Karlsruher Institut für Technologie

Module Handbook
Bachelor's Program Mechanical Engineering International (B.Sc.)

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KIT DEPARTMENT OF MECHANICAL ENGINEERING

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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).

Qualifications Goals

Mechanical Engineering (International) (B.Sc.)

The research and practice-oriented focus of the six-semester English-language bachelor's degree program in Mechanical Engineering (International) at KIT trains graduates for lifelong learning and international employment in typical professional fields of mechanical engineering, such as industry, research, the service sector and public administration.

Students acquire the necessary communicative, organizational, social and intercultural skills for a career in international companies and organizations. In addition, they acquire the scientific qualifications for participation in the Master's degree program in Mechanical Engineering or other related disciplines.

In the basic part of the course, graduates acquire in-depth knowledge of mathematics, mechanics, thermodynamics and materials science. This is supplemented by further basic knowledge in electrical engineering and computer science. In the application-oriented part of the course, students acquire knowledge in the areas of design, logistics and management as well as production and manufacturing planning. International accounting standards for corporate structures and international law are given special consideration in the area of corporate management. Students apply this knowledge in practice as part of a project during their studies and deepen it in an industrial internship.

The in-depth knowledge of scientific theories, principles and methods enables graduates to successfully tackle specific tasks in mechanical engineering with a clear solution approach.

Project work in international teams effectively prepares students for the technical and practical requirements of the engineering profession in an increasingly globalized economy. In addition, the intercultural skills acquired during the program enable students to act responsibly and appropriately at all times in an international business environment.

By combining theoretical and practical approaches in the lectures, the project work, the internship and the Bachelor's thesis, graduates develop interdisciplinary research, problem-solving and planning skills for technical systems. The range of subjects offered in the course is based on internationally applied standards.

Karlsruher Institut für Technologie

Die Forschungsuniversität in der Helmholtz-Gemeinschaft

Amtliche Bekanntmachung

2024 **Ausgegeben Karlsruhe, den 26. Februar 2024** **Nr. 3**

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Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Bachelorstudiengang Mechanical Engineering (International)

vom 21.02.2024

Aufgrund von § 10 Absatz 2 Ziffer 4 und § 20 Absatz 2 KIT-Gesetz in der Fassung vom 14. Juli 2009 (GBl. S. 317 f), zuletzt geändert durch Artikel 2 zur Änderung des Universitätsklinika-Gesetzes und anderer Gesetze vom 15. November 2022 (GBl. S. 585), und § 32 Absatz 3 Satz 1, § 32 a Abs 1 Satz Landeshochschulgesetz in der Fassung vom 1. Januar 2005 (GBl. S. 1 f), zuletzt geändert durch Artikel 8 des Gesetzes zum Erlass eines Klimaschutz- und Klimawandelanpassungsgesetz und zur Verankerung des Klimabelangs in weiteren Rechtsvorschriften vom 07. Februar 2023 (GBl. S. 26, 43), hat der KIT-Senat am 19.02.2024 die folgende Studien- und Prüfungsordnung für den Bachelorstudiengang Mechanical Engineering (International) beschlossen.

Der Präsident hat seine Zustimmung gemäß § 20 Absatz 2 KIT-Gesetz i.V.m. § 32 Absatz 3 Satz 1 Landeshochschulgesetz am 21.02.2024 erteilt.

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Präambel

[1]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. [2]Das KIT sieht daher die am KIT angebotenen konsekutiven Bachelor- und Masterstudiengänge als Gesamtkonzept mit konsekutivem Curriculum.

I. Allgemeine Bestimmungen

§ 1 Geltungsbereich

[1]Diese Bachelorprüfungsordnung regelt Studienablauf, Prüfungen und den Abschluss des Studiums im englischsprachigen Bachelorstudiengang Mechanical Engineering (International) am KIT.

§ 2 Ziel des Studiums, akademischer Grad

(1) [1]Im Bachelorstudium sollen die wissenschaftlichen Grundlagen und die Methodenkompetenz der Fachwissenschaften vermittelt werden. [2]Ziel des Studiums ist die Fähigkeit, einen konsekutiven Masterstudiengang erfolgreich absolvieren zu können sowie das erworbene Wissen berufsfeldbezogen anwenden zu können.

(2) [1]Aufgrund der bestandenen Bachelorprüfung wird der akademische Grad „Bachelor of Science (B.Sc.)“ für den Bachelorstudiengang Mechanical Engineering (International) verliehen.

§ 3 Regelstudienzeit, Studienaufbau, Leistungspunkte

(1) **[1]**Die Regelstudienzeit beträgt sechs Semester.

(2) **[1]**Das Lehrangebot des Studiengangs ist in Fächer, die Fächer sind in Module, die jeweiligen Module in Lehrveranstaltungen gegliedert. [2]Die Fächer und ihr Umfang werden in § 20 festgelegt. [3]Näheres beschreibt das Modulhandbuch.

(3) **[1]**Der für das Absolvieren von Lehrveranstaltungen und Modulen vorgesehene Arbeitsaufwand wird in Leistungspunkten (LP) ausgewiesen. [2]Die Maßstäbe für die Zuordnung von Leistungspunkten entsprechen dem European Credit Transfer System (ECTS). [3]Ein Leistungspunkt entspricht einem Arbeitsaufwand von etwa 30 Zeitstunden. [4]Die Verteilung der Leistungspunkte auf die Semester hat in der Regel gleichmäßig zu erfolgen.

(4) **[1]**Der Umfang der für den erfolgreichen Abschluss des Studiums erforderlichen Studien- und Prüfungsleistungen wird in Leistungspunkten gemessen und beträgt insgesamt 180 Leistungspunkte.

(5) **[1]**Lehrveranstaltungen werden in englischer Sprache angeboten. [2]Im Einzelfall kann der Prüfungsausschuss genehmigen, dass Lehrveranstaltungen in deutscher Sprache belegt werden. [3]Dies gilt nicht für Pflichtveranstaltungen im Studiengang.

§ 4 Modulprüfungen, Studien- und Prüfungsleistungen

(1) [1]Die Bachelorprüfung besteht aus Modulprüfungen. [2]Modulprüfungen bestehen aus einer oder mehreren Erfolgskontrollen. [3]Erfolgskontrollen gliedern sich in Studien- oder Prüfungsleistungen.

(2) [1]Prüfungsleistungen sind:

1. schriftliche Prüfungen,
2. mündliche Prüfungen oder

3. Prüfungsleistungen anderer Art.

(3) [1]Studienleistungen sind schriftliche, mündliche oder praktische Leistungen, die von den Studierenden in der Regel lehrveranstaltungsbegleitend erbracht werden. [2]Die Bachelorprüfung darf nicht mit einer Studienleistung abgeschlossen werden.

(4) [1]Von den Modulprüfungen sollen mindestens 70 % benotet sein.

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

§ 5 Anmeldung und Zulassung zu den Modulprüfungen und Lehrveranstaltungen

(1) [1]Um an den Modulprüfungen teilnehmen zu können, müssen sich die Studierenden online im Studierendenportal zu den jeweiligen Erfolgskontrollen anmelden. [2]In Ausnahmefällen kann eine Anmeldung schriftlich beim Prüfungsausschuss erfolgen. [3]Für die Erfolgskontrollen können durch die Prüfenden Anmeldefristen festgelegt werden. [4]Die Anmeldung der Bachelorarbeit erfolgt im Studierendenportal, näheres ist im Modulhandbuch geregelt.

(2) [1]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. [2]Auf Antrag des/der Studierenden an den Prüfungsausschuss kann die Wahl oder die Zuordnung nachträglich geändert werden. [3]Ein begonnenes Prüfungsverfahren ist zu beenden, d. h. eine erstmals nicht bestandene Prüfung ist zu wiederholen. [4]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) [1]Zu einer Erfolgskontrolle ist zuzulassen, wer

1. in den Bachelorstudiengang Mechanical Engineering (International) am KIT eingeschrieben ist; die Zulassung beurlaubter Studierender ist auf Prüfungsleistungen im Sinne des § 14 Absatz 7 Satz 1 der Zulassungs- und Immatrikulationsordnung des KIT 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 Mechanical Engineering (International) den Prüfungsanspruch nicht verloren hat und
4. die in § 20 a genannte Voraussetzung erfüllt.

(4) [1]Nach Maßgabe von § 30 Absatz 5 Landeshochschulgesetz kann die Zulassung zu einzelnen Pflichtveranstaltungen beschränkt werden. [2]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 § 4 Absatz 1 Satz 1 und 2 der Satzung über Nachteilsausgleichende Regelungen in den Bachelor- und Masterstudiengängen am Karlsruher Institut für Technologie (KIT) in der jeweils geltenden Fassung, sofern ein Abbau des Überhangs durch andere oder zusätzliche Veranstaltungen nicht möglich ist. [2]Für den Fall gleichen Studienfortschritts sind durch die KIT-Fakultäten weitere Kriterien festzulegen. [3]Das Ergebnis wird den Studierenden rechtzeitig bekannt gegeben.

(5) [1]Die Zulassung ist abzulehnen, wenn die in Absatz 3 und 4 genannten Voraussetzungen nicht erfüllt sind.

§ 6 Durchführung von Erfolgskontrollen

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

(2) [1]Die Art der Erfolgskontrolle (§ 4 Absatz 2 Nummer 1 bis 3, Absatz 3) wird von der/dem Prüfenden der betreffenden Lehrveranstaltung in Bezug auf die Lerninhalte der Lehrveranstaltung und die Lernziele des Moduls festgelegt. [2]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. [3]Im Einvernehmen von Prüfender bzw. Prüfendem und Studierender bzw. Studierendem können die Art der Prüfungsleistung sowie die Prüfungssprache auch nachträglich geändert werden; im ersten Fall ist jedoch § 4 Absatz 5 zu berücksichtigen. [4]Bei der Prüfungsorganisation sind die Belange Studierender mit in besonderen Lebenslagen gemäß § 4 Absatz 1 der Satzung über nachteilsausgleichende Regelungen in den Bachelor- und Masterstudiengängen am Karlsruher Institut für Technologie (KIT) in der jeweils geltenden Fassung zu berücksichtigen. § 2 und § 4 Absatz 1 Satz 3 der Satzung über Nachteilsausgleichende Regelungen in den Bachelor- und Masterstudiengängen am Karlsruher Institut für Technologie (KIT) in der jeweils geltenden Fassung gelten entsprechend.

(3) [1]Bei unvertretbar hohem Prüfungsaufwand kann eine schriftlich durchzuführende Prüfungsleistung auch mündlich, oder eine mündlich durchzuführende Prüfungsleistung auch schriftlich abgenommen werden. [2]Diese Änderung muss mindestens sechs Wochen vor der Prüfungsleistung bekannt gegeben werden.

