effect of a radial shaft seal
- can evaluate radial shaft seals, compression packings, mechanical seals, gap seals and labyrinth seals
- can describe and apply the constructional principle of selffortification
- can describe the stick-slip phenomenon during the movement sequences of a reciprocating seal

Learning design:

The students...

- understand the meaning of design
- are able to recognize and implement basic rules and principles of design
- are able to design the connection of partial systems into the total system
- can name requirements of design and take them into account
- know the main groups of manufacturing methods

- are able to explain the manufacturing processes
- are able to depict a casted design in a drawing clearly, e.g. draft of the mold, no material accumulation, ...
- know how components are designed
- Know how the production of the components has an effect on
- their design
- Know the requirements and boundary conditions on design

Learning bolted connections:

The students...

- can list and explain various bolt applications.
- can recognize bolt types and explain their function
- can build a C&C² model of a bolted joint and discuss the influences on its function
- can explain the function of a bolted connection with the help of a spring model
- can reproduce, apply and discuss the screw equation.
- Can estimate the load-bearing capacity of low-loaded bolted joints for dimensioning purposes
- Can indicate which bolted joint is to be calculated and which only roughly dimensioned.
- Can carry out the dimensioning of bolted connections as flange connections
- Can create, explain and discuss the force deflection diagram of a bolted connection

Learning objectives tolerances and fits:

The students...

- know the importance of the microstructure of working surfaces on technical surfaces on the function. They are familiar with a system for describing the surface microstructure in technology and parameters for describing the surface fine structure of working surfaces both in their definition and in their statement and in the quantitative order of magnitude.
- know and can explain surface measurement principles.
- know the relationship between the surface structure and the manufacturing processes and the costs.
- know the purpose of standards, standard types and preferred numbers.
- know and can define tolerances as a description of the geometry of working surfaces. They know the ISO fitting systems in type and structure and can apply it.
- can explain the different types of toleration and their significance for the economic product development process.

Learning objectives component connections:

The students...

- can generally explain basic functions of shaft-hub-connections.
- know and can explain a selection of different component connections to the respective working principles.
- can explain the component connection "centering" in its function and draw it in a technical drawing.
- understand form-closing and force-closing shaft-hub connections and can explain them. They can dimension a cylindrical interference fit (calculation and dimensioning criteria) and understand the stresses on a cylindrical interference fit and can display them graphically.

Learning objectives gears:

The students...

- Understand the function of gearboxes in the context of drive systems.
- are familiar with different operating principles of gearboxes and different types of gearboxes.
- know and understand the law of gearing. They know names on the gear and different flank curves.
- Understand engagement of gears, application limits and damage to gears. They know the basic ideas of gear dimensioning.
- know and understand planetary gearboxes. They understand the operating principle of hydraulic transmissions.

Learning objects dimensioning

Students can...

- Explain the target values of the economic dimensioning
- explain what are the main results of a dimensioning process
- explain the scope of the dimensioning (economic and legal significance)
- Explain the basic sizing procedure and record it as a generic flowchart
- Explain uncertainties in dimensioning
- specify the different basic procedures, both for dimensioning and for determining the influencing variables, e.g. loads, as well as their advantages or disadvantages in relation to each other
- explain different types of calculation methods and their characteristics (static/dynamic, local vs. nominal voltages)
- Name different types of failure (implies the definition of failure)
- Explain possible causes of failure
- provide suitable replacement models for simple subsystems of technical systems as a basis for dimensioning

- Explain different basic load types for given examples Dominant load types relevant to design
- Use the basics of elastostatics for all basic load cases to design components that can be modeled as linear structures according to the nominal stress concept.
- describe the dimensioning parameters presented in the VL and their use (shape number, shape yield strength, shape yield strength ratio)
- explain the purpose of strength hypotheses
- explain the strength hypotheses for metallic materials presented in the VL and select them according to the specific situation
- explain the principal effects of notches, including the factors affecting the magnitude of these effects
- describe how notches can be taken into account in the dimensioning process
- notched components that can be modeled as linear load-bearing structures for static loads
- Explain possibilities for determining the strength of a material or component
- Name influencing variables on the loadability and derive measures from them in order to influence the loadability of a component if necessary.
- describe different types of material behaviour under overelastic stressing of metallic materials
- Describe dynamic loads
- from Wöhler, Haigh- or Smith diagrams determine material characteristics for the loadability under given load conditions
- construct the Smith chart approximately with the given characteristic values
- explain the difference between strength and fatigue strength
- Components that can be modeled as linear structures according to the nominal stress concept for dynamic loads in base load cases and combined loads in the same phase
- for components that can be modeled as linear structures, explain the design approach presented in the lecture for any combined, dynamic loads
- Perform strength analyses in accordance with DIN 743, in the course of which even failure-critical points in the component can be identified and, if the result is negative, appropriate measures can be derived and evaluated.
- Name factors influencing the safety factors to be selected and explain what type of influence this is

Learning objectives shaft couplings:

Students can...

- Name the reasons for using shaft couplings (in short: "Couplings")
- name exemplary applications of couplings
- List basic functions of clutches and delimit clutches to transmissions
- indicate the basic power balance of a coupling
- mention various ancillary functions that occur with clutches
- name various criteria for classifying couplings
- describe the embodiment-function relationship for a given coupling for both main and secondary functions
- If necessary, derive the main and auxiliary functions required for the application, select a suitable coupling (and if necessary also a specific size) or combine several couplings if necessary.
- Explain interactions of couplings with adjacent subsystems, possibly specific to certain designs or groups of couplings
- Specify selection criteria for couplings
- explain central design principles for different groups of couplings, including the designation of key design targets
- for frictionally engageable clutches, slip time, transferable torque and thermal resistance should be designed roughly under the assumptions and simplifications dealt with in the lecture, estimate the relevant loads by the surrounding technical system and, if necessary, influence the specified target values by design measures.
- Apply relevant standards for the design of couplings
- Name possible failure modes for given couplings
- specify which design measures on a coupling can be used to influence the dynamic behaviour of the surrounding system in a desired direction
- explain the various possible actuation types for switchable clutches and give examples of corresponding clutch designs

Learning Objectives Fundamentals of Fluid Technology:

Students can...

- differentiate between different areas of fluid technology on the basis of essential aspects of the operating principles
- Identify properties/ special features of fluid technology systems and the resulting areas of application
- explain basic approaches for the design of hydraulic systems
- differentiate the flow types shown in the lecture
- with the basic equations (continuity equation, Bernoulli,...) of hydrostatics and hydrodynamics explained in the lecture.
- Identify sources of pressure losses in hydraulic systems and influencing factors
- designate basic subsystems of a hydraulic system
- Assign system and component examples shown in the lecture to components of a hydraulic system
- name the symbols shown in the lecture and assign them to the respective system/component
- use symbols to explain the function of simple hydraulic systems

- Draw up function diagrams for hydraulic systems that are similar in complexity to the systems shown in the lecture.

Prerequisites
None

Content
MKL I:

Introduction to mechanical design

Tools for visualization (technical drawing)

Product Development as a problem solution

Technical Systems Product Development

- Systems theroy
- Contact and Channel Approach C&C²-A

Basics of selected construction and machine elements

- springs
- Bearing and fence

The lecture is accompanied by exercises with the following content:

gear workshop

Exercises for visualization tools (technical drawing)

Exercise on Technical Systems Product Creation

- Systems theroy
- Contact and Channel Approach C&C²-A

Exercise on the spring module

Exercise on the bearing and fence Module

MKL II:

- Basics bearings
- Sealings
- Design
- Tolerances and fits
- component connections
- The lecture is accompanied by exercises to deepen the contents of the lecture.

MKL III:

- component connections
- tolerances and fits
- gears
-

MKL IV:

Elementary component connections - Part 2

Basics of clutches

- Function and operating principles
- Characteristic features and classification
- Non-engaging shaft clutches
- Switchable shaft clutches
- Flexible clucthes

Basics of gearboxes

- Function and operating principles
- Basics of gear drives
- Characteristic features and classification
- selection criteria
- Basics of other transmissions
- Fundamentals of lubrication and lubricants

Basics of gearing

- Function and operating principles
- Types of thoothing
- Cycloid as flank curve
- Involute as flank curve
  Method of manufacturing gears
- Profil overlap

- Profil offset
- Limits of application and damage
- Dimensioning
- Thooth strength
- Pitting resistance

Basics of hydraulics

- Basic functions and operating principles
- Characteristic features and classification
- Types and properties
- Sample
- Application
- Design calculation

Annotation

For the Bachelor’s program Mechanical Engineering the module (including all brick details, exams and courses) is offered in German.

For the Bachelor’s program Mechanical Engineering (International) the module (including all brick details, exams and courses) is offered in English.

Workload

MKL1:

Attendance at lectures (15 VL): 22,5h

Presence exercises (8 exercises): 12h

Attendance (3x 2h) and preparation (3x3h) Workshop sessions: 15h

Preparation and execution of online test: 6h

Personal preparation and follow-up of lecture and exercise: 34,5hMKL1:

MKL2:

Attendance lectures (15 VL): 22,5h

Presence exercises (7 ÜB): 10,5h

Personal preparation and follow-up of lecture and exercise, incl. prerequisite and preparation for the exam:: 117h

MKL 3:

Attendance lectures (15 L): 22,5h

Presence exercises (4 exercises): 6h

Attendance milestones project work (3x 4h): 12h

Project work in a team: 80h

Personal preparation and follow-up of lecture and exercise: 29,5h

MKL 4:

Attendance lectures (13 L): 19,5h

Presence exercises (6 exercises): 9h

Attendance milestones project work (3x 4h): 12h

Project work in a team: 120h

Personal preparation and follow-up of lecture and exercise, incl. preparation for the exam: 82,5h

Learning type

Lecture

Tutorial

Project work during the semester

M 7.31 Module: Orientation Exam [M-MACH-104624]

Organisation: University
Part of: Orientation Exam

Credits	Language	Level	Version
0	German	3	1

Mandatory			
T-MATH-100275	Advanced Mathematics I	7 CR	Arens, Griesmaier, Hettlich
T-MACH-100282	Engineering Mechanics I	7 CR	Böhlke, Langhoff
T-MACH-100283	Engineering Mechanics II	6 CR	Böhlke, Langhoff

Modelled deadline
This module must be passed until the end of the **3. term**.

M 7.32 Module: Physics [M-PHYS-104030]

Responsible: Prof. Dr. Gernot Goll
Prof. Dr. Bernd Pilawa

Organisation: KIT Department of Physics

Part of: Fundamentals of Engineering

Credits	Language	Level	Version
5	German/English	3	1

Mandatory			
T-PHYS-108322	Wave and Quantum Physics	5 CR	Goll, Pilawa

Competence Certificate
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

Competence Goal
The students

- are familiar with the properties of waves and can discuss those
- can reflect on the principles of relativity
- comprehend the coherence of the particle and wave description of light and matter
- can explain the limits of wave physics
- are able the apply the Schrödinger-equation to basic problems in quantum mechanics
- can explain the basic properties of atoms, especially for the hydrogen atom
- can discuss fundamental aspects of the electronic properties of solids

Prerequisites
None

Content

- Properties of waves
- Acoustic and electromagnetic waves
- Interference and diffraction
- Relativity
- Wave-particle dualism
- Basic properties of atoms
- Basic electronic properties of solids

Annotation
For the Bachelor’s program Mechanical Engineering the module (including all brick details, exams and courses) is offered in German.

For the Bachelor’s program Mechanical Engineering (International) the module (including all brick details, exams and courses) is offered in English.

Workload
150 hours, consisting of attendance times (45), follow-up of the lecture including exam preparation and preparation of exercises (105)

Learning type
Lecture and Tutorial

7.33 Module: Production Operations Management [M-MACH-100297]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Engineering

Credits	Language	Level	Version
5	German/English	3	2

Mandatory			
T-MACH-100304	Production Operations Management	3 CR	Furmans, Lanza, Schultmann
T-MACH-108734	Production Operations Management-Project	2 CR	Furmans, Lanza

Competence Certificate
The success control takes place in the form of partial examinations in the individual courses of the module. These are a written exam (duration: 90 minutes) and a different type of examination. The module grade is made up of the grades of the courses in the module weighted by credit points.

Competence Goal
If you successfully passed this course you will be able to:

- state the relevant technical terms of business administration, logistics and production engineering
- describe the interrelation between these technical terms
- describe the most important decision problems qualitatively and quantitatively
- apply the appropriate decision models to solve the respective decision problems
- critically evaluate the results and draw appropriate conclusions
- extend the learned methods and models by researching on you own

Prerequisites
none

Content
The institutes alternate with each cycle. Basic skills about the planning and operation of a production plant are taught. The lecture covers the basics of operations and supply chain management as well as business management basics in accounting, investment calculation and legal forms.

Annotation
It is a joint module of the Institute of Materials Handling and Logistics (IFL) and the Institute of Production Science (WBK).

For the Bachelor's program Mechanical Engineering the module (including all brick details, exams and courses) is offered in German.

For the Bachelor's program Mechanical Engineering (International) the module (including all brick details, exams and courses) is offered in English.

Workload
Attendance time: 42 hours,

Self-study: 108 hours

Learning type

1. Lectures (Obligatory)
2. Tutorials (Obligatory)
3. Group work (Obligatory)
4. Oral defense of the group work (Obligatory)

7.34 Module: Technical Thermodynamics (BSc-Modul 05, TTD) [M-MACH-102574]

Responsible: Prof. Dr. Ulrich Maas
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Engineering

Credits	Duration	Language	Level	Version
15	2 term	German/English	3	1

Mandatory			
T-MACH-104747	Technical Thermodynamics and Heat Transfer I	8 CR	Maas
T-MACH-105287	Technical Thermodynamics and Heat Transfer II	7 CR	Maas
T-MACH-105204	Excercises in Technical Thermodynamics and Heat Transfer I	0 CR	Maas
T-MACH-105288	Excercises in Technical Thermodynamics and Heat Transfer II	0 CR	Maas

Competence Certificate
Prerequisite: attestation each semester by homework assignments

Thermodynamics I: Written exam, graded, 3 hours

Thermodynamics II: Written exam, graded, 3 hours

Competence Goal
The students acquire the competency to master the fundamentals of thermodynamics and the ability to apply the knowledge an problem-solving in various branches of mechanical engineering and especially in the Energy Technology sector.

An integral part of the model is that students can define the fundamental laws of thermodynamics and their application. The students are competent in describing and comparing the main processes in energy conversion. Using tools also applied in Industry they are capable of analysing and rating the efficiency of processes. The students are capable of discussing the thermodynamical correlation of ideal gas mixtures, real gases and of humid air as well analysing them with the help of the laws of thermodynamic. Furthermore the students are capable of defining and applying the heattransfer mechanisms.

Module grade calculation
weight according to CP

Prerequisites
None

Content
Thermodynamics I:

- System, properties of state
- Chemical and thermodynamic properties of pure components
- Absolute temperature, model systems
- 1st law of thermodynamics for resting and moved systems Entropy and 2nd law of thermodynamics
- Behavior of real substances described by tables, diagrams and equations of state
- Machine processes

Thermodynamics II:

- Repetition of the topics of “Thermodynamics and Heat Transfer I”
- Mixtures of ideal gases
- Moist air
- Behaviour of real substances described by equations of state
- Applications of the laws of thermodynamics to chemical reactions

Annotation
For the Bachelor's program Mechanical Engineering the module (including all brick details, exams and courses) is offered in German.

For the Bachelor's program Mechanical Engineering (International) the module (including all brick details, exams and courses) is offered in English.

Workload
lectures and exercises: 150h

homework and preparation of examination: 300h

Learning type
Lecture
Exercise course
Tutorial

8 Courses

T 8.1 Course: Advanced Mathematics I [T-MATH-100275]

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

Organisation: KIT Department of Mathematics

Part of: M-MACH-104624 - Orientation Exam
M-MATH-102859 - Advanced Mathematics

Type	Credits	Recurrence	Version
Written examination	7	Each term	2

Events					
WS 19/20	0131000	Höhere Mathematik I für die Fachrichtung Maschinenbau, Geodäsie, Materialwissenschaft und Werkstofftechnik	4 SWS	Lecture (V)	Arens
WS 19/20	0131200	Höhere Mathematik I für die Fachrichtungen Chemieingenieurwesen, Verfahrenstechnik, Bioingenieurwesen und MIT	4 SWS	Lecture (V)	Arens

Competence Certificate
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 Conditions
The following conditions have to be fulfilled:

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

T 8.2 Course: Advanced Mathematics II [T-MATH-100276]

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

Organisation: KIT Department of Mathematics

Part of: M-MATH-102859 - Advanced Mathematics

Type	Credits	Recurrence	Version
Written examination	7	Each term	2

Events					
SS 2019	0180800	Höhere Mathematik II für die Fachrichtungen Maschinenbau, Geodäsie, Materialwissenschaft und Werkstofftechnik	4 SWS	Lecture (V)	Hettlich
SS 2019	0181000	Höhere Mathematik II für die Fachrichtungen Chemieingenieurwesen, Verfahrenstechnik, Bioingenieurwesen und MIT	4 SWS	Lecture (V)	Hettlich

Competence Certificate
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 Conditions
The following conditions have to be fulfilled:

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

T 8.3 Course: Advanced Mathematics III [T-MATH-100277]

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

Organisation: KIT Department of Mathematics

Part of: M-MATH-102859 - Advanced Mathematics

Type	Credits	Recurrence	Version
Written examination	7	Each term	2

Events					
WS 19/20	0131400	Höhere Mathematik III für die Fachrichtungen Maschinenbau, Chemieingenieurwesen, Verfahrenstechnik, Bioingenieurwesen und das Lehramt Maschinenbau	4 SWS	Lecture (V)	Griesmaier

Competence Certificate
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 Conditions
The following conditions have to be fulfilled:

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

T 8.4 Course: Advanced Methods in Strength of Materials [T-MACH-110377]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Prof. Dr.-Ing. Bettina Frohnapfel

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102582 - Major Field: Continuum Mechanics
M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Expansion	Version
Written examination	4	Each winter term	1 terms	1

Events					
WS 19/20	2161252	Continuum mechanics of solids and fluids	2 SWS	Lecture (V)	Böhlke, Frohnapfel

Competence Certificate
Written examination (90 min). Additives as announced

prerequisites to the exam: passing the corresponding Tutorial Continuum Mechanics of Solids and Fluids (T-MACH-110333)

Prerequisites
passing the corresponding Tutorial Continuum Mechanics of Solids and Fluids (T-MACH-110333)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110333 - Tutorial Continuum Mechanics of solids and fluids must have been passed.

T 8.5 Course: Agile Product Innovation Management - Value-driven Planning of new Products [T-MACH-106744]

Responsible: Dr.-Ing. Roland Kläger
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	3

Events					
SS 2019	2122300	Agile product innovation management - value-driven planning of new products	SWS	Lecture (V)	Kläger

Competence Certificate
Oral examination, 20 min.

Prerequisites
None

T 8.6 Course: Alternative Powertrain for Automobiles [T-MACH-105655]

Responsible: Prof.Dipl.-Ing. Karl Ernst Noreikat
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102645 - Major Field: Combustion Engine Techniques
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	2133132	Alternative Powertrains for Automobiles	2 SWS	Lecture (V)	Noreikat

Competence Certificate
written exam

8.7 Course: Analysis of Exhaust Gas and Lubricating Oil in Combustion Engines [T-MACH-105173]

Responsible: Dr.-Ing. Marcus Gohl
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102645 - Major Field: Combustion Engine Techniques

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2134150	Analysis of Exhaust Gas und Lubricating Oil in Combustion Engines	2 SWS	Lecture (V)	Gohl

Competence Certificate
Letter of attendance or oral exam (25 minutes, no auxillary means)

Prerequisites
none

T 8.8 Course: Applied Tribology in Industrial Product Development [T-MACH-105215]

Responsible: Prof. Dr.-Ing. Albert Albers
Dr.-Ing. Benoit Lorentz
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102815 - Major Field: Engineering Design

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	2

Events					
WS 19/20	2145181	Applied Tribology in Industrial Product Development	2 SWS	Lecture (V)	Lorentz

Competence Certificate
oral exam (20 min)

Prerequisites
None

T 8.9 Course: Atomistic Simulations and Molecular Dynamics [T-MACH-105308]

Responsible: Dr. Christian Brandl
Prof. Dr. Peter Gumbsch
Dr.-Ing. Johannes Schneider

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering
M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2019	2181740	Atomistic simulations and molecular dynamics	2 SWS	Lecture (V)	Gumbsch
SS 2019	2181741	Lab for 'Atomistic simulations and molecular dynamics'	2 SWS	Practice (Ü)	Gumbsch

Competence Certificate
oral exam ca. 30 minutes

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics, physics and materials science

T 8.10 Course: Automated Manufacturing Systems [T-MACH-102162]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102589 - Major Field: Production Systems

Type	Credits	Recurrence	Version
Written examination	9	Each summer term	2

Events					
SS 2019	2150904	Automated Manufacturing Systems	6 SWS	Lecture / Practice (VÜ)	Fleischer

Competence Certificate
written exam (120 minutes)

Prerequisites
"T-MACH-108844 - Automatisierte Produktionsanlagen" must not be commenced.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-108844 - Automated Manufacturing Systems must not have been started.

T 8.11 Course: Automated Manufacturing Systems [T-MACH-108844]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-102820 - Major Field: Mechatronics
M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Oral examination	8	Each summer term	1

Events					
SS 2019	2150904	Automated Manufacturing Systems	6 SWS	Lecture / Practice (VÜ)	Fleischer

Competence Certificate
oral exam (40 minutes)

Prerequisites
"T-MACH-102162 - Automatisierte Produktionsanlagen" must not be commenced.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-102162 - Automated Manufacturing Systems must not have been started.

T 8.12 Course: Automated Production Systems (MEI) [T-MACH-106732]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102644 - Major Field: Production Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	3150012	Automated Production Systems (MEI)	2 SWS	Lecture (V)	Fleischer

Competence Certificate
oral exam (20 min)

Prerequisites
none

T 8.13 Course: Automation Systems [T-MACH-105217]

Responsible: Prof. Dr.-Ing. Michael Kaufmann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	2

Events					
SS 2019	2106005	Automation Systems	2 SWS	Lecture (V)	Kaufmann

Competence Certificate
Written exam (Duration: 1 h)

Prerequisites
none

T 8.14 Course: Automotive Engineering I [T-MACH-100092]

Responsible: Prof. Dr. Frank Gauterin
Dr.-Ing. Hans-Joachim Unrau

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Expansion	Language	Version
Written examination	8	Each winter term	1 terms		3

Events					
WS 19/20	2113805	Automotive Engineering I	4 SWS	Lecture (V)	Gauterin, Unrau
WS 19/20	2113809	Automotive Engineering I	4 SWS	Lecture (V)	Gauterin, Gießler

Competence Certificate
Written examination

Duration: 120 minutes

Auxiliary means: none

Prerequisites
The brick "T-MACH-102203 - Automotive Engineering I" is not started or finished. The bricks "T-MACH-100092 - Grundlagen der Fahrzeugtechnik I" and "T-MACH-102203 - Automotive Engineering I" can not be combined.

T 8.15 Course: Automotive Engineering II [T-MACH-102117]

Responsible: Prof. Dr. Frank Gauterin
Dr.-Ing. Hans-Joachim Unrau

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2019	2114835	Automotive Engineering II	2 SWS	Lecture (V)	Unrau
SS 2019	2114855	Automotive Engineering II	2 SWS	Lecture (V)	Gießler

Competence Certificate
Written Examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
none

T 8.16 Course: Automotive Logistics [T-MACH-105165]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102589 - Major Field: Production Systems

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2019	2118085	Automotive Logistics	2 SWS	Lecture (V)	Furmans

Competence Certificate
The assessment consists of a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

Prerequisites
none

T 8.17 Course: Automotive Vision [T-MACH-105218]

Responsible: Dr. Martin Lauer
Prof. Dr.-Ing. Christoph Stiller

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102638 - Major Field: Rail System Technology
M-MACH-102817 - Major Field: Information Technology
M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Written examination	6	Each summer term	1

Events					
SS 2019	2138340	Automotive Vision	3 SWS	Lecture (V)	Lauer

Competence Certificate
Type of Examination: written exam

Duration of Examination: 60 minutes

Prerequisites
none

T 8.18 Course: Bachelor Thesis [T-MACH-109188]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-104494 - Bachelor Thesis

Type	Credits	Recurrence	Version
Final Thesis	12	Each term	1

Competence Certificate
The bachelor thesis is designed to show that the student is able to deal with a problem of his/her subject area in an independent manner and within the given period of time using scientific methods.

The work load of the bachelor thesis corresponds to 12 ECTS. The maximal processing time of the bachelor thesis takes three months. The date of issue of the subject has to be fixed by the supervisor and the student and to be put on record at the examination board. The subject of the bachelor thesis may be only returned once and only within the first month of processing time.

On a reasoned request of the student, the examination board can extend the processing time by up to one month. If the bachelor thesis is not completed in time, this examination is "failed" (5,0), unless the student is not responsible.

The bachelor thesis is to be evaluated by not less than a professor or a senior scientist according to § 14 Abs. 3 Ziff. 1 KITG and another examiner. Generally, one of the two examiners is the person who has assigned the thesis. If the examiners do not agree, the bachelor thesis is graded by the examination board within this assessment; another expert can be appointed too. The bachelor thesis has to be graded within a period of six weeks after the submission.

Prerequisites
The requirement for admission to the bachelor thesis module are 120 ECTS. As to exceptions, the examination board decides on a request of the student (see § 14 (1) SPO).

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to earn at least 120 credits in the following fields:
    - Fundamentals of Engineering
    - Interdisciplinary Qualifications
    - Specialization in Mechanical Engineering

Annotation
The workload for the preparation of the bachelor thesis is about 360 hours.

T 8.19 Course: Basics in Measurement and Control Systems [T-MACH-104745]

Responsible: Prof. Dr.-Ing. Christoph Stiller
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102564 - Measurement and Control Systems

Type	Credits	Recurrence	Version
Written examination	7	Each winter term	3

Events					
WS 19/20	2137301	Measurement and Control Systems	3 SWS	Lecture (V)	Stiller
WS 19/20	2137302	Measurement and Control Systems (Tutorial)	1 SWS	Practice (Ü)	Stiller, Königshof, Kroeper
WS 19/20	3137020	Measurement and Control Systems	3 SWS	Lecture (V)	Stiller
WS 19/20	3137021	Measurement and Control Systems (Tutorial)	1 SWS	Practice (Ü)	Stiller, Königshof, Kroeper

Competence Certificate
written exam

2,5 hours

Prerequisites
none

8.20 Course: Basics of Manufacturing Technology [T-MACH-105219]

Responsible: Prof. Dr.-Ing. Volker Schulze
Dr.-Ing. Frederik Zanger

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102549 - Manufacturing Processes

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	2149658	Basics of Manufacturing Technology	2 SWS	Lecture / Practice (VÜ)	Schulze, Zanger

Competence Certificate
written exam (duration: 60 min)

Prerequisites
none

T 8.21 Course: Basics of Technical Logistics [T-MACH-102163]

Responsible: Dr.-Ing. Martin Mittwollen
Jan Oellerich

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module
M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Written examination	6	Each winter term	4

Events					
WS 19/20	2117095	Basics of Technical Logistics	6 SWS	Lecture / Practice (VÜ)	Mittwollen, Oellerich

Competence Certificate
The assessment consists of a written exam (60 min.).

Prerequisites
none

T 8.22 Course: Behaviour Generation for Vehicles [T-MACH-105367]

Responsible: Prof. Dr.-Ing. Christoph Stiller
Dr. Moritz Werling

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102817 - Major Field: Information Technology
M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-102820 - Major Field: Mechatronics
M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2019	2138336	Behaviour Generation for Vehicles	2 SWS	Lecture (V)	Werling, Stiller

Competence Certificate
written examination

60 min.

Simple calculators are allowed, programmable or graphical ones are prohibited.

Prerequisites
none

T 8.23 Course: Biomechanics: design in nature and inspired by nature [T-MACH-105651]

Responsible: Prof. Dr. Claus Mattheck
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Completed coursework	4	Each winter term	1

Events					
WS 19/20	2181708	Biomechanics: Design in Nature and Inspired by Nature	3 SWS		Mattheck

Competence Certificate
Colloquium, ungraded.

Prerequisites
The number of participants is limited. Prior registration through ILIAS is necessary, In case of too many registrations, a selection (in accordance with SPO) will take place.
Before the registration in SP 26 (ME) or SP 01 (MSMT) the participation at the seminar must be confirmed.

T 8.24 Course: BUS-Controls [T-MACH-102150]

Responsible: Simon Becker
Prof. Dr.-Ing. Marcus Geimer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102817 - Major Field: Information Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2019	2114092	BUS-Controls	2 SWS	Lecture (V)	Geimer, Daiß

Competence Certificate
The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
Required for the participation in the examination is the preparation of a report during the semester. The partial service with the code T-MACH-108889 must have been passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-108889 - BUS-Controls - Advance must have been passed.

Recommendation
Basic knowledge of electrical engineering is recommended. Programming skills are also helpful.

The number of participants is limited. A registration in mandatory, the details will be announced on the webpages of the *Institute of Vehicle System Technology / Institute of Mobile Machines*. In case of too many applications, attendance will be granted based on pre-qualification.

Annotation
The students will get an overview of the theoretic and practical functioning of different bus systems.

After the practical oriented lessons the students will be able to visualize the communication structure of different applications, design basic systems and evaluate the complexity of programming of the complete system.
Hereunto the students program in the practical orientated lessons IFM-controllers using the programming environment CoDeSys.

Content:

- Knowledge of the basics of data communication in networks
- Overview of the operating mode of current field buses
- Explicit observation of the operating mode and application areas of CAN buses
- Practical programming of an example application (hardware is provided)

Literature:

- Etschberger, K.: Controller Area Network, Grundlagen, Protokolle, Bausteine, Anwendungen; München, Wien: Carl Hanser Verlag, 2002.
- Engels, H.: CAN-Bus - CAN-Bus-Technik einfach, anschaulich und praxisnah dargestellt; Poing: Franzis Verlag, 2002.

T 8.25 Course: BUS-Controls - Advance [T-MACH-108889]

Responsible: Kevin Daiß
Prof. Dr.-Ing. Marcus Geimer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102817 - Major Field: Information Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Completed coursework	0	Each summer term	1

Competence Certificate
Creation of control program

Prerequisites
none

T 8.26 Course: CAD-NX Training Course [T-MACH-102187]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management

Type	Credits	Recurrence	Version
Completed coursework (practical)	2	Each term	2

Events					
SS 2019	2123357	CAD-NX training course	3 SWS	Practical course (P)	Ovtcharova, Mitarbeiter
WS 19/20	2123357	CAD-NX training course	2 SWS	Practical course (P)	Ovtcharova, Mitarbeiter

Competence Certificate
Practical examination on CAD computer, duration: 60 min.

Prerequisites
None

Recommendation
Dealing with technical drawings is required.

Annotation
For the practical course compulsory attendance exists.

T 8.27 Course: CAE-Workshop [T-MACH-105212]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management
M-MACH-102746 - Compulsory Elective Module
M-MACH-102815 - Major Field: Engineering Design
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Examination of another type	4	Each term	2

Events					
SS 2019	2147175	CAE-Workshop	3 SWS	Block (B)	Albers, Mitarbeiter
WS 19/20	2147175	CAE-Workshop	3 SWS	Block (B)	Albers, Mitarbeiter

Competence Certificate
Written test (with practical part on the computer), duration 60 min.

Prerequisites
None

Annotation
For a successful participation in the examination a continuous attendance at the workshop days is necessary. Limited number of participants. Selection is made according to a selection procedure.

T 8.28 Course: CATIA CAD Training Course [T-MACH-102185]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management

Type	Credits	Recurrence	Version
Completed coursework (practical)	2	Each term	2

Events					
SS 2019	2123358	CATIA CAD training course	3 SWS	Practical course (P)	Ovtcharova, Mitarbeiter
WS 19/20	2123358	CATIA CAD training course	2 SWS	Practical course (P)	Ovtcharova, Mitarbeiter

Competence Certificate
Practical examination on CAD computer, duration: 60 min.

Prerequisites
None

Recommendation
Dealing with technical drawings is required.

Annotation
For the practical course attendance is compulsory.

T 8.29 Course: Cognitive Automobiles - Laboratory [T-MACH-105378]

Responsible: Bernd Kitt
Dr. Martin Lauer
Prof. Dr.-Ing. Christoph Stiller

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Oral examination	6	Each summer term	1

Events					
SS 2019	2138341	Cogitive Automobiles - Laboratory	3 SWS		Stiller, Lauer, Kamran

Competence Certificate
oral exam

30 minutes

Prerequisites
none

Annotation
The number of participants is limited. A registration is mandatory, the details are announced on the webpages of the institute of measurement and control systems (mrt). In case of too many interested students a subset will be selected (see website).

T 8.30 Course: Combustion Engines I [T-MACH-102194]

Responsible: Prof. Dr. Thomas Koch
Dr.-Ing. Heiko Kubach

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2133113	Combustion Engines I	4 SWS	Lecture / Practice (VÜ)	Koch

Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

T 8.31 Course: Composite Manufacturing - Polymers, Fibers, Semi-Finished Products, Manufacturing Technologies [T-MACH-105535]

Responsible: Prof. Dr.-Ing. Frank Henning
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102638 - Major Field: Rail System Technology
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	2

Events					
SS 2019	2114053	Composite Manufacturing – Polymers, Fibers, Semi-Finished Products, Manufacturing Technologies	2 SWS	Lecture (V)	Henning

Competence Certificate
written exam 90 minutes

Prerequisites
none

T 8.32 Course: Computational Dynamics [T-MACH-105349]

Responsible: Prof. Dr.-Ing. Carsten Proppe
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics
M-MACH-104442 - Major Field: Vibration Theory

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2162246	Computational Dynamics	2 SWS		Proppe

Competence Certificate
oral exam, 30 min.

Prerequisites
none

T 8.33 Course: Computational Intelligence [T-MACH-105314]

Responsible: Dr. Wilfried Jakob
Prof. Dr. Ralf Mikut
PD Dr.-Ing. Markus Reischl

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102817 - Major Field: Information Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	2105016	Computational Intelligence	2 SWS	Lecture (V)	Mikut, Jakob, Reischl

Competence Certificate
Written exam (Duration: 1h)

Prerequisites
none

T 8.34 Course: Computational Vehicle Dynamics [T-MACH-105350]

Responsible: Prof. Dr.-Ing. Carsten Proppe
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102638 - Major Field: Rail System Technology
M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2162256	Computational Vehicle Dynamics	2 SWS	Lecture (V)	Proppe

Competence Certificate
oral exam, 30 min.

Prerequisites
none

T 8.35 Course: Computer Engineering [T-MACH-105360]

Responsible: Dr. Hubert Keller
Dr.-Ing. Maik Lorch

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102817 - Major Field: Information Technology

Type	Credits	Recurrence	Version
Written examination	6	Each summer term	1

Events					
SS 2019	2106002	Computer Engineering	2 SWS	Lecture (V)	Keller, Lorch

Competence Certificate
written exam (Duration: 2 hours)

Prerequisites
none

T 8.36 Course: Computer Science for Engineers [T-MACH-105205]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102563 - Computer Science

Type	Credits	Recurrence	Version
Written examination	6	Each summer term	1

Events					
SS 2019	2121390	Computer Science for Engineers	4 SWS	Lecture / Practice (VÜ)	Ovtcharova
SS 2019	3121034	Computer Science for Engineers	4 SWS	Lecture / Practice (VÜ)	Ovtcharova, Mitarbeiter
SS 2019	3121035	Computer Science for Engineers (Tutorial)	2 SWS	Practice (Ü)	Ovtcharova, Mitarbeiter

Competence Certificate
Written exam [180 min]

Prerequisites
Computer Science for Engineers, passed

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-105206 - Computer Science for Engineers must have been passed.

T 8.37 Course: Computer Science for Engineers [T-MACH-105206]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102563 - Computer Science

Type	Credits	Recurrence	Version
Completed coursework (practical)	0	Each summer term	2

Events					
SS 2019	2121392	Computer Lab for Computer Science in Mechanical Engineering	2 SWS		Ovtcharova, Mitarbeiter
SS 2019	3121036	Computer Science for Engineers Lab Course	2 SWS		Ovtcharova, Mitarbeiter

Competence Certificate
Programming assignments, that are to be implemented at the computer, are given every two weeks. The students are supervised by tutors while they work on the assignments. Therefore online tests must be solved by the students to assess the understanding of the tasks and the lecture material. All assignments have to be handed in, before they can take part in the exam.

Prerequisites
none

T 8.38 Course: Computerized Multibody Dynamics [T-MACH-105384]

Responsible: Prof. Dr.-Ing. Wolfgang Seemann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Competence Certificate
Oral exam, 30 min.