(4) [1]Erfolgskontrollen werden in englischer Sprache abgenommen. [2]§ 6 Absatz 2 gilt entsprechend.

(5) [1]*Schriftliche Prüfungen* (§ 4 Absatz 2 Nummer 1) sind in der Regel von einer/einem Prüfenden nach § 18 Absatz 2 oder 3 zu bewerten. [2]Sofern eine Bewertung durch mehrere Prüfende erfolgt, ergibt sich die Note aus dem arithmetischen Mittel der Einzelbewertungen. [3]Entspricht das arithmetische Mittel keiner der in § 7 Absatz 2 Satz 2 definierten Notenstufen, so ist auf die nächstliegende Notenstufe auf- oder abzurunden. [4]Bei gleichem Abstand ist auf die nächstbessere Notenstufe zu runden. [5]Das Bewertungsverfahren soll sechs Wochen nicht überschreiten. [6]Schriftliche Prüfungen dauern mindestens 60 und höchstens 300 Minuten.

(6) [1]*Mündliche Prüfungen* (§ 4 Absatz 2 Nummer 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. [2]Vor der Festsetzung der Note hört die/der Prüfende die anderen an der Kollegialprüfung mitwirkenden Prüfenden an. [3]Mündliche Prüfungen dauern in der Regel mindestens 15 Minuten und maximal 60 Minuten pro Studierenden.

[4]Die wesentlichen Gegenstände und Ergebnisse der *mündlichen Prüfung* sind in einem Protokoll festzuhalten. [5]Das Ergebnis der Prüfung ist den Studierenden im Anschluss an die mündliche Prüfung bekannt zugeben.

[6]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. [7]Die Zulassung erstreckt sich nicht auf die Beratung und Bekanntgabe der Prüfungsergebnisse.

(7) **[1]**Für *Prüfungsleistungen anderer Art* (§ 4 Absatz 2 Nummer 3) sind angemessene Bearbeitungsfristen einzuräumen und Abgabetermine festzulegen. [2]Dabei ist durch die Art der Aufgabenstellung und durch entsprechende Dokumentation sicherzustellen, dass die erbrachte Prüfungsleistung dem/der Studierenden zurechenbar ist. [3]Die wesentlichen Gegenstände und Ergebnisse einer solchen Erfolgskontrolle sind in einem Protokoll festzuhalten.

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

[5]*Schriftliche Arbeiten* im Rahmen einer *Prüfungsleistung anderer Art* haben dabei die folgende Erklärung zu tragen: „Ich versichere wahrheitsgemäß, die Arbeit selbstständig angefertigt, alle benutzten Quellen und Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht zu haben, was aus Arbeiten anderer unverändert oder mit Abänderungen entnommen wurde.“ [6]Trägt die Arbeit diese Erklärung nicht, wird sie nicht angenommen. [7]Die wesentlichen Gegenstände und Ergebnisse der Erfolgskontrolle sind in einem Protokoll festzuhalten.

§ 6 a Erfolgskontrollen im Antwort-Wahl-Verfahren

[1]Für die Durchführung von Erfolgskontrollen im Antwort-Wahl-Verfahren findet die Satzung des Karlsruher Instituts für Technologie (KIT) zur Durchführung von Erfolgskontrollen im Antwort-Wahl-Verfahren in der jeweils gültigen Fassung Anwendung.

§ 6 b Online-Prüfungen

[1]Für die Durchführung von Online-Prüfungen findet die Satzung zur Durchführung von Online-Prüfungen am Karlsruher Institut für Technologie (KIT) in der jeweils gültigen Fassung Anwendung.

§ 7 Bewertung von Studien- und Prüfungsleistungen

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

(2) **[1]**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.

[2]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) **[1]**Studienleistungen werden mit „bestanden“ oder mit „nicht bestanden“ gewertet.

(4) **[1]**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) **[1]**Jedes Modul und jede Erfolgskontrolle darf in demselben Studiengang nur einmal gewertet werden.

(6) **[1]**Eine Prüfungsleistung ist bestanden, wenn die Note mindestens „ausreichend“ (4,0) ist.

(7) [1]Die Modulprüfung ist bestanden, wenn alle erforderlichen Erfolgskontrollen bestanden sind. [2]Die Modulprüfung und die Bildung der Modulnote sollen im Modulhandbuch geregelt werden. [3]Sofern das Modulhandbuch keine Regelung über die Bildung der Modulnote enthält, errechnet sich die Modulnote aus einem nach den Leistungspunkten der einzelnen Teilmodule gewichteten

Notendurchschnitt. [4]Die differenzierten Noten (Absatz 2) sind bei der Berechnung der Modulnoten als Ausgangsdaten zu verwenden.

(8) [1]Die Ergebnisse der Erfolgskontrollen sowie die erworbenen Leistungspunkte werden durch den Studierendenservice des KIT verwaltet.

(9) [1]Die Noten der Module eines Faches gehen in die Fachnote mit einem Gewicht proportional zu den ausgewiesenen Leistungspunkten der Module ein.

(10) **[1]**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) **[1]**Die Teilmodulprüfungen Advanced Mathematics I sowie Engineering Mechanics I in den Modulen Advanced Mathematics und Engineering Mechanics sind bis zum Ende des zweiten Fachsemesters abzulegen (Orientierungsprüfungen).

(2) [1]Wer die Orientierungsprüfungen einschließlich etwaiger Wiederholungen bis zum Ende 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. [2]Eine zweite Wiederholung der Orientierungsprüfungen ist ausgeschlossen.

(3) [1]Ist die Bachelorprüfung bis zum Ende des zehnten Fachsemesters einschließlich etwaiger Wiederholungen nicht vollständig abgelegt, so erlischt der Prüfungsanspruch im Bachelorstudiengang Mechanical Engineering (International), es sei denn, dass die Fristüberschreitung nicht selbst zu vertreten ist. [2]Die Entscheidung über eine Fristverlängerung und über Ausnahmen von der Fristregelung trifft der Prüfungsausschuss unter Beachtung der in § 32 Absatz 6 Landeshochschulgesetz genannten Tätigkeiten auf Antrag des/der Studierenden. [3]Der Antrag ist schriftlich in der Regel bis sechs Wochen vor Ablauf der in Satz 1 genannten Studienhöchstdauer zu stellen.

(4) **[1]**Der Prüfungsanspruch geht auch verloren, wenn eine nach dieser Studien- und Prüfungsordnung erforderliche Studien- oder Prüfungsleistung endgültig nicht bestanden ist.

§ 9 Wiederholung von Erfolgskontrollen, endgültiges Nichtbestehen

(1) **[1]**Studierende können eine nicht bestandene schriftliche Prüfung (§ 4 Absatz 2 Nummer 1) einmal wiederholen. [2]Wird eine schriftliche Wiederholungsprüfung mit „nicht ausreichend“ (5,0) bewertet, so erfolgt in zeitlichem Zusammenhang eine mündliche Fortsetzung der Wiederholungsprüfung (mündliche Nachprüfung). [3]Die Note der Wiederholungsprüfung, die in diesem Fall nur „ausreichend“ (4,0) oder „nicht ausreichend“ (5,0) lauten kann, wird von den Prüfenden bzw. der/dem Prüfenden unter angemessener Berücksichtigung der schriftlichen Leistung und des Ergebnisses der mündlichen Nachprüfung festgesetzt. [4]Mündliche Nachprüfungen dauern in der Regel mindestens 15 Minuten und maximal 30 Minuten. [5]§ 6 Absatz 6 Satz 1 und 2 sowie Satz 4 und 5 gelten entsprechend. [6]Sofern gemäß § 11 eine schriftliche Wiederholungsprüfung als mit „nicht ausreichend“ (5,0) bewertet gilt, ist eine mündliche Nachprüfung ausgeschlossen.

(2) **[1]**Studierende können eine nicht bestandene mündliche Prüfung (§ 4 Absatz 2 Nummer 2) einmal wiederholen.

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

(4) [1]Prüfungsleistungen anderer Art (§ 4 Absatz 2 Nummer 3) können einmal wiederholt werden.

(5) [1]Studienleistungen können mehrfach wiederholt werden.

(6) [1]Die Prüfungsleistung ist endgültig nicht bestanden, wenn die mündliche Nachprüfung im Sinne des Absatzes 1 mit „nicht ausreichend“ (5,0) bewertet wurde. [2]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.

(7) [1]Das Modul ist endgültig nicht bestanden, wenn eine für sein Bestehen erforderliche Prüfungsleistung endgültig nicht bestanden ist.

(8) [1]Eine zweite Wiederholung derselben Prüfungsleistung gemäß § 4 Absatz 2 ist nur in Ausnahmefällen auf Antrag des/der Studierenden zulässig („Antrag auf Zweitwiederholung“). [2]Der Antrag ist schriftlich beim Prüfungsausschuss in der Regel bis zwei Monate nach Bekanntgabe der Note zu stellen.

[3]Über den ersten Antrag eines/r Studierenden auf Zweitwiederholung entscheidet der Prüfungsausschuss, wenn er den Antrag genehmigt. [4]Wenn der Prüfungsausschuss diesen Antrag ablehnt, entscheidet ein Mitglied des Präsidiums. [5]Über weitere Anträge auf Zweitwiederholung entscheidet nach Stellungnahme des Prüfungsausschusses ein Mitglied des Präsidiums. [6]Wird der Antrag genehmigt, hat die Zweitwiederholung spätestens zum übernächsten Prüfungstermin zu erfolgen. [7]Absatz 1 Satz 2 bis 6 gelten entsprechend.

(9) [1]Die Wiederholung einer bestandenen Prüfungsleistung ist nicht zulässig.

(10) [1]Die Bachelorarbeit kann bei einer Bewertung mit „nicht ausreichend“ (5,0) einmal wiederholt werden. [2]Eine zweite Wiederholung der Bachelorarbeit ist ausgeschlossen. [3]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. [4]Die Präsentation ist endgültig nicht bestanden, wenn sie zweimal mit „nicht bestanden“ (not passed) bewertet wurde.

§ 10 Abmeldung; Versäumnis, Rücktritt

(1) [1]Studierende können ihre Anmeldung zu *schriftlichen Prüfungen* ohne Angabe von Gründen bis zur Ausgabe der Prüfungsaufgaben widerrufen (Abmeldung). [2]Eine Abmeldung kann online im Studierendenportal bis 24:00 Uhr des Vortages der Prüfung oder in begründeten Ausnahmefällen beim Prüfungsausschuss erfolgen. [3]Erfolgt die Abmeldung gegenüber dem/der Prüfenden hat diese/r Sorge zu tragen, dass die Abmeldung im Campus Management System verbucht wird.