Prerequisites
none

Recommendation
Knowledge of EM III/IV

T 8.39 Course: Constitution and Properties of Wearresistant Materials [T-MACH-102141]

Responsible: Prof. Dr. Sven Ulrich
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2019	2194643	Constitution and Properties of Wear resistant materials	2 SWS	Lecture (V)	Ulrich

Competence Certificate
oral examination (about 30 min)

no tools or reference materials

Prerequisites
none

8.40 Course: Control Technology [T-MACH-105185]

Responsible: Christoph Gönnheimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102817 - Major Field: Information Technology

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	2

Events					
SS 2019	2150683	Control Technology	2 SWS	Lecture (V)	Gönnheimer

Competence Certificate
Written Exam (60 min)

Prerequisites
none

T 8.41 Course: Data Analytics for Engineers [T-MACH-105694]

Responsible: Nicole Ludwig
Prof. Dr. Ralf Mikut
PD Dr.-Ing. Markus Reischl

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102817 - Major Field: Information Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	2

Events					
SS 2019	2106014	Data Analytics for Engineers	3 SWS	Lecture / Practice (VÜ)	Mikut, Reischl, Ludwig

Competence Certificate
Written exam (Duration: 1h)

Prerequisites
none

8.42 Course: Design and Development of Mobile Machines [T-MACH-105311]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Jan Siebert

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2113079	Design and Development of Mobile Machines	2 SWS	Lecture (V)	Geimer, Siebert, Lehr, Geiger

Competence Certificate
The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

A registration is mandatory, the details will be announced on the webpages of the *Institute of Vehicle System Technology / Institute of Mobile Machines*. In case of too many applications, attendance will be granted based on pre-qualification.

The course will be replenished by interestung lectures of professionals from leading hydraulic companies.

Prerequisites
Required for the participation in the examination is the preparation of a report during the semester. The partial service with the code T-MACH-108887 must have been passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-108887 - Design and Development of Mobile Machines - Advance must have been passed.

Recommendation
Knowledge in Fluid Power Systems (LV 2114093)

Annotation
After completion of the lecture, studens can:

- design working and travel drive train hydraulics of mobile machines and can derive characteristic key factors.
- choose and apply suitable state of the art designing methods succesfully
- analyse a mobile machines and break its structure down from a complex system to subsystems with reduced complexity
- identify and desrcibe interactions and links between subsystems of a mobile maschine
- present and document solutions of a technical problem according to R&D standards

The number of participants is limited.

Conent:

The working scenario of a mobile machine depends strongly on the machine itself. Highly specialised machines, e.g. pavers are also as common as universal machines with a wide range of applications, e.g. hydraulic excavators. In general, all mobile machines are required to do their intended work in an optimal way and satisfy various critera at the same time. This makes designing mobile machines to a great and interesting challenge. Nevertheless, usually key factors can be derived for every mobile machine, which affect all other machine parameters. During this lecture, those key factors and designing mobile machines accordingly will be adressed. To do so, an exemplary mobile machine will be discussed and designed in the lecture an as a semester project.

Literature:

See german recommendations

T 8.43 Course: Design and Development of Mobile Machines - Advance [T-MACH-108887]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Jan Siebert

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design

Type	Credits	Recurrence	Version
Completed coursework	0	Each term	1

Competence Certificate
Preparation of semester report

Prerequisites
none

T 8.44 Course: Design of a jet engine combustion chamber [T-CIWVT-105780]

Responsible: Prof. Dr.-Ing. Nikolaos Zarzalis
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Oral examination	6	Each winter term	2

Events					
WS 19/20	22527	Design of a Jet Engine Combustion Chamber	SWS		Zarzalis

Competence Certificate
The examination is an oral examination on lecture 22527 with a duration of 20 minutes.

Prerequisites
None

8.45 Course: Design with Plastics [T-MACH-105330]

Responsible: Markus Liedel
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design
M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2174571	Design with Plastics	2 SWS	Lecture (V)	Liedel

Competence Certificate
Oral exam, about 20 minutes

Prerequisites
none

Recommendation
Poly I

T 8.46 Course: Development of Oil-Hydraulic Powertrain Systems [T-MACH-105441]

Responsible: Isabelle Ays
Dr.-Ing. Gerhard Geerling

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2113072	Development of Oil-Hydraulic Powertrain Systems	2 SWS	Block (B)	Geerling, Becker

Competence Certificate
oral exam (20 min)

Prerequisites
none

T 8.47 Course: Digital Control [T-MACH-105317]

Responsible: Dr.-Ing. Michael Knoop
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102817 - Major Field: Information Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	2137309	Digital Control	2 SWS	Lecture (V)	Knoop

Competence Certificate
written exam

60 min.

Prerequisites
none

T 8.48 Course: Dimensioning and Optimization of Power Train System [T-MACH-105536]

Responsible: Prof. Dr.-Ing. Albert Albers
Dr.-Ing. Hartmut Faust
Dr. Eckhard Kirchner
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2146208	Dimensioning and Optimization of Power Train System	2 SWS	Lecture (V)	Faust

Competence Certificate
oral exam (20 min)

Prerequisites
none

T 8.49 Course: Drive Systems and Possibilities to Increase Efficiency [T-MACH-105451]

Responsible: Dr.-Ing. Hans-Peter Kollmeier
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102645 - Major Field: Combustion Engine Techniques

Type	Credits	Recurrence	Version
Oral examination	2	Each winter term	1

Competence Certificate
Oral examination, time duration 30 min., no aids

Prerequisites
none

T 8.50 Course: Drive Train of Mobile Machines [T-MACH-105307]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Marco Wydra

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2113077	Drive Train of Mobile Machines	2 SWS	Lecture (V)	Geimer, Herr
WS 19/20	2113078	Übung zu 'Antriebsstrang mobiler Arbeitsmaschinen'	1 SWS	Practice (Ü)	Geimer, Herr

Competence Certificate
The final assessment will be an oral examination (20 min) taking place during the recess period. The examination will be offered in ervery semester and can be repeated at any regular examination date.

Prerequisites
none

Recommendation

- General principles of mechanicals engineering
- Basic knowledge of hydraulics
- Interest in mobile machinery

Annotation
At the end of the lecture, participants can explain the structure and function of all discussed drive trains of mobile machines. They can analyze complex gearbox schematics and synthesize simple transmission functions using rough calculations.

Content:

In this course the different drive trains of mobile machinery will be discussed. The focus of this course is:

- mechanical gears
- torque converter
- hydrostatic drives
- power split drives
- electrical drives
- hybrid drives
- axles
- terra mechanics

Media: projector presentation

Literature: Download of lecture slides from ILIAS. Further literature recommendations during lectures.

T 8.51 Course: Dynamics of the Automotive Drive Train [T-MACH-105226]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics
M-MACH-104442 - Major Field: Vibration Theory

Type	Credits	Recurrence	Version
Oral examination	5	Each winter term	1

Events					
WS 19/20	2163111	Dynamics of the Automotive Drive Train	2 SWS	Lecture (V)	Fidlin
WS 19/20	2163112	Übungen zu Dynamik des Kfz-Antriebsstrangs	2 SWS	Practice (Ü)	Fidlin, Yüzbasioglu

Competence Certificate
Oral examination, 30 min.

Prerequisites
none

Recommendation
Powertrain Systems Technology A: Automotive SystemsMachine DynamicsVibration Theory

T 8.52 Course: Electric Rail Vehicles [T-MACH-102121]

Responsible: Prof. Dr.-Ing. Peter Gratzfeld
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102638 - Major Field: Rail System Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2114346	Electric Rail Vehicles	2 SWS	Lecture (V)	Gratzfeld

Competence Certificate
Oral examination

Duration: ca. 20 minutes

No tools or reference materials may be used during the exam.

Prerequisites
none

T 8.53 Course: Electrical Engineering and Electronics [T-ETIT-109820]

Responsible: Dr.-Ing. Klaus-Peter Becker
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-104801 - Electrical Engineering

Type	Credits	Recurrence	Version
Written examination	8	Each winter term	1

Events					
WS 19/20	2306339	Electrical Engineering and Electronics foir Mechanical Engineers	4 SWS	Lecture (V)	Becker
WS 19/20	2306340	Electrical Engineering and Electronics foir Mechanical Engineers	2 SWS	Lecture (V)	Becker

Annotation
Exam will be held in german language

T 8.54 Course: Elements and Systems of Technical Logistics [T-MACH-102159]

Responsible: Georg Fischer
Dr.-Ing. Martin Mittwollen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2117096	Elements and systems of Technical Logistics	3 SWS	Lecture / Practice (VÜ)	Mittwollen, Fischer

Competence Certificate
The assessment consists of an oral exam (20min) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Recommendation
Knowledge out of Basics of Technical Logistics (T-MACH-102163) preconditioned

T 8.55 Course: Elements and Systems of Technical Logistics - Project [T-MACH-108946]

Responsible: Georg Fischer
Dr.-Ing. Martin Mittwollen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Examination of another type	2	Each winter term	1

Events					
WS 19/20	2117097	Elements and systems of Technical Logistics - project	SWS	Project (PRO)	Mittwollen, Fischer

Competence Certificate
Presentation of performed project and defense (30min) according to §4 (2), No. 3 of the examination regulation

Prerequisites
T-MACH-102159 (Elements and Systems of Technical Logistics) must have been started

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-102159 - Elements and Systems of Technical Logistics must have been started.

Recommendation
Knowledge out of Basics of Technical Logistics (T-MACH-102163) preconditioned

T 8.56 Course: Energy Efficient Intralogistic Systems [T-MACH-105151]

Responsible: Dr.-Ing. Meike Braun
Dr.-Ing. Frank Schönung

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102816 - Major Field: Fundamentals of Energy Technology
M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2117500	Energy efficient intralogistic systems	2 SWS	Lecture (V)	Braun, Schönung

Competence Certificate
Oral, 30 min. examination dates after the end of each lesson period.

Prerequisites
none

Recommendation
The content of course “Basics of Technical Logistics” should be known.

Annotation
Visit the IFL homepage of the course for the course dates and/or possible limitations of course participation.

T 8.57 Course: Energy Storage and Network Integration [T-MACH-105952]

Responsible: Dr.-Ing. Wadim Jäger
Prof. Dr. Robert Stieglitz

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2189487	Energy Storage and Grid Integration	2 SWS	Lecture (V)	Jäger, Stieglitz

Competence Certificate
oral exam, about 30 minutes

Prerequisites
The courses T-MACH-105952 Energiespeicher und Netzintegration and T-ETIT-104644 - Energy Storage and Network Integration can not be combined.

T 8.58 Course: Energy Systems I: Renewable Energy [T-MACH-105408]

Responsible: Dr. Ron Dagan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology

Type	Credits	Recurrence	Version
Oral examination	6	Each winter term	1

Events					
WS 19/20	2129901	Energy Systems I - Renewable Energy	3 SWS	Lecture (V)	Dagan

Competence Certificate
oral exam, 1/2 hour

Prerequisites
none

T 8.59 Course: Engine Laboratory [T-MACH-105337]

Responsible: Dr.-Ing. Uwe Wagner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102645 - Major Field: Combustion Engine Techniques

Type	Credits	Recurrence	Version
Completed coursework	4	Each summer term	1

Events					
SS 2019	2134001	Engine Laboratory	2 SWS	Practical course (P)	Wagner

Competence Certificate
written documentation of every experiment, certificate of successful attendance, no grading

Prerequisites
none

T 8.60 Course: Engine Measurement Techniques [T-MACH-105169]

Responsible: Dr.-Ing. Sören Bernhardt
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102645 - Major Field: Combustion Engine Techniques
M-MACH-102817 - Major Field: Information Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2134137	Engine measurement techniques	2 SWS	Lecture (V)	Bernhardt

Competence Certificate
oral examination, Duration: 0,5 hours, no auxiliary means

Prerequisites
none

Recommendation
T-MACH-102194 Combustion Engines I

T 8.61 Course: Engineering Mechanics I [T-MACH-100282]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102572 - Engineering Mechanics
M-MACH-104624 - Orientation Exam

Type	Credits	Recurrence	Version
Written examination	7	Each winter term	2

Events					
WS 19/20	2161245	Engineering Mechanics I	3 SWS	Lecture (V)	Böhlke
WS 19/20	3161010	Engineering Mechanics I (Lecture)	3 SWS	Lecture (V)	Langhoff, Böhlke

Competence Certificate
written exam, 90 min, graded

Prerequisites
successful participation in "Engineering Mechanics I (Tutorial)" (see T-MACH-100528)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-100528 - Tutorial Engineering Mechanics I must have been passed.

T 8.62 Course: Engineering Mechanics II [T-MACH-100283]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102572 - Engineering Mechanics
M-MACH-104624 - Orientation Exam

Type	Credits	Recurrence	Version
Written examination	6	Each summer term	2

Events					
SS 2019	2162250	Engineering Mechanics II	3 SWS	Lecture (V)	Schneider
SS 2019	3162010	Engineering Mechanics II (Lecture)	3 SWS	Lecture (V)	Langhoff

Competence Certificate
written exam, 90 min, graded

Prerequisites
successful participation in "Engineering Mechanics II (Tutorial)" (see T-MACH-100284)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-100284 - Tutorial Engineering Mechanics II must have been passed.

T 8.63 Course: Engineering Mechanics III & IV [T-MACH-105201]

Responsible: Prof. Dr.-Ing. Wolfgang Seemann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102572 - Engineering Mechanics

Type	Credits	Recurrence	Version
Written examination	10	Each winter term	2

Events					
SS 2019	2162231	Engineering Mechanics IV	2 SWS	Lecture (V)	Seemann
SS 2019	3162012	Engineering Mechanics 4	2 SWS	Lecture (V)	Seemann
WS 19/20	2161203	Engineering Mechanics III	2 SWS	Lecture (V)	Seemann
WS 19/20	3161012	Engineering Mechanics III (Lecture)	2 SWS	Lecture (V)	Seemann

Competence Certificate
Written Exam (3 h), graded

Prerequisites
Succesful accomplishment of the exercise sheets in Engineering Mechanics III (T-MACH-105202) and of the exercise sheets in Engineering Mechanics IV (T-MACH-105203).

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-105202 - Tutorial Engineering Mechanics III must have been passed.
2. The course T-MACH-105203 - Tutorial Engineering Mechanics IV must have been passed.

T 8.64 Course: Excercises in Technical Thermodynamics and Heat Transfer I [T-MACH-105204]

Responsible: Prof. Dr. Ulrich Maas
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102574 - Technical Thermodynamics

Type	Credits	Recurrence	Version
Completed coursework (written)	0	Each winter term	1

Events					
WS 19/20	2165502	Exercise course Technical Thermodynamics and Heat Transfer I	2 SWS	Practice (Ü)	Maas
WS 19/20	3165015	Technical Thermodynamics and Heat Transfer I (Tutorial)	2 SWS	Tutorial (Tu)	Schießl, Maas

Competence Certificate
Homework is mandatory.

T 8.65 Course: Excercises in Technical Thermodynamics and Heat Transfer II [T-MACH-105288]

Responsible: Prof. Dr. Ulrich Maas
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102574 - Technical Thermodynamics

Type	Credits	Recurrence	Version
Completed coursework	0	Each summer term	1

Events					
SS 2019	2166556	Technical Thermodynamics and Heat Transfer II (Tutorial)	2 SWS	Practice (Ü)	Maas
SS 2019	3166033	Technical Thermodynamics and Heat Transfer II (Tutorial)	2 SWS	Practice (Ü)	Schießl, Maas

Competence Certificate
Homework is mandatory.

Prerequisites
none

T 8.66 Course: Exercices - Tribology [T-MACH-109303]

Responsible: Prof. Dr. Martin Dienwiebel
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems

Type	Credits	Recurrence	Expansion	Version
Completed coursework	0	Each winter term	1 terms	1

Events					
WS 19/20	2181114	Tribology	5 SWS	Lecture / Practice (VÜ)	Dienwiebel, Scherge

Competence Certificate
successful solving of all exercises

Prerequisites
none

T 8.67 Course: Exercises for Materials Characterization [T-MACH-107685]

Responsible: Dr.-Ing. Jens Gibmeier
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Completed coursework	2	Each winter term	3

Events					
WS 19/20	2174586	materials characterization	2 SWS	Lecture (V)	Schneider, Gibmeier

Competence Certificate
Regular attendance

Prerequisites
none

T 8.68 Course: Experimental Dynamics [T-MACH-105514]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102820 - Major Field: Mechatronics
M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics
M-MACH-104442 - Major Field: Vibration Theory

Type	Credits	Recurrence	Version
Oral examination	5	Each summer term	1

Events					
SS 2019	2162225	Experimental Dynamics	3 SWS	Lecture (V)	Fidlin
SS 2019	2162228	Übungen zu Experimentelle Dynamik	2 SWS	Practice (Ü)	Fidlin, Aramendiz Fuentes

Competence Certificate
oral exam, 30 min.

Prerequisites
Can not be combined with Practical Training in Measurement of Vibrations (T-MACH-105373).

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-105373 - Practical Training in Measurement of Vibrations must not have been started.

T 8.69 Course: Failure Analysis [T-MACH-105724]

Responsible: Dr. Christian Greiner
Dr.-Ing. Johannes Schneider

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	2

Events					
WS 19/20	2182572	Failure Analysis	2 SWS	Lecture (V)	Greiner, Schneider

Competence Certificate
oral examination, ca. 30 min

Prerequisites
none

Recommendation
basic knowledge in materials science (e.g. lecture materials science I and II)

T 8.70 Course: Failure of Structural Materials: Deformation and Fracture [T-MACH-102140]

Responsible: Prof. Dr. Peter Gumbsch
Dr. Daniel Weygand

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2181711	Failure of structural materials: deformation and fracture	3 SWS	Lecture / Practice (VÜ)	Gumbsch, Weygand

Competence Certificate
oral exam ca. 30 minutes

no tools or reference materials

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics, mechanics and materials science

T 8.71 Course: Failure of Structural Materials: Fatigue and Creep [T-MACH-102139]

Responsible: Dr. Patric Gruber
Prof. Dr. Peter Gumbsch

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2181715	Failure of Structural Materials: Fatigue and Creep	2 SWS	Lecture (V)	Gruber, Gumbsch

Competence Certificate
oral exam ca. 30 minutes

no tools or reference materials

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics, mechanics and materials science

8.72 Course: Fatigue of Metallic Materials [T-MACH-105354]

Responsible: Dr.-Ing. Stefan Guth
Dr. Karl-Heinz Lang

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	2

Events					
WS 19/20	2173585	Fatigue of Metallic Materials	2 SWS	Lecture (V)	Guth, Lang

Competence Certificate
Oral exam, about 20 minutes

Prerequisites
none

Recommendation
Basic knowledge in Materials Science will be helpful.

T 8.73 Course: Flows and Heat Transfer in Energy Technology [T-MACH-105403]

Responsible: Prof. Dr.-Ing. Xu Cheng
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2189911	Tutorial 'Flows and Heat Transfer in Energy Technology '	1 SWS	Practice (Ü)	Cheng, Mitarbeiter

Competence Certificate
oral exam, 20 min

Prerequisites
none

T 8.74 Course: Fluid Mechanics 1&2 [T-MACH-105207]

Responsible: Prof. Dr.-Ing. Bettina Frohnapfel
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102565 - Fluid Mechanics

Type	Credits	Recurrence	Version
Written examination	8	Each summer term	2

Events					
SS 2019	2154512	Fluid Mechanics I	3 SWS	Lecture / Practice (VÜ)	Frohnapfel
SS 2019	3154510	Fluid Mechanics I	3 SWS	Lecture / Practice (VÜ)	Frohnapfel
WS 19/20	2153512	Fluid Mechanics II	3 SWS	Lecture / Practice (VÜ)	Frohnapfel
WS 19/20	3153511	Fluid Mechanics II	3 SWS	Lecture / Practice (VÜ)	Frohnapfel

Competence Certificate
written exam 3 hours

Prerequisites
none

8.75 Course: Fluid Power Systems [T-MACH-102093]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Felix Pult

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module
M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	2

Events					
WS 19/20	2114093	Fluid Technology	2 SWS	Lecture (V)	Geimer, Pult

Competence Certificate
The assessment consists of a writen exam (90 minutes) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
none

T 8.76 Course: Foundry Technology [T-MACH-105157]

Responsible: Dr.-Ing. Christian Wilhelm
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2019	2174575	Foundry Technology	2 SWS	Lecture (V)	Wilhelm

Competence Certificate
oral exam; about 25 minutes

Prerequisites
M-MACH-102562 - Materials Science must be passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-MACH-102562 - Materials Science must have been passed.

8.77 Course: Fuels and Lubricants for Combustion Engines [T-MACH-105184]

Responsible: Dr.-Ing. Bernhard Ulrich Kehrwald
Dr.-Ing. Heiko Kubach

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102645 - Major Field: Combustion Engine Techniques
M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2133108	Fuels and Lubricants for Combustion Engines	2 SWS	Lecture (V)	Kehrwald

Competence Certificate
oral examination, Duration: ca. 25 min., no auxiliary means

Prerequisites
none

T 8.78 Course: Fundamentals for Design of Motor-Vehicle Bodies I [T-MACH-102116]

Responsible: Horst Dietmar Bardehle
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	2	Each winter term	1

Events					
WS 19/20	2113814	Fundamentals for Design of Motor-Vehicles Bodies I	1 SWS	Lecture (V)	Bardehle

Competence Certificate
Oral group examination

Duration: 30 minutes

Auxiliary means: none

Prerequisites
none

T 8.79 Course: Fundamentals for Design of Motor-Vehicle Bodies II [T-MACH-102119]

Responsible: Horst Dietmar Bardehle
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	2	Each summer term	1

Events					
SS 2019	2114840	Fundamentals for Design of Motor-Vehicles Bodies II	1 SWS	Lecture (V)	Bardehle

Competence Certificate
Oral group examination

Duration: 30 minutes

Auxiliary means: none

Prerequisites
none

T 8.80 Course: Fundamentals in the Development of Commercial Vehicles I [T-MACH-105160]

Responsible: Prof. Dr. Jörg Zürn
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	2	Each winter term	1

Events					
WS 19/20	2113812	Fundamentals in the Development of Commercial Vehicles I	1 SWS	Lecture (V)	Zürn

Competence Certificate
Oral group examination

Duration: 30 minutes

Auxiliary means: none

Prerequisites
none

T 8.81 Course: Fundamentals in the Development of Commercial Vehicles II [T-MACH-105161]

Responsible: Prof. Dr. Jörg Zürn
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	2	Each summer term	1

Events					
SS 2019	2114844	Fundamentals in the Development of Commercial Vehicles II	1 SWS	Lecture (V)	Zürn

Competence Certificate
Oral group examination

Duration: 30 minutes

Auxiliary means: none

Prerequisites
none

T 8.82 Course: Fundamentals of Automobile Development I [T-MACH-105162]

Responsible: Dipl.-Ing. Rolf Frech
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Written examination	2	Each winter term	1

Events					
WS 19/20	2113810	Fundamentals of Automobile Development I	1 SWS	Lecture (V)	Frech
WS 19/20	2113851	Principles of Whole Vehicle Engineering I	1 SWS	Lecture (V)	Frech

Competence Certificate
Written examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
none

T 8.83 Course: Fundamentals of Automobile Development II [T-MACH-105163]

Responsible: Dipl.-Ing. Rolf Frech
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Written examination	2	Each summer term	2

Events					
SS 2019	2114842	Fundamentals of Automobile Development II	1 SWS	Lecture (V)	Frech
SS 2019	2114860	Principles of Whole Vehicle Engineering II	1 SWS		Frech

Competence Certificate
Written examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
none

T 8.84 Course: Fundamentals of Catalytic Exhaust Gas Aftertreatment [T-MACH-105044]

Responsible: Prof. Dr. Olaf Deutschmann
Prof. Dr. Jan-Dierk Grunwaldt
Dr.-Ing. Heiko Kubach
Prof. Dr.-Ing. Egbert Lox

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102645 - Major Field: Combustion Engine Techniques
M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2134138	Fundamentals of catalytic exhaust gas aftertreatment	2 SWS	Lecture (V)	Lox, Grunwaldt, Deutschmann

Competence Certificate
oral examination, Duration: 25 min., no auxiliary means

Prerequisites
none

T 8.85 Course: Fundamentals of Combustion Engine Technology [T-MACH-105652]

Responsible: Dr.-Ing. Sören Bernhardt
Dr.-Ing. Heiko Kubach
Jürgen Pfeil
Dr.-Ing. Olaf Toedter
Dr.-Ing. Uwe Wagner

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102645 - Major Field: Combustion Engine Techniques
M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Version
Oral examination	5	Each winter term	1

Events					
WS 19/20	2133123	Fundamentals of Combustion Engine Technology	2 SWS	Lecture (V)	Kubach, Wagner, Toedter, Pfeil, Bernhardt, Velji

Competence Certificate
oral exam, 30 min

Prerequisites
none

T 8.86 Course: Fundamentals of Combustion I [T-MACH-105213]

Responsible: Prof. Dr. Ulrich Maas
Dr. Jörg Sommerer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module
M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	2165515	Fundamentals of Combustion I	2 SWS	Lecture (V)	Maas
WS 19/20	2165517	Fundamentals of Combustion I (Tutorial)	1 SWS	Practice (Ü)	Bykov
WS 19/20	3165016	Fundamentals of Combustion I	2 SWS	Lecture (V)	Maas
WS 19/20	3165017	Fundamentals of Combustion I (Tutorial)	1 SWS	Practice (Ü)	Bykov

Competence Certificate
Written exam, 3 h

Prerequisites
none

T 8.87 Course: Fundamentals of Combustion II [T-MACH-105325]

Responsible: Prof. Dr. Ulrich Maas
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology
M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2019	2166538	Fundamentals of combustion II	2 SWS	Lecture (V)	Maas
SS 2019	2166539	Übung zu Grundlagen der technischen Verbrennung II	1 SWS	Practice (Ü)	Maas

Competence Certificate
oral exam, 20 min

Prerequisites
none

T 8.88 Course: Fundamentals of Energy Technology [T-MACH-105220]

Responsible: Dr. Aurelian Florin Badea
Prof. Dr.-Ing. Xu Cheng

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology

Type	Credits	Recurrence	Version
Written examination	8	Each summer term	1

Events					
SS 2019	2130927	Fundamentals of Energy Technology	3 SWS	Lecture (V)	Cheng, Badea
SS 2019	3190923	Fundamentals of Energy Technology	3 SWS	Lecture (V)	Badea

Competence Certificate
Written examination, 90 min

Prerequisites
none

T 8.89 Course: Gasdynamics [T-MACH-105533]

Responsible: Dr.-Ing. Franco Magagnato
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology
M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2154200	Gasdynamics	2 SWS	Lecture (V)	Magagnato

Competence Certificate
oral exam - 30 minutes

Prerequisites
none

T 8.90 Course: Gear Cutting Technology [T-MACH-102148]

Responsible: Dr. Markus Klaiber
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2149655	Gear Technology	2 SWS	Lecture (V)	Klaiber

Competence Certificate
Oral Exam (20 min)

Prerequisites
none

T 8.91 Course: Global Logistics [T-MACH-105379]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102644 - Major Field: Production Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	3118095	Global Logistics	2 SWS		Furmans, Fleischer-Dörr, Mittwollen

Competence Certificate
oral exam (20 min)

Prerequisites
none

T 8.92 Course: Global Production Engineering (MEI) [T-MACH-106731]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102644 - Major Field: Production Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	3150040	Global Production Engineering (MEI)	2 SWS	Lecture (V)	Lanza, Stricker

Competence Certificate
oral exam (45 min group examination with 3 students)

Prerequisites
none

T 8.93 Course: Handling Characteristics of Motor Vehicles I [T-MACH-105152]

Responsible: Dr.-Ing. Hans-Joachim Unrau
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2113807	Handling Characteristics of Motor Vehicles I	2 SWS	Lecture (V)	Unrau

Competence Certificate
Verbally

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

T 8.94 Course: Handling Characteristics of Motor Vehicles II [T-MACH-105153]

Responsible: Dr.-Ing. Hans-Joachim Unrau
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2114838	Handling Characteristics of Motor Vehicles II	2 SWS	Lecture (V)	Unrau

Competence Certificate
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

T 8.95 Course: Heat and Mass Transfer [T-MACH-105292]

Responsible: Prof. Dr.-Ing. Henning Bockhorn
Prof. Dr. Ulrich Maas

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Version
Written examination	4	Each term	1

Events					
SS 2019	3122512	Heat and Mass Transfer	2 SWS	Lecture (V)	Bockhorn
WS 19/20	2165512	Heat and mass transfer	2 SWS	Lecture (V)	Maas

Competence Certificate

Written exam, 3 h

Prerequisites

none

T 8.96 Course: Human Factors Engineering I [T-MACH-105518]

Responsible: Prof. Dr.-Ing. Barbara Deml
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102589 - Major Field: Production Systems

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	2

Events					
WS 19/20	2109035	Human Factors Engineering I: Ergonomics	2 SWS	Lecture (V)	Deml

Competence Certificate
written exam, 60 minutes

The exams are only offered in German!

Prerequisites
none

T 8.97 Course: Human Factors Engineering II [T-MACH-105519]

Responsible: Prof. Dr.-Ing. Barbara Deml
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102589 - Major Field: Production Systems

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	2

Events					
WS 19/20	2109036	Human Factors Engineering II: Work Organisation	2 SWS	Lecture (V)	Deml

Competence Certificate
written exam, 60 minutes

The exams are only offered in German!

Prerequisites
none

T 8.98 Course: Human-Machine-Interaction [T-INFO-101266]

Responsible: Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Written examination	6	Each summer term	2

Events					
SS 2019	24659	Human-Computer-Interaction	2 SWS	Lecture (V)	Beigl

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-INFO-106257 - Human-Machine-Interaction Pass must have been passed.

T 8.99 Course: Human-Machine-Interaction Pass [T-INFO-106257]

Responsible: Prof. Dr.-Ing. Michael Beigl
Organisation: KIT Department of Informatics
Part of: M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Completed coursework	0	Each summer term	1

Events					
SS 2019	2400095	Human-Computer-Interaction	1 SWS	Practice (Ü)	Beigl, Exler
SS 2019	24659	Human-Computer-Interaction	2 SWS	Lecture (V)	Beigl

T 8.100 Course: Hybrid and Electric Vehicles [T-ETIT-100784]

Responsible: Dr.-Ing. Klaus-Peter Becker
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	2306321	Hybrid and Electric Vehicles	2 SWS	Lecture (V)	Doppelbauer
WS 19/20	2306323	Tutorial for 2306323 Hybrid and Electric Vehicles	1 SWS	Practice (Ü)	Doppelbauer

Prerequisites
none

T 8.101 Course: Hydraulic Fluid Machinery [T-MACH-105326]

Responsible: Dr. Balazs Pritz
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology
M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Oral examination	8	Each summer term	1

Events					
SS 2019	2157432	Hydraulic Fluid Machinery	4 SWS	Lecture (V)	Pritz

Competence Certificate
oral exam, 40 min.

Prerequisites
None.

8.102 Course: I4.0 Systems platform [T-MACH-106457]

Responsible: Dipl.-Ing. Thomas Maier
Prof. Dr.-Ing. Jivka Ovtcharova

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management

Type	Credits	Recurrence	Version
Examination of another type	4	Each term	2

Events					
SS 2019	2123900	I4.0 Systems platform	4 SWS		Ovtcharova, Maier
WS 19/20	2123900	I4.0 Systems platform	4 SWS		Ovtcharova, Maier

Competence Certificate
Alternative exam assessment (project work)

Prerequisites
None

Annotation
Limited number of participants.

T 8.103 Course: Ignition systems [T-MACH-105985]

Responsible: Dr.-Ing. Olaf Toedter
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102645 - Major Field: Combustion Engine Techniques

Type	Credits	Version
Oral examination	4	1

Events					
WS 19/20	2133125	Ignition systems	2 SWS	Lecture (V)	Toedter

Competence Certificate
oral exam, 20 min

Prerequisites
none

T 8.104 Course: Industrial Aerodynamics [T-MACH-105375]

Responsible: Prof. Dr.-Ing. Thomas Breitling
Prof. Dr.-Ing. Bettina Frohnapfel

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2153425	Industrial aerodynamics	2 SWS		Breitling

Competence Certificate
oral exam - 30 minutes

Prerequisites
none

T 8.105 Course: Information Engineering [T-MACH-102209]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	2

Events					
SS 2019	2122014	Information Engineering	2 SWS	Seminar (S)	Ovtcharova, Mitarbeiter

Competence Certificate
Alternative exam assessment (written composition and speech)

Prerequisites
None

T 8.106 Course: Information Processing in Mechatronic Systems [T-MACH-105328]

Responsible: Prof. Dr.-Ing. Michael Kaufmann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102817 - Major Field: Information Technology

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	2105022	Information Processing in Mechatronic Systems	2 SWS	Lecture (V)	Kaufmann

Competence Certificate
Written exam (Duration: 1 h)

Prerequisites
none

T 8.107 Course: Information Processing in Sensor Networks [T-INFO-101466]

Responsible: Prof. Dr.-Ing. Uwe Hanebeck
Organisation: KIT Department of Informatics
Part of: M-MACH-102817 - Major Field: Information Technology

Type	Credits	Recurrence	Version
Oral examination	6	Irregular	1

Events					
WS 19/20	24102	Information Processing in Sensor Networks	3 SWS	Lecture (V)	Noack, Mayer, Hanebeck

T 8.108 Course: Information Systems and Supply Chain Management [T-MACH-102128]

Responsible: Dr. Christoph Kilger
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management
M-MACH-102817 - Major Field: Information Technology

Type	Credits	Recurrence	Version
Oral examination	3	Each summer term	2

Events					
SS 2019	2118094	Information Systems in Logistics and Supply Chain Management	2 SWS	Lecture (V)	Kilger

Competence Certificate
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

8.109 Course: Integrated Information Systems for Engineers [T-MACH-102083]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management
M-MACH-102589 - Major Field: Production Systems
M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2019	2121001	Integrated Information Systems for engineers	3 SWS	Lecture / Practice (VÜ)	Ovtcharova, Mitarbeiter

Competence Certificate
Oral examination 20 min.

Prerequisites
None

T 8.110 Course: Integrated Production Planning in the Age of Industry 4.0 [T-MACH-108849]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102589 - Major Field: Production Systems

Type	Credits	Recurrence	Version
Oral examination	8	Each summer term	1

Events					
SS 2019	2150660	Integrated Production Planning in the Age of Industry 4.0	6 SWS	Lecture / Practice (VÜ)	Lanza

Competence Certificate
Oral Exam (40 min)

Prerequisites
"T-MACH-109054 - Integrierte Produktionsplanung im Zeitalter von Industrie 4.0" as well as "T-MACH-102106 Integrierte Produktionsplanung" must not be commenced.

T 8.111 Course: Integrative Strategies in Production and Development of High Performance Cars [T-MACH-105188]

Responsible: Karl-Hubert Schlichtenmayer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2019	2150601	Integrative Strategies in Production and Development of High Performance Cars	2 SWS	Lecture (V)	Schlichtenmayer

Competence Certificate
Written Exam (60 min)

Prerequisites
none

T 8.112 Course: Intellectual Property Rights and Strategies in Industrial Companies [T-MACH-105442]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen
Frank Zacharias

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management
M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Oral examination	4	Each term	1

Events					
SS 2019	2147160	Patents and Patentstrategies in innovative companies	2 SWS		Zacharias
WS 19/20	2147161	Intellectual Property Rights and Strategies in Industrial Companies	2 SWS	Lecture (V)	Zacharias

Competence Certificate
oral exam (20 min)

Prerequisites
none

Recommendation
None

T 8.113 Course: Introduction into Mechatronics [T-MACH-100535]

Responsible: Moritz Böhland
Dr.-Ing. Maik Lorch
PD Dr.-Ing. Markus Reischl

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Written examination	6	Each winter term	2

Events					
WS 19/20	2105011	Introduction into Mechatronics	3 SWS	Lecture (V)	Reischl, Lorch, Böhland

Competence Certificate
Oral exam (Duration: 2h)

Prerequisites
none

T 8.114 Course: Introduction into the Multi-Body Dynamics [T-MACH-105209]

Responsible: Prof. Dr.-Ing. Wolfgang Seemann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module
M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102820 - Major Field: Mechatronics
M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	2

Events					
SS 2019	2162235	Introduction into the multi-body dynamics	3 SWS	Lecture (V)	Seemann

Competence Certificate
Written examination, 180 min.

Prerequisites
none

Recommendation
Engineering Mechanics III/IV

T 8.115 Course: Introduction to Ceramics [T-MACH-100287]

Responsible: Prof. Dr. Michael Hoffmann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	6	Each winter term	1

Events					
WS 19/20	2125757	Introduction to Ceramics	3 SWS	Lecture (V)	Hoffmann

Competence Certificate
The assessment consists of an oral exam (30 min) taking place at a specific date.