(2) [1]Bei *mündlichen Prüfungen* muss die Abmeldung spätestens drei Werktage vor dem betreffenden Prüfungstermin gegenüber dem/der Prüfenden erklärt werden. [2]Der Rücktritt von einer mündlichen Prüfung weniger als drei Werktage vor dem betreffenden Prüfungstermin ist nur unter den Voraussetzungen des Absatzes 5 möglich. [3]Der Rücktritt von mündlichen Nachprüfungen im Sinne von § 9 Absatz 1 ist grundsätzlich nur unter den Voraussetzungen von Absatz 5 möglich.

(3) [1]Die Abmeldung von *Prüfungsleistungen anderer Art* sowie von *Studienleistungen* ist im Modulhandbuch geregelt.

(4) [1]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. [2]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) [1]Der für den Rücktritt nach Beginn der Erfolgskontrolle oder das Versäumnis geltend gemachte Grund muss dem Prüfungsausschuss unverzüglich schriftlich angezeigt und glaubhaft gemacht werden. [2]Bei Krankheit des/der Studierenden oder eines allein zu versorgenden Kindes oder pflegebedürftigen Angehörigen kann die Vorlage eines ärztlichen Attestes verlangt werden.

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§ 11 Täuschung, Ordnungsverstoß

(1) [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) [1]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. [2]In diesem Fall gilt die betreffende Erfolgskontrolle als mit „nicht ausreichend“ (5,0) bewertet. [3]In schwerwiegenden Fällen kann der Prüfungsausschuss diese Studierenden von der Erbringung weiterer Erfolgskontrollen ausschließen.

(3) [1]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]Für den Ausgleich von Nachteilen bei Studierenden in besonderen Lebenslagen findet die Satzung über nachteilsausgleichende Regelungen in den Bachelor- und Masterstudiengängen am Karlsruher Institut für Technologie (KIT) in der jeweils geltenden Fassung Anwendung.

§ 13 Studierende mit Behinderung oder chronischer Erkrankung

[1]Für den Ausgleich von Nachteilen bei Studierenden in besonderen Lebenslagen findet die Satzung über nachteilsausgleichende Regelungen in den Bachelor- und Masterstudiengängen am Karlsruher Institut für Technologie (KIT) in der jeweils geltenden Fassung Anwendung.

§ 14 Modul Bachelorarbeit

(1) [1]Voraussetzung für die Zulassung zum Modul Bachelorarbeit ist, dass die/der Studierende Modulprüfungen im Umfang von 120 LP erfolgreich abgelegt hat. [2]Über Ausnahmen entscheidet der Prüfungsausschuss auf Antrag der/des Studierenden.

(1 a) [1]Dem Modul Bachelorarbeit sind 15 LP zugeordnet. [2]Es besteht aus der Bachelorarbeit mit 12 LP und einer Präsentation mit drei LP. [3]Die Präsentation soll spätestens sechs Wochen nach Abgabe der Bachelorarbeit erfolgen.

(2) [1]Die Bachelorarbeit kann von Hochschullehrerinnen und Hochschullehrern am KIT und habilitierten Mitgliedern der KIT-Fakultät für Maschinenbau vergeben werden. [2]Darüber hinaus kann der Prüfungsausschuss weitere Prüfende gemäß § 18 Absatz 2 und 3 zur Vergabe des Themas berechtigen. [3]Den Studierenden ist Gelegenheit zu geben, für das Thema Vorschläge zu machen. [4]Soll die Bachelorarbeit außerhalb der KIT-Fakultät für Maschinenbau angefertigt werden, so bedarf dies der Genehmigung durch den Prüfungsausschuss. [5]Die Bachelorarbeit kann auch in Form einer Gruppenarbeit zugelassen werden, wenn der als Prüfungsleistung zu bewertende Beitrag der/des einzelnen Studierenden aufgrund objektiver Kriterien, die eine eindeutige Abgrenzung ermöglichen, deutlich unterscheidbar ist und die Anforderung nach Absatz 4 erfüllt. [6]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. [7]Die Ausgabe des Themas erfolgt in diesem Fall über die/den Vorsitzende/n des Prüfungsausschusses.

(3) [1]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) [1]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. [2]Der Umfang der Bachelorarbeit entspricht 12 Leistungspunkten. [3]Die maximale Be-

arbeitungsdauer beträgt drei Monate. [4]Thema und Aufgabenstellung sind an den vorgesehenen Umfang anzupassen. [5]Der Prüfungsausschuss legt fest, in welchen Sprachen die Bachelorarbeit geschrieben werden kann. [6]Auf Antrag des Studierenden kann der/die Prüfende genehmigen, dass die Bachelorarbeit in einer anderen Sprache als Englisch geschrieben wird.

(5) [1]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. [2]Wenn diese Erklärung nicht enthalten ist, wird die Arbeit nicht angenommen. [3]Die Erklärung lautet wie folgt: „Ich versichere wahrheitsgemäß, die Arbeit selbstständig verfasst, alle benutzten Quellen und 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.“ [4]Bei Abgabe einer unwahren Versicherung wird die Bachelorarbeit mit „nicht ausreichend“ (5,0) bewertet.

(6) [1]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. [2]Der Zeitpunkt der Abgabe der Bachelorarbeit ist durch den/die Prüfende/n beim Prüfungsausschuss aktenkundig zu machen. [3]Das Thema kann nur einmal und nur innerhalb des ersten Monats der Bearbeitungszeit zurückgegeben werden. [4]Macht der oder die Studierende einen triftigen Grund geltend, kann der Prüfungsausschuss die in Absatz 4 festgelegte Bearbeitungszeit auf Antrag der oder des Studierenden um höchstens einen Monat verlängern. [5]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) [1]Die Bachelorarbeit wird von mindestens einer Hochschullehrerin oder einem Hochschullehrer am KIT oder einem habilitierten Mitglied der KIT-Fakultät für Maschinenbau und einem/einer weiteren Prüfenden bewertet. [2]In der Regel ist eine/r der Prüfenden die Person, die die Arbeit gemäß Absatz 2 vergeben hat. [3]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 eine/n weitere/n Gutachter/in bestellen. [4]Die Bewertung hat innerhalb von sechs Wochen nach Abgabe der Bachelorarbeit zu erfolgen.

§ 14 a Berufspraktikum

(1) [1]Während des Bachelorstudiums ist ein mindestens 12-wöchiges Berufspraktikum abzuleisten, welches geeignet ist, den Studierenden eine Anschauung von berufspraktischer Tätigkeit im Maschinenbau zu vermitteln. [2]Dem Berufspraktikum sind 12 Leistungspunkte zugeordnet.

(2) [1]Die Studierenden setzen sich in eigener Verantwortung mit geeigneten Einrichtungen in der Industrie in Verbindung, an denen das Praktikum abgeleistet werden kann. [2]Berufspraktika in öffentlichen Forschungseinrichtungen sind ausgeschlossen. [3]Das Nähere regelt das Modulhandbuch.

§ 15 Zusatzleistungen

(1) [1]Es können auch weitere Leistungspunkte (Zusatzleistungen) im Umfang von höchstens 30 LP aus dem Gesamtangebot des KIT erworben werden. [2]§ 3 und § 4 der Prüfungsordnung bleiben davon unberührt. [3]Diese Zusatzleistungen gehen nicht in die Festsetzung der Gesamt- und Modulnoten ein. [4]Die bei der Festlegung der Modulnote nicht berücksichtigten LP werden als Zusatzleistungen im Transcript of Records aufgeführt und als Zusatzleistungen gekennzeichnet. [5]Auf Antrag der/des Studierenden werden die Zusatzleistungen in das Bachelorzeugnis aufgenommen und als Zusatzleistungen gekennzeichnet. [6]Zusatzleistungen werden mit den nach § 7 vorgesehenen Noten gelistet.

(2) [1]Die Studierenden haben bereits bei der Anmeldung zu einer Prüfung in einem Modul diese als Zusatzleistung zu deklarieren.

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§ 15 a Mastervorzug

[1]Studierende, die im Bachelorstudium bereits mindestens 120 LP erworben haben, können zusätzlich zu den in § 15 Absatz 1 genannten Zusatzleistungen Leistungspunkte aus einem konsekutiven Masterstudiengang am KIT im Umfang von höchstens 30 LP erwerben (Mastervorzugsleistungen). [2]§ 3 und § 4 der Prüfungsordnung bleiben davon unberührt. [3]Die Mastervorzugsleistungen gehen nicht in die Festsetzung der Gesamt-, Fach- und Modulnoten ein. [4]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

[1]Neben der Vermittlung von fachlichen Qualifikationen ist der Auf- und Ausbau überfachlicher Qualifikationen im Umfang von mindestens 6 LP Bestandteil eines Bachelorstudiums. [2]Überfachliche Qualifikationen können additiv oder integrativ vermittelt werden.

§ 17 Prüfungsausschuss

(1) [1]Für den Bachelorstudiengang Mechanical Engineering (International) wird ein Prüfungsausschuss gebildet. [2]Er besteht aus vier stimmberechtigten Mitgliedern: zwei Hochschullehrerinnen bzw. Hochschullehrern am KIT / Privatdozentinnen bzw. -dozenten, zwei akademischen Mitarbeiterinnen und akademischen Mitarbeitern am KIT und einer bzw. einem Studierenden mit beratender Stimme. [3]Die Amtszeit der nichtstudentischen Mitglieder beträgt zwei Jahre, die des studentischen Mitglieds ein Jahr.

(2) [1]Die/der Vorsitzende, ihre/sein Stellvertreter/in, die weiteren Mitglieder des Prüfungsausschusses sowie deren Stellvertreter/innen werden von dem KIT-Fakultätsrat bestellt, die akademischen Mitarbeiterinnen bzw. akademischen Mitarbeiter am KIT und die Studierenden auf Vorschlag der Mitglieder der jeweiligen Gruppe; Wiederbestellung ist möglich. [2]Die/der Vorsitzende und deren/dessen Stellvertreter/in müssen Hochschullehrerinnen oder Hochschullehrer am KIT sein. [3]Die/der Vorsitzende des Prüfungsausschusses nimmt die laufenden Geschäfte wahr und wird durch das jeweilige Prüfungssekretariat unterstützt.

(3) [1]Der Prüfungsausschuss achtet auf die Einhaltung der Bestimmungen dieser Studien- und Prüfungsordnung und fällt die Entscheidungen in Prüfungsangelegenheiten. [2]Er entscheidet über die Anerkennung von Studienzeiten sowie Studien- und Prüfungsleistungen und trifft die Feststellung gemäß § 19 Absatz 1 Satz 1. [3]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. [4]Er ist zuständig für Anregungen zur Reform der Studien- und Prüfungsordnung und zu Modulbeschreibungen. [5]Der Prüfungsausschuss entscheidet mit der Mehrheit seiner Stimmen. [6]Bei Stimmengleichheit entscheidet die/der Vorsitzende des Prüfungsausschusses.