The re-examination is offered at a specific date.

Prerequisites
None

T 8.116 Course: Introduction to Computational Fluid Dynamics [T-MACH-110362]

Responsible: Prof. Dr.-Ing. Bettina Frohnapfel
Dr.-Ing. Alexander Stroh

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102582 - Major Field: Continuum Mechanics

Type	Credits	Version
Written examination	5	1

Events					
SS 2019	2154533	Introduction to Computational Fluid Dynamics	4 SWS	Lecture (V)	Stroh, Frohnapfel

Competence Certificate
written 90min

Annotation
The content of the lecture "continuum mechanics of solids and fluids" is expected to be known.

T 8.117 Course: Introduction to Nonlinear Vibrations [T-MACH-105439]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104442 - Major Field: Vibration Theory

Type	Credits	Recurrence	Version
Oral examination	7	Each winter term	1

Events					
WS 19/20	2162247	Introduction to Nonlinear Vibrations	2 SWS	Lecture (V)	Fidlin
WS 19/20	2162248	Introduction into the nonlinear vibrations (Tutorial)	2 SWS	Practice (Ü)	Fidlin, Schröders

Competence Certificate
oral exam, 30 min.

Prerequisites
none

Recommendation
Vibration theory, Mathematical Methods of Vibration Theory, Dynamic Stability

T 8.118 Course: Introduction to Nuclear Energy [T-MACH-105525]

Responsible: Prof. Dr.-Ing. Xu Cheng
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2189903	Introduction to Nuclear Energy	2 SWS	Lecture (V)	Cheng

Competence Certificate
oral exam, 30 min

Prerequisites
none

T 8.119 Course: Introduction to Numerical Fluid Dynamics [T-MACH-105515]

Responsible: Dr. Balazs Pritz
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Completed coursework	4	Each winter term	1

Events					
WS 19/20	2157444	Introduction to numerical fluid dynamics	2 SWS	Practical course (P)	Pritz

Competence Certificate
Certificate of participation

Prerequisites
none

T 8.120 Course: Introduction to the Finite Element Method [T-MACH-105320]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102582 - Major Field: Continuum Mechanics

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	3

Events					
SS 2019	2162282	Introduction to the Finite Element Method	2 SWS	Lecture (V)	Langhoff, Böhlke

Competence Certificate
written exam (90 min)

Prerequisites
Passing the Tutorial "Introduction to the Finite element method" (T-MACH-110330) is a prerequisite for taking part in the exam.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110330 - Tutorial Introduction to the Finite Element Method must have been passed.

Annotation
Knowledge of the contents of the courses "Continuum Mechanics of Solids and Fluids" and "Mathematical Methods of Continuum Mechanics" as well as the corresponding tutorials are expected

The assignment of the restricted places in the associated Lab Course is crucial to the institute.

T 8.121 Course: IT-Fundamentals of Logistics [T-MACH-105187]

Responsible: Prof. Dr.-Ing. Frank Thomas
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management
M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102817 - Major Field: Information Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Oral examination	3	Each summer term	2

Events					
SS 2019	2118183	IT-Fundamentals of Logistics	2 SWS	Lecture (V)	Thomas

Competence Certificate
The assessment consists of an oral exam (30min) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Annotation
1) Detailed script can be downloaded online (www.tup.com), updated and enhanced annually.

2) CD-ROM with chapters and exercises at the end of the semester available from the lecturer, also updated and enhanced annually.

T 8.122 Course: Lab Computer-Aided Methods for Measurement and Control [T-MACH-105341]

Responsible: Prof. Dr.-Ing. Christoph Stiller
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102817 - Major Field: Information Technology

Type	Credits	Recurrence	Version
Completed coursework	4	Each winter term	1

Events					
WS 19/20	2137306	Lab Computer-aided methods for measurement and control	3 SWS	Practical course (P)	Stiller, Richter

Competence Certificate
Colloquia

Prerequisites
none

T 8.123 Course: Laboratory Exercise in Energy Technology [T-MACH-105331]

Responsible: Prof. Dr.-Ing. Hans-Jörg Bauer
Prof. Dr. Ulrich Maas
Heiner Wirbser

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology

Type	Credits	Recurrence	Version
Completed coursework	4	Each term	1

Events					
SS 2019	2171487	Laboratory Exercise in Energy Technology	3 SWS	Practical course (P)	Bauer, Maas, Bykov
WS 19/20	2171487	Laboratory Exercise in Energy Technology	3 SWS	Practical course (P)	Bauer, Maas, Bykov

Competence Certificate
1 report, approx. 12 pages

Discussion of the documented results with the assistents

Prerequisites
none

T 8.124 Course: Laboratory Laser Materials Processing [T-MACH-102154]

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

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Completed coursework	4	Each term	2

Events					
SS 2019	2183640	Laboratory "Laser Materials Processing"	3 SWS	Practical course (P)	Schneider, Pfleging
WS 19/20	2183640	Laboratory "Laser Materials Processing"	3 SWS	Practical course (P)	Schneider, Pfleging

Competence Certificate
The assessment consists of a colloquium for every single experiment and an overall final colloquium incl. an oral presentation of 20 min.

Prerequisites
none

Recommendation
basic knowledge of physics, chemistry and material science

The attendance to one of the courses Physical Basics of Laser Technology (2181612) or Laser Application in Automotive Engineering (2182642) is strongly recommended.

Annotation
The maximum number of students is 12 per semester.

T 8.125 Course: Laboratory Mechatronics [T-MACH-105370]

Responsible: Dr.-Ing. Maik Lorch
Prof. Dr.-Ing. Wolfgang Seemann
Prof. Dr.-Ing. Christoph Stiller

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design
M-MACH-102817 - Major Field: Information Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Completed coursework	4	Each winter term	4

Events					
WS 19/20	2105014	Laboratory mechatronics	3 SWS	Practical course (P)	Seemann, Stiller, Lorch, Böhland, Burgert

Competence Certificate
certificate of successful attendance

Prerequisites
None

T 8.126 Course: Laboratory Production Metrology [T-MACH-108878]

Responsible: Dr.-Ing. Benjamin Häfner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102589 - Major Field: Production Systems
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Examination of another type	4	Each summer term	1

Events					
SS 2019	2150550	Laboratory Production Metrology	3 SWS	Practical course (P)	Häfner

Competence Certificate
Alternative Test Achievement: Group presentation of 15 min at the beginning of each experiment and evaluation of the participation during the experiments

and

Oral Exam (15 min)

Prerequisites
none

Annotation
For organizational reasons the number of participants for the course is limited. Hence al selection process will take place. Applications are made via the homepage of wbk (http://www.wbk.kit.edu/studium-und-lehre.php).

T 8.127 Course: Laser in Automotive Engineering [T-MACH-105164]

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

Part of: M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2019	2182642	Laser in automotive engineering	2 SWS	Lecture (V)	Schneider

Competence Certificate
oral examination (30 min)

no tools or reference materials

Prerequisites
It is not possible, to combine this brick with brick Physical Basics of Laser Technology [T-MACH-109084] and brick Physical Basics of Laser Technology [T-MACH-102102]

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-102102 - Physical Basics of Laser Technology must not have been started.

Recommendation
preliminary knowlegde in mathematics, physics and materials science

T 8.128 Course: Leadership and Conflict Management [T-MACH-105440]

Responsible: Hans Hatzl
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2110017	Leadership and Conflict Management (in German)	2 SWS	Lecture (V)	Hatzl

Competence Certificate
oral exam (approx. 30 min)

Prerequisites
none

T 8.129 Course: Leadership and Management Development [T-MACH-105231]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen
Andreas Ploch

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102815 - Major Field: Engineering Design

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2145184	Leadership and Product Development	2 SWS	Lecture (V)	Ploch

Competence Certificate
oral exam (20 min)

Prerequisites
none

T 8.130 Course: Lightweight Engineering Design [T-MACH-105221]

Responsible: Prof. Dr.-Ing. Albert Albers
Norbert Burkardt

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	2

Events					
SS 2019	2146190	Lightweight Engineering Design	2 SWS	Lecture (V)	Albers, Burkardt

Competence Certificate
Written examination (90 min)

Prerequisites
None

T 8.131 Course: Machine Dynamics [T-MACH-105210]

Responsible: Prof. Dr.-Ing. Carsten Proppe
Organisation: KIT Department of Mechanical Engineering

Part of:
M-MACH-102746 - Compulsory Elective Module
M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102820 - Major Field: Mechatronics
M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics
M-MACH-104442 - Major Field: Vibration Theory

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	1

Events					
SS 2019	2161224	Machine Dynamics	2 SWS	Lecture (V)	Proppe
SS 2019	2161225	Machine Dynamics (Tutorial)	1 SWS	Practice (Ü)	Proppe, Koebele

Competence Certificate
written exam, 180 min.

Prerequisites
none

T 8.132 Course: Machine Dynamics II [T-MACH-105224]

Responsible: Prof. Dr.-Ing. Carsten Proppe
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102820 - Major Field: Mechatronics
M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics
M-MACH-104442 - Major Field: Vibration Theory

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2162220	Machine Dynamics II	2 SWS	Lecture (V)	Proppe

Competence Certificate
oral exam, 30 min.

Prerequisites
none

Recommendation
Machine Dynamics

T 8.133 Course: Machine Tools and Industrial Handling [T-MACH-109055]

Responsible: Prof. Dr.-Ing. Jürgen Fleischer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102589 - Major Field: Production Systems
M-MACH-102815 - Major Field: Engineering Design

Type	Credits	Recurrence	Version
Oral examination	8	Each winter term	1

Events					
WS 19/20	2149902	Machine Tools and Industrial Handling	6 SWS	Lecture / Practice (VÜ)	Fleischer

Competence Certificate
Oral exam (40 minutes)

Prerequisites
"T-MACH-102158 - Werkzeugmaschinen und Handhabungstechnik" must not be commenced.

T 8.134 Course: Machine Vision [T-MACH-105223]

Responsible: Dr. Martin Lauer
Prof. Dr.-Ing. Christoph Stiller

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102817 - Major Field: Information Technology

Type	Credits	Recurrence	Version
Written examination	8	Each winter term	2

Events					
WS 19/20	2137308	Machine Vision	4 SWS	Lecture / Practice (VÜ)	Lauer, Quehl

Competence Certificate

Type of Examination: written exam

Duration of Examination: 60 minutes

Prerequisites

None

T 8.135 Course: Machines and Processes [T-MACH-105208]

Responsible: Prof. Dr.-Ing. Hans-Jörg Bauer
Dr.-Ing. Heiko Kubach
Prof. Dr. Ulrich Maas
Dr. Balazs Pritz

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102566 - Machines and Processes

Type	Credits	Recurrence	Version
Written examination	7	Each term	2

Events					
SS 2019	3134140	Machines and Processes	4 SWS	Lecture / Practice (VÜ)	Bauer, Maas, Kubach, Pritz
WS 19/20	2185000	Machines and Processes	4 SWS	Lecture / Practice (VÜ)	Bauer, Kubach, Maas, Pritz

Competence Certificate
written exam (duration: 120 min)

Prerequisites
Taking part at the exam is possible only when lab course has been successfully completed

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-105232 - Machines and Processes, Prerequisite must have been passed.

T 8.136 Course: Machines and Processes, Prerequisite [T-MACH-105232]

Responsible: Prof. Dr.-Ing. Hans-Jörg Bauer
Dr.-Ing. Heiko Kubach
Prof. Dr. Ulrich Maas
Dr. Balazs Pritz

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102566 - Machines and Processes

Type	Credits	Recurrence	Version
Completed coursework	0	Each term	1

Events					
SS 2019	2187000	Machinery and Processes	1 SWS	Practical course (P)	Bauer, Kubach, Maas, Pritz
WS 19/20	2187000	Machines and Processes	1 SWS	Practical course (P)	Bauer, Kubach, Maas, Pritz, Schmidt

Competence Certificate
successful completed training course

Prerequisites
none

T 8.137 Course: Manufacturing Technology [T-MACH-102105]

Responsible: Prof. Dr.-Ing. Volker Schulze
Dr.-Ing. Frederik Zanger

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102589 - Major Field: Production Systems
M-MACH-102815 - Major Field: Engineering Design

Type	Credits	Recurrence	Version
Written examination	8	Each winter term	3

Events					
WS 19/20	2149657	Manufacturing Technology	6 SWS	Lecture / Practice (VÜ)	Schulze, Zanger

Competence Certificate
Written Exam (180 min)

Prerequisites
none

T 8.138 Course: Material Flow in Logistic Systems [T-MACH-102151]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102589 - Major Field: Production Systems
M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Examination of another type	9	Each winter term	3

Events					
WS 19/20	2117051	Material flow in logistic systems	6 SWS	Others (sonst.)	Furmans

Competence Certificate
The assessment (Prüfungsleistung anderer Art) consists of the following assignments:

- 40% assessment of the final case study as individual performance,
- 60% semester evaluation which includes working on 5 case studies and defending those (For both assessment types, the best 4 of 5 tries count for the final grade.):
    - 40% assessment of the result of the case studies as group work,
    - 20% assessment of the oral examination during the case study colloquiums as individual performance.

A detailed description of the learning control can be found under Annotations.

Prerequisites
none

Recommendation
Recommended elective subject: Probability Theory and Statistics

Annotation
Students are divided into groups for this course. Five case studies are carried out in these groups. The results of the group work during the lecture period are presented and evaluated in writing. In the oral examination during the case study colloquiums, the understanding of the result of the group work and the models dealt with in the course is tested. The participation in the oral defenses is compulsory and will be controlled. For the written submission the group receives a common grade, in the oral defense each group member is evaluated individually.

After the lecture period, there is the final case study. This case study contains the curriculum of the whole semester. The students work individually on this case study which takes place at a predefined place and time (duration: 4h).

T 8.139 Course: Materials Characterization [T-MACH-107684]

Responsible: Dr.-Ing. Jens Gibmeier
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	3

Events					
WS 19/20	2174586	materials characterization	2 SWS	Lecture (V)	Schneider, Gibmeier

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
Successful participation in Exercises for Materials Characterization is the condition for the admittance to the oral exam in Materials Characterization.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-107685 - Exercises for Materials Characterization must have been passed.

T 8.140 Course: Materials of Lightweight Construction [T-MACH-105211]

Responsible: Dr.-Ing. Wilfried Liebig
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2174574	Materials for Lightweight Construction	2 SWS	Lecture (V)	Liebig, Elsner

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
none

Recommendation
Materials Science I/II

8.141 Course: Materials Science and Engineering III [T-MACH-105301]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	8	Each winter term	1

Events					
WS 19/20	2173553	Materials Science and Engineering III	4 SWS	Lecture (V)	Heilmaier, Lang
WS 19/20	2173554	Übungen zu Werkstoffkunde III	1 SWS	Practice (Ü)	Heilmaier, Kauffmann

Competence Certificate
Oral exam, about 35 minutes

Prerequisites
none

T 8.142 Course: Materials Science I & II [T-MACH-105145]

Responsible: Dr.-Ing. Jens Gibmeier
Prof. Dr.-Ing. Martin Heilmaier
Prof. Dr.-Ing. Kay Weidenmann

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102562 - Materials Science

Type	Credits	Recurrence	Version
Oral examination	11	Each winter term	2

Events					
SS 2019	2174560	Materials Science and Engineering II for mach, phys	3 SWS	Lecture (V)	Heilmaier, Pundt
SS 2019	3174015	Materials Science and Engineering II (Lecture)	3 SWS	Lecture (V)	Gibmeier
SS 2019	3174026	Materials Science and Engineering II (Tutorials)	1 SWS	Practice (Ü)	Gibmeier, Mitarbeiter
WS 19/20	2173550	Materials Science and Engineering I for mach, phys	4 SWS	Lecture (V)	Heilmaier, Pundt
WS 19/20	3173008	Materials Science and Engineering I (Lecture)	4 SWS	Lecture (V)	Gibmeier
WS 19/20	3173009	Materials Science and Engineering I (Tutorial)	1 SWS	Practice (Ü)	Gibmeier

Competence Certificate
oral exam, about 25 minutes

Prerequisites
Lab course must be finished successfully prior to the registration for the oral exam.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-105146 - Materials Science Lab Course must have been passed.

Annotation
The workload for the lecture Materials Science I & II is 165 h per semester and consists of the presence during the lectures (WS: 4 SWS, SS: 2SWS) and the exercises (1 SWS per WS and 1 SWS per SS) as well as preparation and rework time at home.

T 8.143 Course: Materials Science Lab Course [T-MACH-105146]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Prof. Dr. Anton Möslang
Prof. Dr.-Ing. Kay Weidenmann

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102562 - Materials Science

Type	Credits	Recurrence	Version
Completed coursework (practical)	3	Each summer term	1

Events					
SS 2019	2174597	Experimental Lab Course in Material Science	3 SWS	Practical course (P)	Heilmaier, Pundt, Dietrich, Gibmeier, Lang
SS 2019	3174016	Materials Science and Engineering Lab Course	3 SWS	Practical course (P)	Gibmeier, Heilmaier, Pundt, Dietrich, Lang

Competence Certificate
Oral colloquium at the beginning of each topic; certificate of successful attendance.

Prerequisites
none

Annotation
The workload for the lab course Materials Science is 90 h in total and consists of the presence during the 10 experiments (one week half-time, 4 hours per day) as well as preparation and rework time at home.

T 8.144 Course: Mathematical Methods in Continuum Mechanics [T-MACH-110375]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102582 - Major Field: Continuum Mechanics
M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Expansion	Version
Written examination	4	Each winter term	1 terms	1

Events					
WS 19/20	2161254	Mathematical Methods in Continuum Mechanics	2 SWS	Lecture (V)	Böhlke

Competence Certificate
written exam (90 min). Additives as announced.

Prerequisites
Passing the Tutorial to Mathematical Methods of Continuum Mechanics (T-MACH-110376)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110376 - Tutorial Mathematical Methods in Continuum Mechanics must have been passed.

T 8.145 Course: Mathematical Methods in Dynamics [T-MACH-105293]

Responsible: Prof. Dr.-Ing. Carsten Proppe
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module
M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics

Type	Credits	Recurrence	Version
Written examination	6	Each winter term	2

Events					
WS 19/20	2161206	Mathematical Methods in Dynamics	2 SWS	Lecture (V)	Proppe
WS 19/20	2161207	Übungen zu Mathematische Methoden der Dynamik	1 SWS	Practice (Ü)	Oestringer, Proppe

Competence Certificate
written examination, 180 min.

Prerequisites
none

T 8.146 Course: Mathematical Methods in Fluid Mechanics [T-MACH-105295]

Responsible: Prof. Dr.-Ing. Bettina Frohnapfel
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Version
Written examination	6	Each summer term	1

Events					
SS 2019	2154432	Mathematical Methods in Fluid Mechanics	2 SWS	Lecture (V)	Frohnapfel, Stroh, Gatti
SS 2019	2154433	Tutorial in Mathematical Methods of Fluid Mechanics	1 SWS	Practice (Ü)	Frohnapfel, Stroh, Gatti
SS 2019	2154540	Mathematical Methods in Fluid Mechanics	SWS	Lecture (V)	Magagnato

Competence Certificate
written examination - 3 hours

Prerequisites
none

Recommendation
Basic Knowledge about Fluid Mechanics

T 8.147 Course: Mathematical Methods of Vibration Theory [T-MACH-105294]

Responsible: Prof. Dr.-Ing. Wolfgang Seemann
Organisation: KIT Department of Mechanical Engineering

Part of:
M-MACH-102746 - Compulsory Elective Module
M-MACH-102820 - Major Field: Mechatronics
M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics
M-MACH-104442 - Major Field: Vibration Theory

Type	Credits	Recurrence	Version
Written examination	6	Each summer term	2

Events					
SS 2019	2162241	Mathematical methods of vibration theory	2 SWS	Lecture (V)	Seemann
SS 2019	2162242	Mathematical methods of vibration theory (Tutorial)	2 SWS	Practice (Ü)	Seemann, Burgert

Competence Certificate
written examination, 180 min.

Prerequisites
none

Recommendation
Engineering Mechanics III/IV

T 8.148 Course: Mathématiques appliquées aux sciences de l'ingénieur [T-MACH-105452]

Responsible: Prof. Dr. Jean-Yves Dantan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Version
Oral examination	5	Each term	1

Events					
SS 2019	2161230	Mathématiques appliquées aux sciences de l'ingénieur	4 SWS	Lecture / Practice (VÜ)	Dantan
WS 19/20	2161230	Mathématiques appliquées aux sciences de l'ingénieur	4 SWS	Lecture / Practice (VÜ)	Dantan

Competence Certificate
oral exam, 30 min.

Prerequisites
none

T 8.149 Course: Measurement II [T-MACH-105335]

Responsible: Prof. Dr.-Ing. Christoph Stiller
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102817 - Major Field: Information Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2019	2138326	Measurement II	2 SWS	Lecture (V)	Stiller, Wirth

Competence Certificate
written exam

60 min.

2 DIN A4 Self-created formular sheets allowed

Prerequisites
none

T 8.150 Course: Mechanical Design I & II [T-MACH-105286]

Responsible: Prof. Dr.-Ing. Albert Albers
Norbert Burkardt
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102573 - Mechanical Design

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	2

Events					
SS 2019	2146178	Mechanical Design II	2 SWS	Lecture (V)	Albers, Matthiesen, Behrendt
SS 2019	3146017	Mechanical Design II Lecture	2 SWS	Lecture (V)	Albers, Burkardt
WS 19/20	2145178	Mechanical Design I	2 SWS	Lecture (V)	Albers, Matthiesen, Behrendt
WS 19/20	3145186	Mechanical Design I (Lecture)	2 SWS	Lecture (V)	Albers, Burkardt

Competence Certificate
written exam, graded, duration: 60 min

Prerequisites
Admission to the exam only with successful completion of the T-MACH-105282 - Mechanical Design I, prerequisites and T-MACH-105283 - Mechanical Design II, prerequisites.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-105282 - Mechanical Design I, prerequisites must have been passed.
2. The course T-MACH-105283 - Mechanical Design II, prerequisites must have been passed.

T 8.151 Course: Mechanical Design I, prerequisites [T-MACH-105282]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102573 - Mechanical Design

Type	Credits	Recurrence	Version
Completed coursework	1	Each winter term	2

Events					
WS 19/20	2145185	Tutorials Mechanical Design I	1 SWS	Practice (Ü)	Albers, Matthiesen, Behrendt, Mitarbeiter
WS 19/20	3145187	Mechanical Design I (Tutorial)	2 SWS	Practice (Ü)	Albers, Burkardt

Competence Certificate
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.

Furthermore an online test is carried out.

Prerequisites
none

T 8.152 Course: Mechanical Design II, prerequisites [T-MACH-105283]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102573 - Mechanical Design

Type	Credits	Recurrence	Version
Completed coursework	1	Each summer term	2

Events					
SS 2019	2146185	Tutorials Mechanical Design II	2 SWS	Practice (Ü)	Albers, Matthiesen, Behrendt, Mitarbeiter
SS 2019	3146018	Mechanical Design II Tutorials	2 SWS	Practice (Ü)	Albers, Mitarbeiter

Competence Certificate
Concomitant to the lecture, 2 online tests are carried out and the knowledge from the lecture will be tested. The knowledge from mechanical design I and II will further be controlled with a design and a CAD task.

Prerequisites
None

T 8.153 Course: Mechanical Design III & IV [T-MACH-104810]

Responsible: Prof. Dr.-Ing. Albert Albers
Norbert Burkardt
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102573 - Mechanical Design

Type	Credits	Recurrence	Version
Written examination	13	Each winter term	2

Events					
SS 2019	2146177	Mechanical Design IV	2 SWS	Lecture (V)	Albers, Matthiesen
SS 2019	3146020	Mechanical Design IV Lecture	2 SWS	Lecture (V)	Albers, Burkardt
WS 19/20	2145151	Mechanical Design III	2 SWS	Lecture (V)	Albers, Matthiesen, Mitarbeiter
WS 19/20	3145016	Mechanical Design III (Lecture)	2 SWS	Lecture (V)	Albers, Burkardt

Competence Certificate
written exam consisting of:

- written part duration 60 min and
- design part duration 180 min

Sum: 240 min

Prerequisites
Admission to the exam only with successful completion of the T-MACH-105284 - Mechanical Design III, Constructing the Team and T-MACH-105285 - Mechanical Design IV, Constructing the Team.

Modeled Conditions
You have to fulfill one of 2 conditions:

1. The course T-MACH-105284 - Mechanical Design III, Constructing the Team must have been passed.
2. The course T-MACH-105285 - Mechanical Design IV, Constructing the Team must have been passed.

T 8.154 Course: Mechanical Design III, Constructing the Team [T-MACH-105284]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102573 - Mechanical Design

Type	Credits	Recurrence	Version
Completed coursework	0	Each winter term	2

Events					
WS 19/20	2145153	Tutorials Mechanical Design III	2 SWS	Practice (Ü)	Albers, Matthiesen, Mitarbeiter
WS 19/20	2145154	Mechanical Design III Workshop	1 SWS	Practical course (P)	Albers, Matthiesen, Albers Assistenten
WS 19/20	3145017	Mechanical Design III (Tutorial)	2 SWS	Practice (Ü)	Albers, Burkardt
WS 19/20	3145018	Mechanical Design III (Workshop)	SWS		Albers, Burkardt

Competence Certificate
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 CAD-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

T 8.155 Course: Mechanical Design IV, Constructing the Team [T-MACH-105285]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102573 - Mechanical Design

Type	Credits	Recurrence	Version
Completed coursework	0	Each summer term	2

Events					
SS 2019	2146184	Tutorials Mechanical Design IV	2 SWS	Practice (Ü)	Albers, Matthiesen, Mitarbeiter
SS 2019	2146187	Workshop 'Mechanical Design IV'	1 SWS		Albers, Matthiesen, Mitarbeiter
SS 2019	3146021	Mechanical Design IV Tutorials	1 SWS	Practice (Ü)	Albers, Mitarbeiter
SS 2019	3146022	Mechanical Design IV Workshop	1 SWS		Albers, Mitarbeiter

Competence Certificate
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

T 8.156 Course: Mechanics and Strength of Polymers [T-MACH-105333]

Responsible: Prof. Dr.-Ing. Bernd-Steffen von Bernstorff
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	2

Events					
WS 19/20	2173580	Mechanics and Strengths of Polymers	2 SWS	Lecture (V)	von Bernstorff

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
none

Recommendation
Basic knowledge in materials science (e.g. lecture materials science I and II)

T 8.157 Course: Mechanics in Microtechnology [T-MACH-105334]

Responsible: Dr. Christian Greiner
Dr. Patric Gruber

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2181710	Mechanics in Microtechnology	2 SWS	Lecture (V)	Gruber, Greiner

Competence Certificate
Oral examination, ca. 30 min

Prerequisites
none

T 8.158 Course: Metallographic Lab Class [T-MACH-105447]

Responsible: Ulla Hauf
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Completed coursework	4	Each term	2

Events					
SS 2019	2175590	Metallographic Lab Class	3 SWS	Practical course (P)	Mühl
WS 19/20	2175590	Metallographic Lab Class	3 SWS	Practical course (P)	Mühl

Competence Certificate
Colloquium for every experiment, about 60 minutes, protocol

Prerequisites
M-MACH-102562 - Materials Science must be passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-MACH-102562 - Materials Science must have been passed.

T 8.159 Course: Micro- and nanosystem integration for medical, fluidic and optical applications [T-MACH-108809]

Responsible: Dr. Ulrich Gengenbach
Prof. Dr. Veit Hagenmeyer
Dr. Liane Koker
PD Dr.-Ing. Ingo Sieber

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2105032	Micro- and nanosystem integration for medical, fluidic and optical applications	2 SWS	Lecture (V)	Koker, Gengenbach, Sieber

Competence Certificate
Oral exam (Duration: 30min)

Prerequisites
T-MACH-105695 "Selected topics of system integration for micro- and nanotechnology" must not be started.

T 8.160 Course: Microenergy Technologies [T-MACH-105557]

Responsible: Prof. Dr. Manfred Kohl
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2142897	Microenergy Technologies	2 SWS	Lecture (V)	Kohl

Competence Certificate
Oral examination (30 Min.)

Prerequisites
none

T 8.161 Course: Modelling and Simulation [T-MACH-100300]

Responsible: Prof. Dr. Peter Gumbsch
Prof. Dr. Britta Nestler

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Version
Written examination	5	Each term	2

Events					
SS 2019	2183703	Modelling and Simulation	2+1 SWS	Lecture / Practice (VÜ)	Nestler
WS 19/20	2183703	Numerical methods and simulation techniques	3 SWS	Lecture / Practice (VÜ)	Nestler

Competence Certificate
Written exam, 90 min

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics, physics and materials science

T 8.162 Course: Modelling of Microstructures [T-MACH-105303]

Responsible: Dr. Anastasia August
Prof. Dr. Britta Nestler

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module
M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	5	Each winter term	2

Events					
WS 19/20	2183702	Modelling of Microstructures	3 SWS	Lecture / Practice (VÜ)	August, Nestler

Competence Certificate
oral exam 30 min

Prerequisites
none

Recommendation
materials science
fundamental mathematics

T 8.163 Course: Modern Control Concepts I [T-MACH-105539]

Responsible: Dr. Lutz Groell
PD Dr.-Ing. Jörg Matthes

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2019	2105024	Modern Control Concepts I	2 SWS	Lecture (V)	Matthes, Groell

Competence Certificate
Written exam (Duration: 1 h)

Prerequisites
none

T 8.164 Course: Novel Actuators and Sensors [T-MACH-102152]

Responsible: Prof. Dr. Manfred Kohl
Dr. Martin Sommer

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	3

Events					
WS 19/20	2141865	Novel actuators and sensors	2 SWS	Lecture (V)	Kohl, Sommer

Competence Certificate
written exam, 60 minutes

Prerequisites
none

T 8.165 Course: Numerical Fluid Mechanics [T-MACH-105338]

Responsible: Dr.-Ing. Franco Magagnato
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology
M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	2

Events					
WS 19/20	2153441	Numerical Fluid Mechanics	2 SWS	Lecture (V)	Magagnato

Competence Certificate
oral exam - 30 minutes

Prerequisites
none

T 8.166 Course: Photovoltaics [T-ETIT-101939]

Responsible: Prof. Dr.-Ing. Michael Powalla
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology

Type	Credits	Recurrence	Version
Written examination	6	Each summer term	2

Events					
SS 2019	2313737	Photovoltaics	4 SWS	Lecture (V)	Powalla, Lemmer

Prerequisites
"M-ETIT-100524 - Solar Energy" must not have started.

T 8.167 Course: Physical and Chemical Principles of Nuclear Energy in View of Reactor Accidents and Back-End of Nuclear Fuel Cycle [T-MACH-105537]

Responsible: Dr. Ron Dagan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology

Type	Credits	Recurrence	Version
Oral examination	2	Each winter term	2

Events					
WS 19/20	2189906	Physical and chemical principles of nuclear energy in view of reactor accidents and back-end of nuclear fuel cycle	1 SWS	Lecture (V)	Dagan

Competence Certificate
oral exam, 30 min.

Prerequisites
none

T 8.168 Course: Physical Basics of Laser Technology [T-MACH-102102]

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

Part of: M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Version
Oral examination	5	Each winter term	3

Events					
WS 19/20	2181612	Physical basics of laser technology	3 SWS	Lecture / Practice (VÜ)	Schneider

Competence Certificate
oral examination (30 min)

no tools or reference materials

Prerequisites
It is not possible, to combine this brick with brick Laser Application in Automotive Engineering [T-MACH-105164] and brick Physical Basics of Laser Technology [T-MACH-109084]

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-105164 - Laser in Automotive Engineering must not have been started.

Recommendation
Basic knowledge of physics, chemistry and material science

T 8.169 Course: Physics for Engineers [T-MACH-100530]

Responsible: Prof. Dr. Martin Dienwiebel
Prof. Dr. Peter Gumbsch
Prof. Dr. Alexander Nesterov-Müller
Dr. Daniel Weygand

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	1

Events					
SS 2019	2142890	Physics for Engineers	2 SWS	Lecture (V)	Weygand, Dienwiebel, Nesterov-Müller, Gumbsch

Competence Certificate
written exam 90 min

Prerequisites
none

T 8.170 Course: PLM for Product Development in Mechatronics [T-MACH-102181]

Responsible: Prof. Dr.-Ing. Martin Eigner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2122376	PLM for product development in mechatronics	SWS	Lecture (V)	Eigner
WS 19/20	2122376	PLM for product development in mechatronics	SWS	Lecture (V)	Eigner

Competence Certificate
Oral examination 20 min.

Prerequisites
none

T 8.171 Course: PLM-CAD Workshop [T-MACH-102153]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management

Type	Credits	Recurrence	Version
Examination of another type	4	Each term	2

Events					
SS 2019	2121357	PLM-CAD Workshop	4 SWS	Practical course (P)	Ovtcharova, Mitarbeiter
WS 19/20	2121357	PLM-CAD Workshop	4 SWS	Project (PRO)	Ovtcharova, Mitarbeiter

Competence Certificate
Alternative exam assessment (graded)

Prerequisites
None

Annotation
Number of participants is limited, compulsory attendance

T 8.172 Course: Polymer Engineering I [T-MACH-102137]

Responsible: Prof. Dr.-Ing. Peter Elsner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2173590	Polymer Engineering I	2 SWS	Lecture (V)	Elsner, Liebig

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
none

T 8.173 Course: Powertrain Systems Technology A: Automotive Systems [T-MACH-105233]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen
Sascha Ott

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	2

Events					
SS 2019	2146180	Powertrain Systems Technology A: Automotive Systems	2 SWS	Lecture (V)	Albers, Ott

Competence Certificate
written examination: 60 min duration

Prerequisites
None

T 8.174 Course: Powertrain Systems Technology B: Stationary Machinery [T-MACH-105216]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen
Sascha Ott

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102815 - Major Field: Engineering Design

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	2

Events					
WS 19/20	2145150	Powertrain Systems Technology B: Stationary Machinery	2 SWS	Lecture (V)	Albers, Ott

Competence Certificate
written examination: 60 min duration

Prerequisites
None

T 8.175 Course: Practical Training in Measurement of Vibrations [T-MACH-105373]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102820 - Major Field: Mechatronics
M-MACH-104442 - Major Field: Vibration Theory

Type	Credits	Recurrence	Version
Completed coursework	4	Each summer term	1

Events					
SS 2019	2162208	Schwingungstechnisches Praktikum	SWS	Practical course (P)	Fidlin, Aramendiz Fuentes

Competence Certificate
Colloquium to each session, 10 out of 10 colloquiums must be passed

Prerequisites
Can not be combined with Experimental Dynamics (T-MACH-105514).

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-105514 - Experimental Dynamics must not have been started.

Recommendation
Vibration Theory, Mathematical Methods of Vibration Theory, Dynamic Stability, Nonlinear Vibrations

T 8.176 Course: Presentation [T-MACH-109189]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-104494 - Bachelor Thesis

Type	Credits	Recurrence	Version
Completed coursework	3	Each term	1

Competence Certificate
The colloquium presentation must be held within 6 weeks after the submission of the bachelor thesis. The presentation should last around 20 minutes followed by a scientific discussion with the present expert audience. The students should show that they are able to independently present and discuss the content of their bachelor thesis according to scientific criteria.

Prerequisites
Bachelor Thesis has been started

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-109188 - Bachelor Thesis must have been started.

Annotation
The workload for the presentation of the bachelor thesis is about 90 hours.

T 8.177 Course: Principles of Ceramic and Powder Metallurgy Processing [T-MACH-102111]

Responsible: Dr. Günter Schell
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2193010	Basic principles of powder metallurgical and ceramic processing	2 SWS	Lecture (V)	Schell

Competence Certificate
The assessment consists of an oral exam (20-30 min) taking place at the agreed date. The re-examination is offered upon agreement.

Prerequisites
none

8.178 Course: Product- and Production-Concepts for modern Automobiles [T-MACH-110318]

Responsible: Dr. Stefan Kienzle
Dr. Dieter Steegmüller

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2149670	Product- and Production-Concepts for modern Automobiles	2 SWS	Lecture (V)	Steegmüller, Kienzle

Competence Certificate
Oral Exam (20 min)

Prerequisites
T-MACH-105166 - Materials and Processes for Body Leightweight Construction in the Automotive Industry must not have been started.

T 8.179 Course: Product Lifecycle Management [T-MACH-105147]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management
M-MACH-102589 - Major Field: Production Systems
M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	2

Events					
WS 19/20	2121350	Product Lifecycle Management	2 SWS	Lecture (V)	Ovtcharova

Competence Certificate
Writen examination 90 min.

Prerequisites
None

T 8.180 Course: Product, Process and Resource Integration in the Automotive Industry [T-MACH-102155]

Responsible: Dr.-Ing. Sama Mbang
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2019	2123364	Product, Process and Resource Integration in the Automotive Industry	2 SWS	Lecture (V)	Mbang

Competence Certificate
Oral examination 20 min.