(4) [1]Der Prüfungsausschuss kann die Erledigung seiner Aufgaben für alle Regelfälle auf die/den Vorsitzende/n des Prüfungsausschusses übertragen. [2]In dringenden Angelegenheiten, deren Erledigung nicht bis zu der nächsten Sitzung des Prüfungsausschusses warten kann, entscheidet die/der Vorsitzende des Prüfungsausschusses.

(5) [1]Die Mitglieder des Prüfungsausschusses haben das Recht, der Abnahme von Prüfungen beizuwohnen. [2]Die Mitglieder des Prüfungsausschusses, die Prüfenden und die Beisitzenden unterliegen der Verschwiegenheit. [3]Sofern sie nicht im öffentlichen Dienst stehen, sind sie durch die/den Vorsitzende/n zur Verschwiegenheit zu verpflichten.

(6) [1]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) [1]Belastende Entscheidungen des Prüfungsausschusses sind schriftlich mitzuteilen. [2]Sie sind zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen. [3]Vor einer Entscheidung ist Gelegenheit zur Äußerung zu geben. [4]Widersprüche gegen Entscheidungen des Prüfungsausschusses sind innerhalb eines Monats nach Zugang der Entscheidung bei diesem einzulegen. [5]Über Widersprüche entscheidet das für Lehre zuständige Mitglied des Präsidiums.

§ 18 Prüfende und Beisitzende

(1) [1]Der Prüfungsausschuss bestellt die Prüfenden. [2]Er kann die Bestellung der/dem Vorsitzenden übertragen.

(2) [1]Prüfende sind Hochschullehrinnen bzw. Hochschullehrer am KIT, habilitierte Mitglieder und akademische Mitarbeiterinnen und Mitarbeiter am KIT, welche der KIT-Fakultät angehören und denen die Prüfungsbefugnis gemäß § 14 Absatz 2, § 14 b Absatz 1 Nummer 1 KIT-Gesetz i.V.m. § 52 Absatz Satz 6 Halbsatz 2 Landeshochschulgesetz übertragen wurde. [2]Bestellt werden darf nur, wer mindestens die dem jeweiligen Prüfungsgegenstand entsprechende fachwissenschaftliche Qualifikation erworben hat.

(3) [1]Soweit Lehrveranstaltungen von anderen als den unter Absatz 2 genannten Personen durchgeführt werden, sollen diese zu Prüfenden bestellt werden, sofern sie die gemäß Absatz 2 Satz 2 vorausgesetzte Qualifikation nachweisen können.

(4) [1]Die Beisitzenden werden durch die Prüfenden benannt. [2]Zu Beisitzenden darf nur benannt werden, wer eine dem jeweiligen Prüfungsgegenstand entsprechende fachwissenschaftliche Qualifikation erworben hat.

§ 19 Anerkennung von Studien- und Prüfungsleistungen, Studienzeiten

(1) [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. [2]Dabei ist kein schematischer Vergleich, sondern eine Gesamtbetrachtung vorzunehmen. [3]Bezüglich des Umfangs einer zur Anerkennung vorgelegten Studien- und Prüfungsleistung (Anrechnung) werden die Grundsätze des ECTS herangezogen.

(2) [1]Die Studierenden haben die für die Anerkennung erforderlichen Unterlagen vorzulegen. [2]Studierende, die neu in den Bachelorstudiengang Mechanical Engineering (International) immatrikuliert wurden, haben den Antrag mit den für die Anerkennung erforderlichen Unterlagen innerhalb des ersten Semesters nach Immatrikulation zu stellen. [3]Bei Unterlagen, die nicht in deutscher oder englischer Sprache vorliegen, kann eine amtlich beglaubigte Übersetzung verlangt werden. [4]Die Beweislast dafür, dass der Antrag die Voraussetzungen für die Anerkennung nicht erfüllt, liegt beim Prüfungsausschuss.

(3) [1]Werden Leistungen angerechnet, die nicht am KIT erbracht wurden, werden sie im Zeugnis als „anerkannt“ ausgewiesen. [2]Liegen Noten vor, werden die Noten, soweit die Notensysteme vergleichbar sind, übernommen und in die Berechnung der Modulnoten und der Gesamtnote einbezogen. [3]Sind die Notensysteme nicht vergleichbar, können die Noten umgerechnet werden. [4]Liegen keine Noten vor, wird der Vermerk „bestanden“ aufgenommen.

(4) [1]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) [1]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 erwor-

ben wurden, ein genormtes Qualitätssicherungssystem hat. [2]Die Anrechnung kann in Teilen versagt werden, wenn mehr als 50 Prozent des Hochschulstudiums ersetzt werden soll.

(6) [1]Zuständig für Anerkennung und Anrechnung ist der Prüfungsausschuss. [2]Im Rahmen der Feststellung, ob ein wesentlicher Unterschied im Sinne des Absatz 1 vorliegt, sind die zuständigen Fachvertreter/innen zu hören.

II. Bachelorprüfung

§ 20 Umfang und Art der Bachelorprüfung

(1) [1]Die Bachelorprüfung besteht aus den Modulprüfungen nach Absatz 2 sowie dem Modul Bachelorarbeit (§ 14) und dem Berufspraktikum (§ 14 a).

(2) [1]Es sind Modulprüfungen in folgenden Pflichtfächern abzulegen:

1. Fundamentals of Engineering: Modul(e) im Umfang von 127 LP,
2. Specialization in Mechanical Engineering (International): Modul(e) im Umfang von 12 LP,
3. International Studies im Umfang von 14 LP.

[2]Die Vermittlung überfachlicher Qualifikationen im Umfang von 6 LP gemäß § 16 findet im Rahmen fachwissenschaftlicher Module im Fach International Studies statt.

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

§ 20 a Leistungsnachweise für die Bachelorprüfung

[1]Voraussetzung für die Anmeldung zur letzten Modulprüfung der Bachelorprüfung ist die Bescheinigung über das erfolgreich abgeleistete Berufspraktikum nach § 14 a. [2]In Ausnahmefällen, die die Studierenden nicht zu vertreten haben, kann der Prüfungsausschuss die nachträgliche Vorlage dieses Leistungsnachweises genehmigen.

§ 21 Bestehen der Bachelorprüfung, Bildung der Gesamtnote

(1) [1]Die Bachelorprüfung ist bestanden, wenn alle in § 20 genannten Modulprüfungen bestanden sind.

(2) [1]Die Gesamtnote der Bachelorprüfung errechnet sich als ein mit Leistungspunkten gewichteter Notendurchschnitt der Fachnoten sowie des Moduls Bachelorarbeit. [2]Dabei wird die Note des Moduls Bachelorarbeit mit dem doppelten Gewicht der Noten der übrigen Fächer berücksichtigt.

(3) [1]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) [1]Über die Bachelorprüfung werden nach Bewertung der letzten Prüfungsleistung eine Bachelorurkunde und ein Zeugnis erstellt. [2]Die Ausfertigung von Bachelorurkunde und Zeugnis soll nicht später als drei Monate nach Ablegen der letzten Prüfungsleistung erfolgen. [3]Bachelorurkunde und Bachelorzeugnis werden in deutscher und englischer Sprache ausgestellt. [4]Bachelorurkunde und Zeugnis tragen das Datum der erfolgreichen Erbringung der letzten Prüfungsleistung. [5]Diese Dokumente werden den Studierenden zusammen ausgehändigt. [6]In der Bachelorurkunde wird die Verleihung des akademischen Bachelorgrades beurkundet. [7]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) [1]Das Zeugnis enthält die Fach- und Modulnoten sowie die den Modulen und Fächern zugeordneten Leistungspunkte und die Gesamtnote. [2]Sofern gemäß § 7 Absatz 2 Satz 2 eine differenzierte Bewertung einzelner Prüfungsleistungen vorgenommen wurde, wird auf dem Zeugnis auch die entsprechende Dezimalnote ausgewiesen; § 7 Absatz 4 bleibt unberührt. [3]Das Zeugnis ist von der KIT-Dekanin/dem KIT-Dekan der KIT-Fakultät und von der/dem Vorsitzenden des Prüfungsausschusses zu unterzeichnen.

(3) [1]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) [1]Das Transcript of Records enthält in strukturierter Form alle erbrachten Studien- und Prüfungsleistungen. [2]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. [3]Absatz 2 Satz 2 gilt entsprechend. [4]Aus dem Transcript of Records soll die Zugehörigkeit von Erfolgskontrollen zu den einzelnen Modulen deutlich erkennbar sein. [5]Angerechnete Studien- und Prüfungsleistungen sind im Transcript of Records aufzunehmen. [6]Alle Zusatzleistungen werden im Transcript of Records aufgeführt.

(5) [1]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

[1]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. [2]Dasselbe gilt, wenn der Prüfungsanspruch erloschen ist.

§ 24 Aberkennung des Bachelorgrades

(1) [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. [2]Gegebenenfalls kann die Modulprüfung für „nicht ausreichend" (5,0) und die Bachelorprüfung für „nicht bestanden" erklärt werden.

(2) [1]Waren die Voraussetzungen für die Zulassung zu einer Prüfung nicht erfüllt, ohne dass die/der Studierende darüber täuschen wollte, und wird diese Tatsache erst nach Aushändigung des Zeugnisses bekannt, wird dieser Mangel durch das Bestehen der Prüfung geheilt. [2]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) [1]Vor einer Entscheidung des Prüfungsausschusses ist Gelegenheit zur Äußerung zu geben.

(4) [1]Das unrichtige Zeugnis ist zu entziehen und gegebenenfalls ein neues zu erteilen. [2]Mit dem unrichtigen Zeugnis ist auch die Bachelorurkunde einzuziehen, wenn die Bachelorprüfung aufgrund einer Täuschung für „nicht bestanden" erklärt wurde.

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

(6) [1]Die Aberkennung des akademischen Grades richtet sich nach § 36 Absatz 7 Landeshochschulgesetz.

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§ 25 Einsicht in die Prüfungsakten

(1) [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) [1]Für die Einsichtnahme in die schriftlichen Modulprüfungen, schriftlichen Modulteilprüfungen bzw. Prüfungsprotokolle gilt eine Frist von einem Monat nach Bekanntgabe des Prüfungsergebnisses.

(3) [1]Der/die Prüfende bestimmt Ort und Zeit der Einsichtnahme.

(4) [1]Prüfungsunterlagen sind mindestens fünf Jahre aufzubewahren.

§ 26 Inkrafttreten, Übergangsvorschriften

(1) [1]Diese Studien- und Prüfungsordnung tritt am 1. Oktober 2024 in Kraft und gilt für

1. Studierende, die ihr Studium im Bachelorstudiengang Mechanical Engingeering (International) am KIT im ersten Fachsemester aufnehmen, sowie für

2. Studierende, die ihr Studium im Bachelorstudiengang Mechanical Engineering (International) am KIT in einem höheren Fachsemester aufnehmen, sofern dieses Fachsemester nicht über dem Fachsemester liegt, das der erste Jahrgang nach Ziff. 1 erreicht.

(2) [1]Die Studien- und Prüfungsordnung des KIT für den Bachelorstudiengang Mechanical Engineering (International) vom 19. Juli 2017 (Amtliche Bekanntmachung des KIT Nr. 51 vom 21. Juni 2017) zuletzt geändert durch Artikel 23 der Satzung zur Änderung der Regelung über die mündliche Nachprüfung in den Studien- und Prüfungsordnungen des Karlsruher Institut für Technologie (KIT) vom 29. März 2023 (Amtliche Bekanntmachung des KIT Nummer 30 vom 30. März 2023) behält Gültigkeit für

1. Studierende, die ihr Studium im Bachelorstudiengang Mechanical Engineering (International) am KIT zuletzt im Sommersemester 2024 aufgenommen haben, sowie für

2. Studierende, die ihr Studium im Bachelorstudiengang Mechanical Engineering (International am KIT ab dem Wintersemester 2024/25 in einem höheren Fachsemester aufnehmen, sofern das Fachsemester über dem liegt, das der erste Jahrgang nach Absatz 1 Ziff. 1 erreicht hat.

[2]Im Übrigen tritt sie außer Kraft.

(3) [1]Studierende, die auf Grundlage der Studien- und Prüfungsordnung des KIT für den Bachelorstudiengang Mechanical Engineering (International) vom 19. Juli 2017 (Amtliche Bekanntmachung des KIT Nr. 51 vom 21. Juni 2017) zuletzt geändert durch Artikel 23 der Satzung zur Änderung der Regelung über die mündliche Nachprüfung in den Studien- und Prüfungsordnungen des Karlsruher Institut für Technologie (KIT) vom 29. März 2023 (Amtliche Bekanntmachung des KIT Nummer 30 vom 30. März 2023) letztmalig bis zum 30. September 2030 ablegen.

Karlsruhe, den 21. Februar 2024

gez.

Prof. Dr. Oliver Kraft

(In Vertretung des Präsidenten des KIT)

Karlsruhe Institute of Technology

The Research University in the Helmholtz Association

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No. 3

Studies and Examination Regulations of Karlsruhe Institute of Technology (KIT) for the Bachelor's Program of Mechanical Engineering (International)

The present English translation has no legally binding effect. It is provided for your information only.

Studies and Examination Regulations of Karlsruhe Institute of Technology (KIT) for the Bachelor's Program of Mechanical Engineering (International)

dated February 21, 2024

Pursuant to Article 10, par. 2, clause 4 and Article 20, par. 2 of the Act on Karlsruhe Institute of Technology (KIT-Gesetz, KIT Act – KITG) of July 14, 2009 (bulletin, p. 317 f.), last amended by Article 2 of the Act Amending the Act of Baden-Württemberg on University Hospitals and Other Acts (Gesetz zur Änderung des Universitätsklinika-Gesetzes und anderer Gesetze) of November 15, 2022 (bulletin p. 585) and Article 32, par. 3, clause 1 and Article 32a, par. 1, clause 1 of the Act of Baden-Württemberg on Universities and Colleges (Landeshochschulgesetz – LHG) of January 01, 2005 (bulletin, p. 1 f.), last amended by Article 8 of the Act on Adoption of a Climate Protection and Climate Change Adaptation Act and on Inclusion of Climate Protection Matters in Other Legal Regulations (Gesetz zum Erlass eines Klimaschutz- und Klimawandelanpassungsgesetzes und zur Verankerung des Klimabelangs in weiteren Rechtsvorschriften) of February 7, 2023 (bulletin, pp. 26, 43), the Senate of KIT adopted the following Studies and Examination Regulations for the Bachelor's Program of Mechanical Engineering (International) on February 19, 2024.

The President expressed his approval according to Article 20, par. 2, KITG in conjunction with Article 32, par. 3, clause 1, LHG on February 21, 2024.

Contents

Preamble

Within the framework of the implementation of the Bologna process for establishment of a European higher education area, it is the declared objective of KIT that higher education at KIT should be completed by a master's degree. KIT therefore understands the consecutive bachelor's and master's programs offered to represent an integrated concept with a consecutive curriculum.

I. General Provisions

Article 1 – Scope

The present bachelor's examination regulations cover the course of studies, examinations, and graduation in the Bachelor's Program of Mechanical Engineering (International) at KIT.

Article 2 – Objective of Studies, Academic Degree

(1) During the bachelor's program, scientific fundamentals and methodological competence of the scientific discipline are imparted. Having completed the studies, the student is able to successfully pass a consecutive master's program and to apply the knowledge acquired in the corresponding professions.

(2) Upon successful completion of the bachelor's examination, the academic degree of "Bachelor of Science" (abbreviated by "B.Sc.") is awarded for the Bachelor's Program of Mechanical Engineering (International).

Article 3 – Regular Period of Studies, Organization of Studies, Credits

(1) The regular period of studies is six semesters.

(2) The curriculum of the program is divided into subjects, the subjects into modules, and the modules are divided into courses. The subjects and their scopes are defined in Article 20. Details are outlined in the module handbook.

(3) The work expenditure envisaged for passing courses and modules is expressed in credits. The criteria for assigning credits correspond to the European Credit Transfer System (ECTS). One credit corresponds to a work expenditure of about 30 hours. As a rule, the credits must be distributed evenly over the semesters.

(4) The coursework and examinations required for the successful completion of the studies are measured in credits and amount to a total of 180 credits.

(5) The courses are offered in the English language. In the individual case, attendance of courses in the German language may be permitted by the examination committee. This does not apply to mandatory courses of the program.

Article 4 – Module Examinations, Coursework and Examinations

(1) The bachelor's examination consists of module examinations. Module examinations consist of one or several controls of success. Controls of success consist of coursework and examinations.

(2) Examinations are:

1. Written examinations,
2. oral examinations, or
3. examinations of another type.

(3) Coursework is written, oral, or practical work that is usually accomplished by students parallel to the courses. The bachelor's examination must not be completed by a coursework.

(4) At least 70% of the module examinations are graded.

(5) In case of complementary contents, module examinations of several modules may be replaced by a module-overlapping examination (par. 2, nos. 1-3).

Article 5 – Registration for and Admission to Module Examinations and Courses

(1) To participate in module examinations, students must register online on the Students Portal for the corresponding controls of success. In exceptional cases, registration can be made in writing with the examination committee. For controls of success, registration deadlines may be specified by the examiners. Registration of the bachelor's thesis takes place on the Students Portal; details are outlined in the module handbook.

(2) For admission to an examination in a certain module of choice, students, prior to the first examination in this module, submit together with their registration for the examination a binding declaration relating to their choice of the module and its assignment to a subject. At the request of the student, the choice or assignment to a subject can be changed later on. Once it has started, an examination procedure must be completed, i.e. an examination not passed for the first time must be repeated. If an examination procedure has already started in a module, the choice or assignment can be changed upon its completion only. This applies to examinations only.

(3) Admission to a control of success is granted to students, who

1. are enrolled in the Bachelor's Program of Mechanical Engineering (International) at KIT; the admission of students on leave is limited to examinations specified in Article 14, par. 7, cl. 1 of the Admission and Enrollment Regulations of KIT; and to students, who
2. can prove that they meet the requirements for admission to a control of success outlined in the module handbook and
3. can prove that their entitlement to the examination in the Bachelor's Program of Mechanical Engineering (International) has not been lost and
4. fulfill the requirement outlined in Article 20 a.

(4) According to Article 30, par. 5, LHG, admission to individual mandatory courses may be restricted. The examiner decides on the selection of students, who have registered in due time before the deadline given by the examiner, taking into account the study progress made by these students and taking into consideration Article 4, par. 1, clauses 1 and 2 of the Satzung über nachteilsausgleichende Regelungen in den

Bachelor- und Masterstudiengängen am Karlsruher Institut für Technologie (KIT) (statutes on the compensation of drawbacks in the bachelor's and master's programs of Karlsruhe Institute of Technology (KIT)), as amended, if the surplus of registrations cannot be reduced by other or additional courses. For the case of identical study progress, further criteria are specified by the KIT Departments. The result is announced to the students in due time.

(5) Admission is refused, if the conditions outlined in pars. 3 and 4 are not fulfilled.

Article 6 – Carrying out Controls of Success

(1) Controls of success are performed parallel to the studies, usually while imparting the contents of the individual modules or shortly afterwards.

(2) The type of control of success (Article 4, par. 2, nos. 1 – 3 and par. 3) is specified by the examiner of the respective course depending on the contents of the course and teaching objectives of the module. The type of controls of success, their frequency, sequence, weighting, and the determination of the module grade, if applicable, must be announced in the module handbook six weeks prior to the start of the lecturing period at the latest. The examiner and student may agree on a change of the type of examination and the examination language later on. In the former case, Article 4, par. 5 must be observed. When organizing examinations, the needs of students in special life situations must be considered according to Article 4, par. 1 of the Satzung über nachteilsausgleichende Regelungen in den Bachelor- und Masterstudiengängen am Karlsruher Institut für Technologie (KIT) (statutes on the compensation of drawbacks in the bachelor's and master's programs of Karlsruhe Institute of Technology (KIT)), as amended. Article 2 and Article 4, par. 1, cl. 3 of the above statutes, as amended, apply accordingly.

(3) In case of an unreasonably high examination expenditure, a written examination may also be passed orally or an oral examination may also be passed in writing. This modification must be announced six weeks prior to the examination at the latest.

(4) Controls of success are organized in English. Article 6, par. 2 applies accordingly.

(5) *Written examinations* (Article 4, par. 2, no. 1) are usually evaluated by an examiner according to Article 18, par. 2 or par. 3. If an evaluation is made by several examiners, the grade is the arithmetic mean of their individual evaluations. If the arithmetic mean does not correspond to any of the grade levels defined in Article 7, par. 2, clause 2, the grade is rounded to the next higher or lower grade level. In case of equal distance to the next higher and lower levels, the grade is rounded to the next higher grade level. The evaluation procedure must not exceed six weeks. Written examinations last a minimum of 60 and a maximum of 300 minutes.

(6) *Oral examinations* (Article 4, par. 2, no. 2) are performed and evaluated as group or individual examinations by several examiners (examining board) or by one examiner in the presence of an associate. Prior to determining the grade, the examiner consults the other examiners of the examining board. Oral examinations usually last at least 15 minutes and not more than 60 minutes per student.

Major details and results of the *oral examination* are documented in the minutes. The result of the examination is announced to the students directly after the oral examination.

Students, who intend to take the same examination in a later semester, are admitted to oral examinations as an audience depending on the space available and upon approval of the examinee. They are not admitted to the consultation of the examining board and announcement of the examination results.