Prerequisites
None

Annotation
Limited number of participants.

T 8.181 Course: Production and Logistics Controlling [T-WIWI-103091]

Responsible: Alexander Rausch
Organisation: KIT Department of Economics and Management
Part of: M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Competence Certificate
The assessment consists of a written exam (60 minutes) following §4(2), 1 of the examination regulation.
The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

T 8.182 Course: Production Operations Management [T-MACH-100304]

Responsible: Prof. Dr.-Ing. Kai Furmans
Prof. Dr.-Ing. Gisela Lanza
Prof. Dr. Frank Schultmann

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-100297 - Production Operations Management

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	2

Events					
WS 19/20	2110085	Production Operations Management	3 SWS	Lecture / Practice (VÜ)	Furmans, Lanza

Competence Certificate
written exam (duration: 90 min)

Prerequisites
T-MACH-108734 - Production Operations Management-Project must have been completed successfully.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-108734 - Production Operations Management-Project must have been passed.

T 8.183 Course: Production Operations Management-Project [T-MACH-108734]

Responsible: Prof. Dr.-Ing. Kai Furmans
Prof. Dr.-Ing. Gisela Lanza

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-100297 - Production Operations Management

Type	Credits	Recurrence	Version
Examination of another type	2	Each winter term	1

Events					
WS 19/20	2110086	Production Operations Management-Project	1 SWS	Project (PRO)	Furmans, Lanza

Competence Certificate

Assignments during the semester consisting of solving 4 and presenting 2 case studies, whereof:

- 80% assessment of the case study as group work
- 20% evaluation of the defense of the case studies as an individual grade

Prerequisites

none

T 8.184 Course: Project Management in Global Product Engineering Structures [T-MACH-105347]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Peter Gutzmer
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management
M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2145182	Project management in Global Product Engineering Structures	2 SWS	Lecture (V)	Gutzmer

Competence Certificate
oral exam (20 min)

Aids: None

Prerequisites
none

T 8.185 Course: Project Management in Rail Industry [T-MACH-104599]

Responsible: Prof. Dr.-Ing. Peter Gratzfeld
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102638 - Major Field: Rail System Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2115995	Project Management in Rail Industry	2 SWS	Lecture (V)	Gratzfeld

Competence Certificate
Oral examination

Duration: ca. 20 minutes

No tools or reference materials may be used during the exam.

Prerequisites
none

T 8.186 Course: Project Workshop: Automotive Engineering [T-MACH-102156]

Responsible: Dr.-Ing. Michael Frey
Prof. Dr. Frank Gauterin
Dr.-Ing. Martin Gießler

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	6	Each term	1

Events					
SS 2019	2115817	Project Workshop: Automotive Engineering	3 SWS	Lecture (V)	Gauterin, Gießler, Frey
WS 19/20	2115817	Project Workshop: Automotive Engineering	3 SWS	Lecture (V)	Gauterin, Gießler, Frey

Competence Certificate
Oral examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

8.187 Course: Quality Management [T-MACH-102107]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102589 - Major Field: Production Systems
M-MACH-102815 - Major Field: Engineering Design
M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	2149667	Quality Management	2 SWS	Lecture (V)	Lanza

Competence Certificate
Written Exam (60 min)

Prerequisites
none

T 8.188 Course: Rail System Technology [T-MACH-106424]

Responsible: Prof. Dr.-Ing. Peter Gratzfeld
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102638 - Major Field: Rail System Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each term	1

Events					
SS 2019	2115919	Rail System Technology	2 SWS	Lecture (V)	Gratzfeld
WS 19/20	2115919	Rail System Technology	2 SWS	Lecture (V)	Gratzfeld

Competence Certificate
Oral examination

Duration: ca. 20 minutes

No tools or reference materials may be used during the exam.

Prerequisites
none

T 8.189 Course: Rail Vehicle Technology [T-MACH-105353]

Responsible: Prof. Dr.-Ing. Peter Gratzfeld
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102638 - Major Field: Rail System Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each term	1

Events					
SS 2019	2115996	Rail Vehicle Technology	2 SWS	Lecture (V)	Gratzfeld
WS 19/20	2115996	Rail Vehicle Technology	2 SWS	Lecture (V)	Gratzfeld

Competence Certificate
Oral examination

Duration: ca. 20 minutes

No tools or reference materials may be used during the exam.

Prerequisites
none

T 8.190 Course: Railways in the Transportation Market [T-MACH-105540]

Responsible: Prof. Dr.-Ing. Peter Gratzfeld
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102638 - Major Field: Rail System Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2114914	Railways in the Transportation Market	2 SWS	Block (B)	Gratzfeld

Competence Certificate

Oral examination

Duration: ca. 20 minutes

No tools or reference materials may be used during the exam.

Prerequisites

none

T 8.191 Course: Reliability Engineering 1 [T-MACH-107447]

Responsible: Dr.-Ing. Alexei Konnov
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102817 - Major Field: Information Technology
M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Written examination	3	Each winter term	1

Events					
WS 19/20	2169550	Reliability Engineering 1	2 SWS	Lecture (V)	Konnov

Competence Certificate
written exam

Prerequisites
none

T 8.192 Course: Robotics I - Introduction to Robotics [T-INFO-108014]

Responsible: Prof. Dr.-Ing. Tamim Asfour
Organisation: KIT Department of Informatics
Part of: M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Written examination	6	Each winter term	1

Events					
WS 19/20	2424152	Robotics I - Introduction to Robotics	3/1 SWS	Lecture (V)	Asfour

T 8.193 Course: Safety Engineering [T-MACH-105171]

Responsible: Hans-Peter Kany
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design
M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	2

Events					
WS 19/20	2117061	Safety Engineering	2 SWS	Lecture (V)	Kany

Competence Certificate
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

8.194 Course: Scientific Computing for Engineers [T-MACH-100532]

Responsible: Prof. Dr. Peter Gumbsch
Dr. Daniel Weygand

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	2

Events					
WS 19/20	2181738	Scientific computing for Engineers	2 SWS	Lecture (V)	Weygand, Gumbsch
WS 19/20	2181739	Exercises for Scientific Computing for Engineers	2 SWS	Practice (Ü)	Weygand

Competence Certificate
Written exam (90 minutes)

Prerequisites
The brick can not be combined with the brick "Application of advanced programming languages in mechanical engineering" (T-MACH-105390).

T 8.195 Course: Selected Applications of Technical Logistics [T-MACH-102160]

Responsible: Viktor Milushev
Dr.-Ing. Martin Mittwollen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2118087	Selected Applications of Technical Logistics	3 SWS	Lecture (V)	Mittwollen, Milushev

Competence Certificate
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

Recommendation
Knowledge out of Basics of Technical Logistics (T-MACH-102163) / Elements and Systems of Technical Logistics (T-MACH-102159) preconditioned

8.196 Course: Selected Applications of Technical Logistics - Project [T-MACH-108945]

Responsible: Viktor Milushev
Dr.-Ing. Martin Mittwollen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Examination of another type	2	Each summer term	1

Competence Certificate
presentation of performed project and defense (30min) according to $4 (2), No. 3 of the examination regulation

Prerequisites
T-MACH-102160 (selected applications of technical logistics) must have been started

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-102160 - Selected Applications of Technical Logistics must have been started.

Recommendation
Knowledge out of Basics of Technical Logistics (T-MACH-102163) / Elements and Systems of Technical Logistics (T-MACH-102159) preconditioned

T 8.197 Course: Selected Problems of Applied Reactor Physics and Exercises [T-MACH-105462]

Responsible: Dr. Ron Dagan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2190411	Selected Problems of Applied Reactor Physics and Exercises	2 SWS	Lecture (V)	Dagan

Competence Certificate
oral exam, 1/2 hour

Prerequisites
none

T 8.198 Course: Seminar for Rail System Technology [T-MACH-108692]

Responsible: Prof. Dr.-Ing. Peter Gratzfeld
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102638 - Major Field: Rail System Technology

Type	Credits	Recurrence	Version
Examination of another type	3	Each term	2

Events					
SS 2019	2115009	Seminar for Rail System Technology	1 SWS	Seminar (S)	Gratzfeld
WS 19/20	2115009	Seminar for Rail System Technology	1 SWS	Seminar (S)	Gratzfeld

Competence Certificate
Examination: Writing a Seminararbeit, final presentation

Prerequisites
none

8.199 Course: Signals and Systems [T-ETIT-109313]

Responsible: Prof. Dr.-Ing. Fernando Puente León
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Expansion	Version
Written examination	6	Each winter term	1 terms	1

Events					
WS 19/20	2302109	Signals and Systems	2 SWS	Lecture (V)	Puente León

Prerequisites
none

T 8.200 Course: Simulation of Coupled Systems [T-MACH-105172]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Yusheng Xiang

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2019	2114095	Simulation of Coupled Systems	2 SWS	Lecture (V)	Geimer, Xiang

Competence Certificate

The assessment consists of an oral exam (20 min) taking place in the recess period. The exam takes place in every semester. Re-examinations are offered at very ordinary examination date.

A registration in mandatory, the details will be announced on the webpages of the *Institute of Vehicle System Technology / Institute of Mobile Machines*. In case of too many applications, attendance will be granted based on pre-qualification.

Prerequisites

Required for the participation in the examination is the preparation of a report during the semester. The partial service with the code T-MACH-108888 must have been passed.

Modeled Conditions

The following conditions have to be fulfilled:

1. The course T-MACH-108888 - Simulation of Coupled Systems - Advance must have been passed.

Recommendation

- Knowledge of ProE (ideally in actual version)
- Basic kniwledge of Matlab/Simulink
- Basic knowledge of dynamics of machnies
- Basic knowledge of hydraulics

Annotation

After completion of course, students are able to:

- build a coupled simulation
- parametrize models
- perform simulations
- conduct troubleshooting
- check results for plausibility

The number of participants is limited.

Content:

- Basics of multi-body and hydralics simulation programs
- Possibilities of coupled simulations
- Modelling and Simulation of Mobile Machines using a wheel loader
- Documentation of the result in a short report

Literature:

Software guide books (PDFs)

Information about wheel-type loader specifications

T 8.201 Course: Simulation of Coupled Systems - Advance [T-MACH-108888]

Responsible: Prof. Dr.-Ing. Marcus Geimer
Yusheng Xiang

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics

Type	Credits	Recurrence	Version
Completed coursework	0	Each summer term	1

Competence Certificate
Preparation of semester report

Prerequisites
none

T 8.202 Course: SmartFactory@Industry (MEI) [T-MACH-106733]

Responsible: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102644 - Major Field: Production Engineering

Type	Credits	Recurrence	Version
Examination of another type	4	Each summer term	1

Events					
SS 2019	3150044	SmartFactory@Industry	2 SWS		Lanza

Competence Certificate
alternative test achievement (graded)

- colloquium (approx. 15 min)
- presentation (approx. 20 min)

Prerequisites
Successful completion of the following courses:

- M-MACH-102563 - Computer Science
- MACH-102573 - Mechanical Design

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-MACH-102563 - Computer Science must have been passed.
2. The module M-MACH-102573 - Mechanical Design must have been passed.

T 8.203 Course: Solar Thermal Energy Systems [T-MACH-106493]

Responsible: Dr. Ron Dagan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	2

Events					
WS 19/20	2189400	Solar Thermal Energy Systems	2 SWS	Lecture (V)	Dagan

Competence Certificate
oral exam of about 30 minutes

Prerequisites
none

Recommendation
Literature

1. "Solar Engineering of Thermal Processes", 4th Edition, J. Duffie &W. Beckman. Published by Wiley & Sons
2. “Heat Transfer”, 10th Edition, J. P. Holman Mc. Graw Hill publisher
3. “Fundamentals of classical Thermodynamics”, G. Van Wylen & R. E. Sonntag. Published by Wiley &Sons

T 8.204 Course: Strategic product development - identification of potentials of innovative products [T-MACH-105696]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen
Dr.-Ing. Andreas Siebe

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	3	Each summer term	2

Events					
SS 2019	2146198	Strategic product development - identification of potentials of innovative products	2 SWS	Lecture (V)	Siebe

Competence Certificate
Oral exam in small groups (30 minutes)

Prerequisites
The precondition of this partial work is the successful processing of a case study(T-MACH-110396): written elaboration & presentation of the results (15 minutes)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110396 - Strategic product development - identification of potentials of innovative products - Case Study must have been passed.

T 8.205 Course: Strategic product development - identification of potentials of innovative products - Case Study [T-MACH-110396]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen
Dr.-Ing. Andreas Siebe

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Completed coursework (practical)	1	Each summer term	1

Events					
SS 2019	2146198	Strategic product development - identification of potentials of innovative products	2 SWS	Lecture (V)	Siebe

Competence Certificate
Successful processing of a case study(T-MACH-110396): written elaboration & presentation of the results (15 minutes)

T 8.206 Course: Structural Analysis of Composite Laminates [T-MACH-105970]

Responsible: Dr.-Ing. Luise Kärger
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module
M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2113106	Structural Analysis of Composite Laminates	2 SWS	Lecture (V)	Kärger

Competence Certificate
oral exam, 20 min

Prerequisites
none

T 8.207 Course: Supply Chain Management [T-MACH-105181]

Responsible: Dr.-Ing. Knut Alicke
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management

Type	Credits	Recurrence	Version
Oral examination	6	Each winter term	1

Competence Certificate
The assessment consists of an oral exam (20 min.) taking place in the recess period according to § 4 paragraph 2 Nr. 2 of the examination regulation.

Prerequisites
none

T 8.208 Course: Sustainable Product Engineering [T-MACH-105358]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen
Dr. Karl-Friedrich Ziegahn

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management
M-MACH-102812 - Major Field: Powertrain Systems
M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2019	2146192	Sustainable Product Engineering	2 SWS	Lecture (V)	Ziegahn

Competence Certificate
written exam (60 min)

Prerequisites
none

T 8.209 Course: System Integration in Micro- and Nanotechnology [T-MACH-105555]

Responsible: Dr. Ulrich Gengenbach
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2106033	System Integration in Micro- and Nanotechnology	2 SWS	Lecture (V)	Gengenbach

Competence Certificate
oral exam (Duration: 30 min)

Prerequisites
none

8.210 Course: Systematic Materials Selection [T-MACH-100531]

Responsible: Dr.-Ing. Stefan Dietrich
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	3

Events					
SS 2019	2174576	Systematic Materials Selection	3 SWS	Lecture (V)	Dietrich
SS 2019	2174577	Übungen zu 'Systematische Werkstoffauswahl'	1 SWS	Practice (Ü)	Dietrich, Mitarbeiter

Competence Certificate
The assessment is carried out as a written exam of 2 h.

Prerequisites
M-MACH-102562 - Materials Science must be passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-MACH-102562 - Materials Science must have been passed.

Recommendation
Basic knowledge in materials science, mechanics and mechanical design due to the lecture Materials Science I/II.

T 8.211 Course: Technical Design in Product Development [T-MACH-105361]

Responsible: Prof. Dr.-Ing. Albert Albers
Prof. Dr.-Ing. Sven Matthiesen
Dr.-Ing. Markus Schmid

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2019	2146179	Technical Design in Product Development	2 SWS	Lecture (V)	Schmid

Competence Certificate
Written exam (20 min)

Only dictionnary is allowed

Prerequisites
none

T 8.212 Course: Technical Thermodynamics and Heat Transfer I [T-MACH-104747]

Responsible: Prof. Dr. Ulrich Maas
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102574 - Technical Thermodynamics

Type	Credits	Recurrence	Version
Written examination	8	Each winter term	2

Events					
WS 19/20	2165501	Technical Thermodynamics and Heat Transfer I	4 SWS	Lecture (V)	Maas
WS 19/20	3165014	Technical Thermodynamics and Heat Transfer I	4 SWS	Lecture (V)	Schießl, Maas

Competence Certificate
Written exam [duration: 180 min]

Prerequisites
Successful participation in the tutorial (T-MACH-105204 - Excercises in Technical Thermodynamics and Heat Transfer I)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-105204 - Excercises in Technical Thermodynamics and Heat Transfer I must have been passed.

T 8.213 Course: Technical Thermodynamics and Heat Transfer II [T-MACH-105287]

Responsible: Prof. Dr. Ulrich Maas
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102574 - Technical Thermodynamics

Type	Credits	Recurrence	Version
Written examination	7	Each summer term	1

Events					
SS 2019	2166526	Technical Thermodynamics and Heat Transfer II	3 SWS	Lecture (V)	Maas
SS 2019	3166526	Technical Thermodynamics and Heat Transfer II	3 SWS	Lecture (V)	Schießl

Competence Certificate
Written exam [duration: 180 min]

Prerequisites
Successful participation in the tutorial (T-MACH-105288 - Exercises in Technical Thermodynamics and Heat Transfer II)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-105288 - Excercises in Technical Thermodynamics and Heat Transfer II must have been passed.

T 8.214 Course: Technology of Steel Components [T-MACH-105362]

Responsible: Prof. Dr.-Ing. Volker Schulze
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	2

Events					
SS 2019	2174579	Technology of steel components	2 SWS	Lecture (V)	Schulze

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
M-MACH-102562 - Materials Science must be passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-MACH-102562 - Materials Science must have been passed.

T 8.215 Course: Theoretical Description of Mechatronic Systems [T-MACH-105521]

Responsible: Prof. Dr.-Ing. Wolfgang Seemann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2161117	Theoretical Description of Mechatronic Systems	2 SWS	Lecture (V)	Seemann

Competence Certificate
oral exam, approx. 30 min..

Prerequisites
none

T 8.216 Course: Theory of Stability [T-MACH-105372]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102820 - Major Field: Mechatronics
M-MACH-104442 - Major Field: Vibration Theory

Type	Credits	Recurrence	Version
Oral examination	6	Each summer term	1

Events					
SS 2019	2163113	Theory of Stability	2 SWS	Lecture (V)	Fidlin
SS 2019	2163114	Übungen zu Stabilitätstheorie	2 SWS	Practice (Ü)	Fidlin, Schröders

Competence Certificate
oral exam, 30 min.