(7) For *examinations of another type* (Article 4, par. 2, no. 3), appropriate deadlines and submission dates are specified. Proper description of the task and adequate documentation ensure that the examination passed can be credited to the student. Major details and results of the control of success are recorded in the minutes.

During *oral examinations of another type*, an associate is present in addition to the examiner and also signs the minutes together with the examiner.

Theses or papers to be written for *an examination of another type* must be provided with the following declaration: “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.” (I herewith declare that the present thesis/paper is original work written by me alone and that I have indicated completely and precisely all aids used as well as all citations, whether changed or unchanged, of other theses and publications). If the thesis/paper does not contain this declaration, it will not be accepted. Major details and results of such a control of success are recorded in the minutes.

Article 6 a – Controls of Success by a Multiple Choice Test

Controls of success by a multiple-choice test are subject to the Satzung des Karlsruher Instituts für Technologie (KIT) zur Durchführung von Erfolgskontrollen im Antwort-Wahl-Verfahren (statutes of Karlsruhe Institute of Technology (KIT) on controls of success by a multiple-choice test), as amended.

Article 6 b – Online Examinations

Online examinations are subject to the Satzung zur Durchführung von Online-Prüfungen am Karlsruher Institut für Technologie (KIT) (statutes on online examinations at Karlsruhe Institute of Technology (KIT)), as amended.

Article 7 – Evaluation of Coursework and Examinations

(1) The result of an examination is determined by the examiners in the form of a grade.

(2) The following grades must be used:

sehr gut (very good)	for an outstanding performance;
gut (good)	for a performance that is far above average;
befriedigend (satisfactory)	for a performance that meets average requirements;

ausreichend (sufficient)	for a performance that is still acceptable in spite of its deficiencies;
nicht ausreichend (failed)	for a performance that is no longer acceptable due to major deficiencies.

For the differentiated evaluation of individual examinations, the following grades must be applied exclusively:

1.0, 1.3	sehr gut (very good),
1.7, 2.0, 2.3	gut (good),
2.7, 3.0, 3.3	befriedigend (satisfactory),
3.7, 4.0	ausreichend (sufficient), and
5.0	nicht ausreichend (failed).

(3) Coursework is evaluated with “bestanden” (passed) or “nicht bestanden” (not passed).

(4) When determining the weighted means of module grades, subject grades, and the total grade, only the first decimal place is considered. All following decimal places are deleted without rounding.

(5) Every module and control of success may only be credited once in the same program.

(6) An examination is passed, if the grade is at least “ausreichend” (4.0, sufficient).

(7) A module examination is passed, if all required controls of success are passed. The module examination and determination of the module grade are outlined in the module handbook. If the handbook does not contain any regulation about the determination of the module grade, the module grade is calculated from the grade average weighted according to the credits of the partial modules. The differentiated grades (par. 2) are used for calculating the module grades.

(8) The results of the controls of success as well as the credits acquired are administrated by the Students Office of KIT.

(9) The grades of the modules of a subject must be considered proportionally to the credits assigned to the modules when calculating the subject grade.

(10) The total grade of the bachelor's examination, the subject grades, and the module grades are:

Down to 1.5	sehr gut (very good),
from 1.6 to 2.5	gut (good),
from 2.6 to 3.5	befriedigend (satisfactory),
from 3.6 to 4.0	ausreichend (sufficient).

Article 8 – Orientation Exams, Loss of the Entitlement to the Examination

(1) The partial module examinations of Advanced Mathematics 1 and Engineering Mechanics 1 in the modules of Advanced Mathematics and Engineering Mechanics must be passed by the end of the second semester (orientation exams).

(2) Students who fail the orientation exams, including potential repetitions, by the end of the 3rd semester, loses the entitlement to the examination in the program, unless the student is not responsible for having exceeded the deadline. The corresponding decision is made by the examination committee at the request of the student. A second repetition of the orientation exams is excluded.

(3) In case the bachelor's examination, including potential repetitions, is not passed completely by the end of the tenth semester, the entitlement to the examination in the Bachelor's Program of Mechanical Engineering (International) will expire, unless the student is not responsible for having exceeded the deadline. The decision on extending the deadline and on exceptions from the deadline regulations is made by the examination committee taking into account the activities listed in Article 32, par. 6, LHG at the request of the student. This request must be made in writing usually six weeks prior to the expiry of the maximum study period specified in clause 1.

(4) The entitlement to the examination will also expire, if coursework or an examination required according to the present studies and examination regulations is finally failed.

Article 9 – Repetition of Examinations, Ultimate Failure

(1) Students may repeat once a written examination that has not been passed (Article 4, par. 2, no. 1). In case a repeated written examination is given the grade of “nicht ausreichend” (5.0, failed), an oral reexamination must take place soon after the date of the failed examination. In this case, the grade of this reexamination may only be “ausreichend” (4.0, sufficient) or “nicht ausreichend” (5.0, failed) and is given by the examiners or the examiner taking into account the result of the written examination and that of the oral reexamination. Oral reexaminations usually last at least 15 minutes and not more than 30 minutes. Article 6, par. 6, clauses 1 and 2 and clauses 4 and 5 apply accordingly. If a written reexamination is deemed to be “nicht ausreichend” (5.0, failed) according to Article 11, an oral reexamination is excluded.

(2) Students may repeat once an oral examination that has not been passed (Article 4, par. 2, no. 2).

(3) Repeated examinations according to paragraphs 1 and 2 must correspond to the first examination in terms of contents, scope, and type (oral or written). At request, exceptions may be approved by the responsible examination committee.

(4) Examinations of another type (Article 4, par. 2, no. 3) can be repeated once.

(5) Coursework can be repeated several times.

(6) An examination is ultimately not passed, if an oral reexamination according to par. 1 was evaluated with the grade of “nicht ausreichend” (5.0, failed). The examination also is ultimately not passed, if the oral examination according to par. 2 or the examination of another type according to par. 4 was evaluated twice with the grade of “nicht bestanden” (not passed).

(7) The module is ultimately not passed, if an examination required for passing the module is ultimately not passed.

(8) A second repetition of the same examination according to Article 4, par. 2 is possible in exceptional cases at the request of the student only (“Antrag auf Zweitwiederholung” – application for a second repetition). As a rule, the request must be submitted in writing to the examination committee within two months upon announcement of the grade.

The examination committee decides on the first application of a student for a second repetition. If the examination committee rejects the application, a member of the Executive Board decides. Upon comment of the examination committee, a member of the Executive Board decides on further applications for a second repetition. If the application is accepted, the second repetition takes place on the next but one examination date at the latest. Paragraph 1, clauses 2 through 6 apply accordingly.

(9) Repetition of a passed examination is not permitted.

(10) In case a bachelor’s thesis has been granted the grade “nicht ausreichend” (5.0, failed), it can be repeated once. A second repetition of the bachelor’s thesis is excluded. The presentation according to Article 14, par. 1a is coursework and when it is given the grade “nicht bestanden” (not passed), it can be repeated once only (contrary to other coursework). The presentation is ultimately not passed, if it was evaluated twice with the grade of “nicht bestanden” (not passed).

Article 10 – Deregistration, Absence, Withdrawal

(1) Students can revoke their registration for *written examinations* until the issue of the examination tasks without having to indicate any reasons (deregistration). Deregistration can be made online on the Students Portal by 12 pm on the day before the examination or in justified exceptional cases with the examination committee. If the deregistration is addressed to the examiner, the latter ensures that the deregistration is documented in the Campus Management System.

(2) In case of *oral examinations*, deregistration must be declared to the examiner at least three working days before the date of examination. Withdrawal from an oral examination less than three working days before the date of examination is possible under the conditions outlined in par. 5 only. In principle, withdrawal from oral reexaminations in the sense of Article 9, par. 1 is possible under the conditions of par. 5 only.

(3) Deregistration from *examinations of another type* and from *coursework* is subject to the provisions given in the module handbook.

(4) A control of success is deemed to have been “nicht ausreichend” (5.0, failed), if students fail to be present at the examination without a good reason or if they withdraw from the control of success after its start without a good reason. The same applies, if the bachelor’s thesis is not submitted within the period envisaged, unless the student is not responsible for having exceeded the deadline.

(5) The reason given for withdrawal after the start of the control of success or absence must be notified immediately, credibly, and in writing to the examination committee. In case of sickness of the student or of a child dependent on the student alone or of a relative in need of care, submission of a medical certificate may be required.

Article 11 – Deception, Breach of Regulations

(1) In case students try to influence the result of their control of success by deception or the use of impermissible aids, this control of success is deemed to have been “nicht ausreichend” (5.0, failed).

(2) Students disturbing the proper execution of the control of success may be excluded from the continuation of this control of success by the examiner or supervisor. In this case, the control of success is deemed to have been “nicht ausreichend” (5.0, failed). In serious cases, the examination committee can exclude these students from other controls of success.

(3) Details relating to honesty during examinations and internships are outlined in the General Statutes of KIT, as amended.

Article 12 – Maternity Protection, Parental Leave, Fulfilment of Family Obligations

As regards the compensation of drawbacks of students in special life situations, the Satzung über nachteilsausgleichende Regelungen in den Bachelor- und Masterstudiengängen am Karlsruher Institut für Technologie (KIT) (statutes on the compensation of drawbacks in the bachelor's and master's programs of Karlsruhe Institute of Technology (KIT)), as amended, apply.

Article 13 – Students with a Disability or Chronic Disease

As regards the compensation of drawbacks of students in special life situations, the Satzung über nachteilsausgleichende Regelungen in den Bachelor- und Masterstudiengängen am Karlsruher Institut für Technologie (KIT) (statutes on the compensation of drawbacks in the bachelor's and master's programs of Karlsruhe Institute of Technology (KIT)), as amended, apply.

Article 14 – Bachelor's Thesis Module

(1) For admission to the bachelor's thesis module, the module examinations in the amount of 120 credits must have been passed successfully. At the request of the student, the examination committee decides on exceptions.

(1a) The bachelor's thesis module is assigned 15 credits. The bachelor's thesis module consists of the bachelor's thesis in the amount of 12 credits and a presentation in the amount of 3 credits. The presentation must be made not later than six weeks after the submission of the bachelor's thesis.

(2) The bachelor's thesis can be assigned by university professors of KIT and habilitated members of the KIT Department of Mechanical Engineering. In addition, the examination committee can authorize other examiners to assign the subject according

to Article 18, pars. 2 and 3. The students are given the possibility of making proposals relating to the subject. If the bachelor's thesis is to be written outside of the KIT Department of Mechanical Engineering, the approval of the examination committee is required. The bachelor's thesis may also be accepted in the form of group work, if the contributions of the individual students to be evaluated in the examination can be distinguished clearly based on objective criteria and if the requirement outlined in par. 4 is fulfilled. In exceptional cases, the chairperson of the examination committee takes care of the student receiving a subject for the bachelor's thesis within four weeks upon her/his request. In this case, the subject is issued by the chairperson of the examination committee.