Prerequisites
none

Recommendation
Vibration theory, Mathematical Methods of Vibration Theory

T 8.217 Course: Thermal Solar Energy [T-MACH-105225]

Responsible: Prof. Dr. Robert Stieglitz
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2169472	Thermal Solar Energy	2 SWS	Lecture (V)	Stieglitz

Competence Certificate
Oral examination, 30 minutes

Prerequisites
none

T 8.218 Course: Thermal Turbomachines I [T-MACH-105363]

Responsible: Prof. Dr.-Ing. Hans-Jörg Bauer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Oral examination	6	Each winter term	1

Events					
WS 19/20	2169453	Thermal Turbomachines I	3 SWS	Lecture / Practice (VÜ)	Bauer
WS 19/20	2169454	Tutorial - Thermal Turbo Machines I (Übungen zu Thermische Turbomaschinen I)	2 SWS	Practice (Ü)	Bauer
WS 19/20	2169553	Thermal Turbomachines I (in English)	3 SWS	Lecture / Practice (VÜ)	Bauer

Competence Certificate
oral exam, duration 30 min.

Prerequisites
none

T 8.219 Course: Thermal Turbomachines II [T-MACH-105364]

Responsible: Prof. Dr.-Ing. Hans-Jörg Bauer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Oral examination	6	Each summer term	2

Events					
SS 2019	2170476	Thermal Turbomachines II	3 SWS	Lecture (V)	Bauer
SS 2019	2170477	Tutorial - Thermal Turbomachines II (Übung - Thermische Turbomaschinen II)	2 SWS	Practice (Ü)	Bauer, Mitarbeiter
SS 2019	2170553	Thermal Turbomachines II (in English)	3 SWS	Lecture / Practice (VÜ)	Bauer, Mitarbeiter

Competence Certificate
oral exam, duration: 30 min.

Prerequisites
none

T 8.220 Course: Tires and Wheel Development for Passenger Cars [T-MACH-102207]

Responsible: Dr.-Ing. Günter Leister
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2114845	Tires and Wheel Development for Passenger Cars	2 SWS	Lecture (V)	Leister

Competence Certificate
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
none

T 8.221 Course: Tribology [T-MACH-105531]

Responsible: Prof. Dr. Martin Dienwiebel
Prof. Dr.-Ing. Matthias Scherge

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102812 - Major Field: Powertrain Systems

Type	Credits	Recurrence	Version
Oral examination	8	Each winter term	2

Events					
WS 19/20	2181114	Tribology	5 SWS	Lecture / Practice (VÜ)	Dienwiebel, Scherge

Competence Certificate
oral examination (ca. 40 min)

no tools or reference materials

Prerequisites
admission to the exam only with successful completion of the exercises [T-MACH-109303]

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-109303 - Exercices - Tribology must have been passed.

Recommendation
preliminary knowlegde in mathematics, mechanics and materials science

T 8.222 Course: Turbo Jet Engines [T-MACH-105366]

Responsible: Prof. Dr.-Ing. Hans-Jörg Bauer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2170478	Turbo Jet Engines	2 SWS	Lecture (V)	Bauer, Mitarbeiter

Competence Certificate
oral exam, duration: 20 min.

Prerequisites
none

T 8.223 Course: Tutorial Advanced Mathematics I [T-MATH-100525]

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

Organisation: KIT Department of Mathematics

Part of: M-MATH-102859 - Advanced Mathematics

Type	Credits	Recurrence	Version
Completed coursework (written)	0	Each winter term	2

Events					
WS 19/20	0131100	Übungen zu 0131000	2 SWS	Practice (Ü)	Arens
WS 19/20	0131300	Übungen zu 0131200	2 SWS	Practice (Ü)	Arens

Competence Certificate
Learning assessment is carried out by written assigments (pre-requesite). Exact requirements will be communicated in the lectures.

Prerequisites
None.

T 8.224 Course: Tutorial Advanced Mathematics II [T-MATH-100526]

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

Organisation: KIT Department of Mathematics

Part of: M-MATH-102859 - Advanced Mathematics

Type	Credits	Recurrence	Version
Completed coursework (written)	0	Each summer term	2

Events					
SS 2019	0180900	Übungen zu 0180800	2 SWS	Practice (Ü)	Hettlich
SS 2019	0181100	Übungen zu 0181000	2 SWS	Practice (Ü)	Hettlich

Competence Certificate
Learning assessment is carried out by written assigments (pre-requesite). Exact requirements will be communicated in the lectures.

Prerequisites
None.

T 8.225 Course: Tutorial Advanced Mathematics III [T-MATH-100527]

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

Organisation: KIT Department of Mathematics

Part of: M-MATH-102859 - Advanced Mathematics

Type	Credits	Recurrence	Version
Completed coursework (written)	0	Each winter term	2

Events					
WS 19/20	0131500	Übungen zu 0131400	2 SWS	Practice (Ü)	Griesmaier

Competence Certificate
Learning assessment is carried out by written assigments (pre-requesite). Exact requirements will be communicated in the lectures.

Prerequisites
None.

T 8.226 Course: Tutorial Continuum Mechanics of solids and fluids [T-MACH-110333]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Prof. Dr.-Ing. Bettina Frohnapfel

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102582 - Major Field: Continuum Mechanics
M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Version
Completed coursework	1	Each winter term	1

Events					
WS 19/20	2161253	Tutorial Continuum mechanics of solids and fluids	1 SWS	Practice (Ü)	Dyck, Böhlke

Competence Certificate

Successfully passing the Tutorial is a prerequisite for taking part in the exam "Continuum Mechanics of Solids and Fluids" (T-MACH-110377)

For students of Mechanical Engineering (Bachelor) that have chosen the Major Field "Continuum Mechanics", the prerequisites consist of successfully solving the written homework sheets as well as the computational homework sheets using the commercial Finite Element Program Abaqus.during the associated Lab Course.

For students of Mechanical Engineering (Bachelor) that have chosen a different Major Field of students from different fields of study the prerequisites consist of successfully solving only the written homework sheets. For organizational matters these students can not take part into the Lab Course.

Prerequisites

None

T 8.227 Course: Tutorial Engineering Mechanics I [T-MACH-100528]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102572 - Engineering Mechanics

Type	Credits	Recurrence	Version
Completed coursework	0	Each winter term	2

Events					
WS 19/20	2161246	Tutorial Engineering Mechanics I	2 SWS	Practice (Ü)	Lang, Gajek, Böhlke
WS 19/20	3161011	Engineering Mechanics I (Tutorial)	2 SWS	Practice (Ü)	Pallicity, Langhoff

Competence Certificate
Attestations have to be achieved in the following four categories: mandatory written homework problems, written homework problems, computational homework problems, colloquia.

This course is passed if all mandatory written homework problems are passed and if in the other three categories (written homework problems, computational homework problems, colloquia) in total at most three attestations have been finally not passed, at most one in each of the three categories.

Succesful participation in this course allows for registration to the Exam "Engineering Mechanics I" (see T-MACH-100282)

Prerequisites
None

T 8.228 Course: Tutorial Engineering Mechanics II [T-MACH-100284]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102572 - Engineering Mechanics

Type	Credits	Recurrence	Version
Completed coursework (written)	0	Each summer term	2

Events					
SS 2019	2162251	Tutorial Engineering Mechanics II	2 SWS	Practice (Ü)	N.N., Schneider
SS 2019	3162011	Engineering Mechanics II (Tutorial)	2 SWS	Practice (Ü)	N.N., Langhoff

Competence Certificate

Attestations have to be achieved in the following four categories: mandatory written homework problems, written homework problems, computational homework problems, colloquia.

This course is passed if all mandatory written homework problems are passed and if in the other three categories (written homework problems, computational homework problems, colloquia) in total at most two attestations have been finally not passed, at most one in each of the three categories.

Succesful participation in this course allows for registration to the Exam "Engineering Mechanics II" (see T-MACH-100283)

Prerequisites

None

T 8.229 Course: Tutorial Engineering Mechanics III [T-MACH-105202]

Responsible: Prof. Dr.-Ing. Wolfgang Seemann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102572 - Engineering Mechanics

Type	Credits	Recurrence	Version
Completed coursework (written)	0	Each winter term	2

Events					
WS 19/20	2161204	Engineering Mechanics III (Tutorial)	2 SWS	Practice (Ü)	Seemann, Keller, N.N.
WS 19/20	3161013	Engineering Mechanics III (Tutorial)	2 SWS	Practice (Ü)	Seemann, Keller

Competence Certificate
Attestations, succesful accomplishment of exercise sheets

Prerequisites
None

T 8.230 Course: Tutorial Engineering Mechanics IV [T-MACH-105203]

Responsible: Prof. Dr.-Ing. Wolfgang Seemann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102572 - Engineering Mechanics

Type	Credits	Recurrence	Version
Completed coursework (written)	0	Each summer term	1

Events					
SS 2019	2162232	Engineering Mechanics IV (Tutorial)	2 SWS	Practice (Ü)	Seemann, Yüzbasioglu, Keller
SS 2019	3162013	Engineering Mechanics 4 (Tutorial)	2 SWS	Practice (Ü)	Seemann, Yüzbasioglu, Keller

Competence Certificate
Attestations, succesful accomplishment of exercise sheets

T 8.231 Course: Tutorial Introduction to the Finite Element Method [T-MACH-110330]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102582 - Major Field: Continuum Mechanics

Type	Credits	Recurrence	Version
Completed coursework	1	Each summer term	1

Events					
SS 2019	2162257	Tutorial "Introduction to the Finite Element Method"	1 SWS	Practice (Ü)	Langhoff, Böhlke

Competence Certificate
Depening on the field of study, attestations have to be achieved in the following categories: written homework problems and computational homework problems

This course is passed if in total at most two attestations have finally not been passed

Successful participation in this course allows for registration to the Exam "Introduction to the Finite Element Method" (see 76-T-MACH-105320)

Annotation
Knowledge of the contents of the courses "Continuum Mechanics of Solids and Fluids" and "Mathematical Methods of Continuum Mechanics" as well as the corresponding tutorials are expected.

The assignment of the restricted places in the Lab Course is crucial to the institute.

T 8.232 Course: Tutorial Mathematical Methods in Continuum Mechanics [T-MACH-110376]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-102582 - Major Field: Continuum Mechanics
M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Expansion	Version
Completed coursework	1	Each winter term	1 terms	1

Events					
WS 19/20	2161255	Tutorial Mathematical Methods in Continuum Mechanics	2 SWS	Practice (Ü)	Wicht, Böhlke

Competence Certificate
successfully solving the homework sheets. Details are announced in the first lecture.

Prerequisites
None

T 8.233 Course: Value stream within enterprises – The value chain at Bosch [T-MACH-106375]

Responsible: Dr. Rudolf Maier
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102576 - Key Competences

Type	Credits	Recurrence	Version
Completed coursework	2	Each winter term	1

Events					
WS 19/20	2149661	The value stream in an industrial company - The value chain at BOSCH as an example	2 SWS	Seminar (S)	Maier

Competence Certificate
alternative achievement (ungraded):
- attendance on at least 12 lecture units

Prerequisites
none

8.234 Course: Vehicle Comfort and Acoustics I [T-MACH-105154]

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-104442 - Major Field: Vibration Theory

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
SS 2019	2114856	Vehicle Ride Comfort & Acoustics I	2 SWS	Lecture (V)	Gauterin
WS 19/20	2113806	Vehicle Comfort and Acoustics I	2 SWS	Lecture (V)	Gauterin

Competence Certificate
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
Can not be combined with lecture T-MACH-102206

T 8.235 Course: Vehicle Comfort and Acoustics II [T-MACH-105155]

Responsible: Prof. Dr. Frank Gauterin
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102818 - Major Field: Vehicle Technology
M-MACH-104442 - Major Field: Vibration Theory

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	2114825	Vehicle Comfort and Acoustics II	2 SWS	Lecture (V)	Gauterin
SS 2019	2114857	Vehicle Ride Comfort & Acoustics II	2 SWS	Lecture (V)	Gauterin

Competence Certificate
Oral Examination

Duration: 30 up to 40 minutes

Auxiliary means: none

Prerequisites
Can not be combined with lecture T-MACH-102205

T 8.236 Course: Vehicle Ergonomics [T-MACH-108374]

Responsible: Dr.-Ing. Tobias Heine
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102815 - Major Field: Engineering Design
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Written examination	4	Each summer term	1

Events					
SS 2019	2110050	Vehicle Ergonomics	2 SWS	Lecture (V)	Heine

Competence Certificate
written exam, 60 minutes

Prerequisites
none

T 8.237 Course: Vehicle Lightweight Design - Strategies, Concepts, Materials [T-MACH-105237]

Responsible: Prof. Dr.-Ing. Frank Henning
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102638 - Major Field: Rail System Technology
M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Events					
WS 19/20	2113102	Vehicle Lightweight design – Strategies, Concepts, Materials	2 SWS	Lecture (V)	Henning

Competence Certificate
Written exam, 90 minutes

Prerequisites
none

Recommendation
none

T 8.238 Course: Vehicle Mechatronics I [T-MACH-105156]

Responsible: Prof. Dr.-Ing. Dieter Ammon
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102818 - Major Field: Vehicle Technology

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	1

Competence Certificate
Written examination

Duration: 90 minutes

Auxiliary means: none

Prerequisites
none

T 8.239 Course: Vibration Theory [T-MACH-105290]

Responsible: Prof. Dr.-Ing. Alexander Fidlin
Prof. Dr.-Ing. Wolfgang Seemann

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module
M-MACH-102820 - Major Field: Mechatronics
M-MACH-104430 - Major Field: Modeling and Simulation in Dynamics
M-MACH-104442 - Major Field: Vibration Theory

Type	Credits	Recurrence	Version
Written examination	5	Each winter term	2

Events					
WS 19/20	2161212	Vibration Theory	2 SWS	Lecture (V)	Fidlin, Römer
WS 19/20	2161213	Übungen zu Technische Schwingungslehre	2 SWS	Practice (Ü)	Fidlin, Römer, Burgert

Competence Certificate
written exam, 180 min.

Prerequisites
none

T 8.240 Course: Virtual Engineering (Specific Topics) [T-MACH-105381]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102746 - Compulsory Elective Module

Type	Credits	Recurrence	Version
Oral examination	4	Each summer term	1

Events					
SS 2019	3122031	Virtual Engineering (Specific Topics)	2 SWS	Lecture (V)	Ovtcharova, Mitarbeiter

Competence Certificate
oral exam, 20 min.

Prerequisites
none

T 8.241 Course: Virtual Reality Practical Course [T-MACH-102149]

Responsible: Prof. Dr.-Ing. Jivka Ovtcharova
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102583 - Major Field: Information Management
M-MACH-102820 - Major Field: Mechatronics

Type	Credits	Recurrence	Version
Examination of another type	4	Each term	2

Events					
WS 19/20	2123375	Virtual Reality Practical Course	3 SWS	Project (PRO)	Ovtcharova, Mitarbeiter

Competence Certificate
Assessment of another type (graded)

Prerequisites
None

Annotation
Number of participants is limited

8.242 Course: Warehousing and Distribution Systems [T-MACH-105174]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102821 - Major Field: Technical Logistics

Type	Credits	Recurrence	Version
Written examination	3	Each summer term	2

Events					
SS 2019	2118097	Warehousing and distribution systems	2 SWS	Lecture (V)	Furmans

Competence Certificate
The assessment consists of a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

Prerequisites
none

8.243 Course: Wave and Quantum Physics [T-PHYS-108322]

Responsible: Prof. Dr. Gernot Goll
Prof. Dr. Bernd Pilawa
Organisation: KIT Department of Physics
Part of: M-PHYS-104030 - Physics

Type	Credits	Recurrence	Version
Written examination	5	Each summer term	1

Events					
SS 2019	4040411	Wellen und Quantenphysik	2 SWS	Lecture (V)	Pilawa
SS 2019	4040412	Übungen zu Wellen und Quantenphysik	1 SWS	Practice (Ü)	Pilawa, Reisinger
SS 2019	4040431	Wave and Quantum Physics	2 SWS	Lecture (V)	Goll
SS 2019	4040432	Exercises to Wave and Quantum Physics	1 SWS	Practice (Ü)	Goll, Chung

Competence Certificate
Written exam (usually about 180 min)

Prerequisites
none

T 8.244 Course: Wave Propagation [T-MACH-105443]

Responsible: Prof. Dr.-Ing. Wolfgang Seemann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-104442 - Major Field: Vibration Theory

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	2

Events					
WS 19/20	2161219	Wave Propagation	2 SWS	Lecture (V)	Seemann

Competence Certificate
oral exam, 30 min.

T 8.245 Course: Welding Technology [T-MACH-105170]

Responsible: Dr. Majid Farajian
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102819 - Major Field: Materials Science and Engineering

Type	Credits	Recurrence	Version
Oral examination	4	Each winter term	1

Events					
WS 19/20	2173571	Welding Technology	2 SWS	Lecture (V)	Farajian

Competence Certificate
Oral exam, about 20 minutes

Prerequisites
none

Recommendation
Basics of material science (iron- and non-iron alloys), materials, processes and production, design.

All the relevant books of the German Welding Institute (DVS: Deutscher Verband für Schweißen und verwandte Verfahren) in the field of welding and joining is recommended.

T 8.246 Course: Windpower [T-MACH-105234]

Responsible: Dr. Norbert Lewald
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology
M-MACH-102838 - Major Field: Energy Converting Engines

Type	Credits	Recurrence	Version
Written examination	4	Each winter term	2

Competence Certificate
written exam, 120 minutes

Prerequisites
none

T 8.247 Course: Working Methods in Mechanical Engineering [T-MACH-105296]

Responsible: Prof. Dr.-Ing. Barbara Deml
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102576 - Key Competences

Type	Credits	Recurrence	Version
Completed coursework	4	Each summer term	1

Events					
SS 2019	2110969	Working Methods in Mechanical Engineering	1 SWS	Lecture (V)	Deml
SS 2019	2114990	Workshop 'Working Methods in Mechanical Engineering' (FAST - Bahnsystemtechnik)	1 SWS	Others (sonst.)	Gratzfeld
SS 2019	2174970	Working Methods in Mechanical Engineering	1 SWS	Lecture (V)	Deml

Competence Certificate
Tests within the workshop sessions concerning the topics of the online-lecture as well as active participation during all four workshop sessions.

Prerequisites
none

T 8.248 Course: Workshop on computer-based flow measurement techniques [T-MACH-106707]

Responsible: Prof. Dr.-Ing. Hans-Jörg Bauer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102816 - Major Field: Fundamentals of Energy Technology

Type	Credits	Recurrence	Version
Completed coursework	4	Each term	1

Events					
SS 2019	2171488	Workshop on computer-based flow measurement techniques	3 SWS	Practical course (P)	Bauer, Mitarbeiter
WS 19/20	2171488	Workshop on computer-based flow measurement techniques	3 SWS	Practical course (P)	Bauer, Mitarbeiter

Competence Certificate
Group colloquia for each topic

Duration: approximately 10 minutes

no tools or reference materials may be used

Prerequisites
none