(3) The subject, task, and scope of the bachelor's thesis are limited by the supervisor such that it can be handled with the expenditure outlined in par. 4.

(4) The bachelor's thesis demonstrates that the students are able to deal with a problem of their subject area in an independent manner and within a limited period of time using scientific methods. The scope of the bachelor's thesis corresponds to 12 credits. The maximum duration of work on the thesis is three months. The subject and task must be adapted to the scope envisaged. The examination committee specifies the languages in which the bachelor's thesis can be written. At the student's request, the examiner can agree to the bachelor's thesis being written in a language other than English.

(5) When submitting the bachelor's thesis, the students assure in writing that the thesis is original work by them alone and that they have used no sources and aids other than indicated, marked all citations in word and content, and observed the Statutes of KIT for Safeguarding Good Research Practice, as amended. If this declaration is not contained, the thesis will not be accepted. The wording of the declaration may be: "Ich versichere wahrheitsgemäß, die Arbeit selbstständig verfasst, alle benutzten Quellen und 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." (I herewith declare that the present thesis is original work written by me alone and that I have indicated completely and

precisely all sources and aids used as well as all citations, whether changed or unchanged, of other theses and publications, and that I have observed the Statutes of KIT for Safeguarding Good Research Practice, as amended).
If the declaration is found to be not true, the bachelor's thesis will be evaluated "nicht ausreichend" (5.0, failed).

(6) The time of assignment of the subject of the bachelor's thesis is recorded by the supervisor and the student/s and documented in the files of the examination committee. The time of submission of the bachelor's thesis is recorded in the files of the examination committee by the examiner. The student is allowed to return the subject of the bachelor's thesis once only within the first month of the period of work on the thesis. At the justified request of the student, the examination committee may extend the time of work on the thesis given in par. 4 by one month at the maximum. If the bachelor's thesis is not submitted in time, it is deemed to have been "nicht ausreichend" (5.0, failed), unless the student is not responsible for this failure.

(7) The bachelor's thesis is evaluated by a university professor of KIT or a habilitated member of the KIT Department of Mechanical Engineering and another examiner at least. As a rule, one of the examiners is the person who assigned the thesis according to par. 2. In case of deviating evaluations of both persons, the examination committee fixes the grade of the bachelor's thesis within the limits of the evaluations of both persons. It may also appoint another expert. The evaluation period must not exceed six weeks upon submission of the bachelor's thesis.

Article 14 a – Internship

(1) During the bachelor's studies, students must complete an internship of at least twelve weeks, which gives them an insight into professional activities in the field of mechanical engineering. The internship is assigned 12 credits.

(2) Students are responsible for contacting suitable industrial companies where they can complete the internship. Internships at public research institutions are excluded. Details are outlined in the module handbook.

Article 15 – Additional Achievements

(1) A maximum of 30 additional credits (additional achievements) can be earned in the courses offered by KIT. Articles 3 and 4 of the examination regulations remain unaffected. These additional achievements are not considered when calculating the total and module grades. The credits not considered when determining the module grade will be listed and marked as additional achievements in the transcript of records. At the student's request, additional achievements are indicated in the bachelor's certificate and marked as additional achievements. Additional achievements are listed with the grades outlined in Article 7.

(2). When registering for an examination in a module, students must declare this as an additional achievement.

Article 15 a – Prior Master's Examinations

Students, who have earned at least 120 credits in the bachelor's program, may acquire credits in a consecutive master's program at KIT in the maximum amount of 30 credits in addition to the additional achievements specified in Article 15, par. 1. Articles 3 and 4 of the examination regulations remain unaffected. The prior master's examinations are not considered when determining the total, subject, and module grades. They are listed in the transcript of records and marked as prior master's examinations together with the grades listed in Article 7. Article 15, par. 2 applies accordingly.

Article 16 – Interdisciplinary Qualifications

In addition to scientific qualifications, acquisition and development of interdisciplinary qualifications in the amount of at least 6 credits are parts of the bachelor's program. Interdisciplinary qualifications may be imparted additively or integratively.

Article 17 – Examination Committee

(1) For the Bachelor's Program of Mechanical Engineering (International), an examination committee is formed. It consists of four members entitled to vote: Two

university professors of KIT/ Privatdozentinnen or Privatdozenten and two academic staff members of KIT as well as one student with an advisory vote. The term of office of the non-student members is two years, the term of office of the student member is one year.

(2) The chairperson, her/his deputy, the other members of the examination committee, and their deputies are appointed by the KIT Department Council. The academic staff members of KIT and the students are proposed by the members of the respective groups. Reappointment is possible. The chairperson and her/his deputy must be university professors of KIT. The chairperson of the examination committee is responsible for current transactions and supported by the respective examination office.

(3) The examination committee ensures compliance with of the provisions of the present studies and examination regulations being observed and decides on examination matters. It decides on the recognition of study periods, coursework, and examinations according to Article 19, par. 1, cl. 1. It regularly reports to the KIT Department about the development of examination and study periods as well as about the times of work on the bachelor’s theses and the distribution of module and total grades. It makes suggestions for reforms of the studies and examination regulations and module descriptions. The examination committee decides with the majority of its votes. In the case of a split vote, the chairperson of the examination committee decides.

(4) The examination committee may delegate the fulfilment of its tasks for all standard cases to its chairperson. In urgent cases that cannot be postponed until the next meeting of the examination committee, the chairperson of the examination committee decides.

(5) The members of the examination committee have the right to participate in examinations. The members of the examination committee, the examiners, and the associates are obliged to secrecy. If they do not work in the public service sector, they are obliged to secrecy by the chairperson.

(6) In matters of the examination committee, which are related to an examination to be passed at another KIT Department, a competent person authorized to examine and to be appointed by the respective KIT Department must be consulted at the request of a member of the examination committee.

(7) The student is informed in writing about incriminating decisions by the examination committee. These decisions must be justified and provided with an information on legal remedies available. Prior to a decision, the student must be given the opportunity to comment. Objections against decisions made by the examination committee must be made to the examination committee within one month upon receipt of the decision. In case of objections, the executive board member responsible for higher education decides.

Article 18 – Examiners and Associates

(1) The examination committee appoints the examiners. It may transfer this task to its chairperson.

(2) Examiners are university professors of KIT, habilitated members, and academic staff members of KIT from the respective KIT Department, who have been authorized to examine students according to Article 14, par. 2 and Article 14b, par. 1., No. 1 KITG in conjunction with Article 52, clause 6, part 2 LHG. Only those who have acquired at least a scientific qualification corresponding to the respective subject of the examination may be appointed.

(3) If courses are held by persons other than those mentioned in par. 2, these must be appointed examiners, if they have the scientific qualification required in par. 2, cl. 2.

(4) Associates are appointed by the examiners. Persons having the scientific qualification corresponding to the examination subject at least may be appointed associate exclusively.

Article 19 – Recognition of Coursework and Examinations as well as of Study Periods

(1) Coursework and examinations made as well as study periods passed in study programs at state or state-recognized universities and cooperative state universities of the Federal Republic of Germany or at foreign state or state-recognized universities are recognized at the request of the students, if the competences acquired do not differ considerably from the achievements or degrees to be replaced. For this, no schematic comparison, but an overall analysis is made. As regards the scope of a coursework or examination to be recognized (credited), the principles of the ECTS are applied.

(2) The students submit the documents required for recognition. Students newly enrolled in the Bachelor's Program of Mechanical Engineering (International) submit the application together with the documents required for recognition within the first semester upon enrollment. If documents are not available in German or English, an officially certified translation may be requested. The burden of proof that the application does not meet the requirements for recognition lies with the examination committee.

(3) If achievements not made at KIT are recognized, they are listed as "anerkannt" (recognized) in the certificate. If grades exist, they are taken over in case of comparable grade scales and are included in the calculation of module grades and the total grade. In case of incomparable grade systems, the grades can be converted. In the absence of grades, the note "bestanden" (passed) is entered.

(4) When recognizing coursework and examinations completed outside of the Federal Republic of Germany, the equivalence agreements adopted by the Conference of Ministers of Education and the German Rectors' Conference as well as agreements concluded within the framework of university partnerships must be considered.

(5) Knowledge and skills acquired outside of the higher education system are recognized, if they are equivalent to the coursework and examinations to be replaced in terms of contents and level and if the institution, where the knowledge and skills were acquired, has a standardized quality assurance system. Recognition may be refused in parts, if more than 50% of the university's study program is to be replaced.

(6) The examination committee is responsible for recognitions and crediting. To determine whether a considerable difference in the sense of par. 1 exists, the responsible subject representatives must be heard.

II. Bachelor's Examination

Article 20 – Scope and Type of the Bachelor's Examination

(1) The bachelor's examination consists of the module examinations according to par. 2, the bachelor's thesis module (Article 14), and the internship (Article 14 a).

(2) Module examinations must be passed in the following subjects:

1. Fundamentals of Engineering: Module(s) in the amount of 127 credits
2. Specialization in Mechanical Engineering (International): Module(s) in the amount of 12 credits
3. International Studies in the amount of 14 credits

Interdisciplinary qualifications in the amount of 6 credits according to Article 16 are imparted within the scientific modules of the subject of International Studies.

The modules available for selection and their allocation to subjects are specified in the module handbook.

Article 20 a – Performance Records Needed for the Bachelor's Examination

Registration for the last module examination of the bachelor's examination requires submission of the certificate of a successfully passed internship according to Article 14 a. In exceptional cases, for which the students are not responsible, the examination committee may permit later submission of this performance record.

Article 21 – Passing of the Bachelor's Examination, Calculation of the Total Grade

(1) The bachelor's examination is passed, if all the module examinations mentioned in Article 20 have been passed.

(2) The total grade of the bachelor's examination is the mean of the subject grades and the bachelor's thesis module grade weighted with the credits.
The grade of the bachelor's thesis module is considered with twice the weight of the grades of the remaining subjects.

(3) If students have completed the bachelor's thesis with the grade 1.0 and the bachelor's examination with an average of 1.2 or better, the rating "mit Auszeichnung" (with distinction) is granted.

Article 22 – Bachelor's Transcript, Bachelor's Certificate, Diploma Supplement, and Transcript of Records

(1) After the assessment of the last examination, a bachelor's certificate and a transcript must be issued about the bachelor's examination not later than three months upon the last examination. The bachelor's certificate and transcript are issued in the German and English languages. The bachelor's certificate and transcript bear the date of the successful passing of the last examination. They are handed over to the students together. The bachelor's certificate documents conferral of the academic bachelor's degree. The bachelor's certificate is signed by the President and the KIT Dean of the KIT Department and provided with the seal of KIT.

(2) The transcript lists the subject and module grades, the credits assigned to the modules and subjects, and the total grade. If a differentiated evaluation of individual examinations was made according to Article 7, par. 2, cl. 2, the respective decimal grade is indicated in the transcript. Article 7, par. 4 remains unaffected. The transcript is signed by the KIT Dean of the KIT Department and the chairperson of the examination committee.

(3) In addition, the students receive a diploma supplement in the German and English languages, which meets the requirements of the applicable ECTS Users' Guide, as well as a transcript of records in German and English.

(4) The transcript of records lists in a structured form all coursework and examinations passed by the student. It includes all subjects and subject grades as well as the assigned credits, the modules assigned to the respective subject with the module grades and the credits assigned, as well as the controls of success assigned to the modules together with the grades and the credits. Paragraph 2, cl. 2 applies accordingly. The transcript of records clearly reflects the assignment of controls of success to the individual modules. Recognized coursework and examinations are included in the transcript of records. All additional achievements are listed in the transcript of records.

(5) The bachelor's certificate, bachelor's transcript, and the diploma supplement, including the transcript of records, are issued by the Students Office of KIT.

III. Final Provisions

Article 23 – Certificate of Examination Achievements

In case students have ultimately failed in the bachelor's examination, they must be given at request and against submission of the exmatriculation certificate a written certificate about the coursework and examinations made and the respective grades, which reveals that the overall examination has not been passed. The same applies when the entitlement to the examination has expired.

Article 24 – Revocation of the Bachelor's Degree

(1) If students have been guilty of deception during an examination and if this fact becomes known upon the hand-over of the certificates only, the grades of the module examinations, during which the students were guilty of deception, can be corrected. If applicable, this module examination may be declared to have been "nicht ausreichend"

(5.0, failed) and the bachelor's examination may be declared to have been "nicht bestanden" (not passed).

(2) If the conditions for admission to an examination were not fulfilled without the student wanting to deceive and if this fact becomes known upon the hand-over of the certificate only, this default is remedied by the passing of the examination. If the student intentionally and wrongly obtained admission to the examination, the module examination may be declared to have been "nicht ausreichend" (5.0, failed) and the bachelor's examination may be declared to have been "nicht bestanden" (not passed).

(3) Prior to a decision of the examination committee, the student is given the opportunity to comment.

(4) The incorrect certificate is confiscated and, if applicable, a new certificate is issued. Together with the incorrect certificate, the bachelor's certificate is also confiscated, if the bachelor's examination was declared to have been "nicht bestanden" (not passed) due to a deception.

(5) A decision pursuant to par. 1 and par. 2, cl. 2 is excluded after a period of five years upon the date of issue of the certificate.

(6) Revocation of the academic degree is subject to Article 36, par. 7 LHG.

Article 25 – Inspection of Examination Files

(1) Upon completion of the bachelor's examination, the students are granted the right to inspect the examination copy of their bachelor's theses, the related opinions, and minutes of the examinations within one year at request.

(2) For inspection of the written module examinations, written module part examinations, and examination minutes, a deadline of one month after announcement of the examination result applies.

(3) The examiner determines the place and time of inspection.

(4) Examination documents must be kept for at least five years.

Article 26 – Entry into Force, Transition Regulations

(1) The present Studies and Examination Regulations enter into force on October 01, 2024 and apply to
1. students, who start their studies within the Bachelor's Program of Mechanical Engineering (International) at KIT in the first semester, and

2. students, who start their studies within the Bachelor's Program of Mechanical Engineering (International) at KIT in a higher semester, provided that this semester is not higher than the semester reached by students of the first year according to cl. 1.

(2) The Studies and Examination Regulations of KIT for the Bachelor's Program of Mechanical Engineering (International) of July 19, 2017 (Official Announcement of KIT, No. 51 of June 21, 2017), last amended by Article 23 of the Satzung zur Änderung der Regelung über die mündliche Nachprüfung in den Studien- und Prüfungsordnungen des Karlsruher Instituts für Technologie (KIT) (statutes on amendment of the regulation on oral reexamination in the studies and examination regulations of Karlsruhe Institute of Technology (KIT)) of March 29, 2023 (Official Announcement of KIT, No. 30 of March 30, 2023) remain in force for
1. students, who started their studies within the Bachelor's Program of Mechanical Engineering (International) at KIT not later than in the summer semester 2024, and
2. students, who, as of the winter semester 2024/2025, start their studies within the Bachelor's Program of Mechanical Engineering (International) at KIT in a higher semester, provided that this semester is higher than the semester reached by the first year of students according to par. 1, No. 1.

As for the rest, they cease to be in force.

(3) Students, who started their studies based on the Studies and Examination Regulations for the Bachelor's Program of Mechanical Engineering (International) of July 19, 2017 (Official Announcement of KIT, No. 51 of June 21, 2017), last amended

by Article 23 of the Satzung zur Änderung der Regelung über die mündliche Nachprüfung in den Studien- und Prüfungsordnungen des Karlsruher Instituts für Technologie (KIT) (statutes on amendment of the regulation on oral reexamination in the studies and examination regulations of Karlsruhe Institute of Technology (KIT)) of March 29, 2023 (Official Announcement of KIT, No. 30 of March 30, 2023), may pass examinations based on those studies and examination regulations by September 30, 2030 for the last time.

Karlsruhe, February 21, 2024
Professor Dr. Oliver Kraft
(Acting President)

Karlsruher Institut für Technologie

Die Forschungsuniversität in der Helmholtz-Gemeinschaft

Amtliche Bekanntmachung

2024 **Ausgegeben Karlsruhe, den 17. Juli 2024** **Nr. 25**

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Berichtigung der Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Bachelorstudiengang Mechanical Engineering (International)

vom 17.07.2024

Die in den Amtlichen Bekanntmachungen des Karlsruher Instituts für Technologie (KIT) veröffentlichte Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Bachelorstudiengang Mechanical Engineering (International) vom 21.02.2024 (Amtliche Bekanntmachung des Karlsruher Instituts für Technologie (KIT) Nr. 3 vom 26. Februar 2024), wird wie folgt berichtigt:

In **§ 26 Absatz 3** werden nach der Angabe „30. März 2023)“ die Wörter „ihr Studium am KIT aufgenommen haben, können Prüfungen auf Grundlage dieser Studien- und Prüfungsordnung“ eingefügt.

Karlsruhe, den 17. Juli 2024

Prof. Dr. Oliver Kraft

(In Vertretung des Präsidenten des KIT)

Karlsruher Institut für Technologie

Die Forschungsuniversität in der Helmholtz-Gemeinschaft

Amtliche Bekanntmachung

2023 **Ausgegeben Karlsruhe, den 24. Juli 2023** **Nr. 62**

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Satzung für das hochschuleigene Auswahlverfahren im internationalen englischsprachigen Bachelorstudiengang Mechanical Engineering (International) am Karlsruher Institut für Technologie (KIT)

vom 24. Juli 2023

Aufgrund von § 10 Absatz 2 Ziffer 5 und § 20 Absatz 2 KIT-Gesetz in der Fassung vom 14. Juli 2009 (GBl. S. 317 ff), zuletzt geändert durch Artikel 2 des Gesetzes zur Änderung des Universitätsklinika-Gesetzes und anderer Gesetze vom 15. November 2022 (GBl. S. 585), §§ 58 Absatz 1, 63 Absatz 2 Landeshochschulgesetz in der Fassung vom 1. Januar 2005 (GBl. S. 1 ff), zuletzt geändert durch Artikel 8 des Gesetzes zum Erlass eines Klimaschutz- und Klimawandelanpassungsgesetz und zur Verankerung des Klimabelangs in weiteren Rechtsvorschriften vom 07. Februar 2023 (GBl. S. 26, 43), § 2 b, § 6 Absatz 1 und 2, §§ 6 a, 6 b, § 7 Hochschulzulassungsgesetz in der Fassung vom 23. Oktober 2019 (GBl. S. 405 ff), zuletzt geändert durch das Vierte Hochschulrechtsänderungsgesetz vom 17. Dezember 2020 (GBl. S. 1204, 1229) sowie Anlage 5 zu § 20 Absatz 2 Satz 2 und § 22 Absatz 4 Hochschulzulassungsverordnung in der Fassung vom 02. Dezember 2019, zuletzt geändert durch Artikel 1 der Verordnung des Wissenschaftsministeriums zur Änderung der Hochschulzulassungsverordnung vom 12. Dezember 2022 (GBl. S. 647 ff), hat der KIT-Senat am 17. Juli 2023 die nachstehende Satzung beschlossen:

INHALTSÜBERSICHT

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ABSCHNITT 3

Zulassungsentscheidung und Schlussbestimmungen

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ABSCHNITT 1

Allgemeine Regelungen

§ 1

Anwendungsbereich, Quoten

(1) [1]Das Studienangebot des englischsprachigen internationalen auslandsorientierten Bachelorstudiengangs Mechanical Engineering (International) (im Folgenden: Bachelorstudiengang Mechanical Engineering) ist in besonderer Weise auf ausländische Studienbewerber und Studienbewerberinnen ausgerichtet. [2]Die Lehrveranstaltungen werden ganz in englischer Sprache abgehalten.

(2) [1]Die Ausländerquote beträgt in diesem Studiengang gemäß § 6 a Satz 2 HZG i.V.m. § 22 Absatz 4 und Anlage 5 Hochschulzulassungsverordnung (im Folgenden: HZVO) **70 vom Hundert**. [2]Zugelassen werden in dieser Quote Studienbewerber/innen ausländischer Staatsangehörigkeit oder Staatenlose, die nicht Deutschen nach § 1 Absatz 2 HZVO gleichgestellt sind. [3]**30 vom Hundert** der zur Verfügung stehenden Plätze werden an deutsche und Deutschen gemäß § 1 Absatz 2 HZVO gleichgestellte Studienbewerber/innen vergeben.

(3) [1]Sind in dem Studiengang Zulassungszahlen nach der jeweils geltenden Verordnung des Ministeriums für Wissenschaft, Forschung und Kunst über die Festsetzung von Zulassungszahlen für die Studiengänge im Vergabeverfahren der Universitäten (ZZVO) festgesetzt, vergibt das Karlsruher Institut für Technologie (KIT) (im Folgenden: KIT) die zur Verfügung stehenden Studienplätze sowohl in der Ausländerquote von 70 vom Hundert als auch in der Quote für Deutsche und Deutschen Gleichgestellten von 30 vom Hundert nach dem Ergebnis eines hochschuleigenen Auswahlverfahrens gemäß dieser Satzung. [2]Die Auswahlentscheidung wird nach dem Grad der Eignung der Bewerber/innen für den Bachelorstudiengang Mechanical Engineering (International) und den angestrebten Beruf getroffen.

§ 2

Fristen

[1]Eine Zulassung von Studienanfängern/innen erfolgt nur zum Wintersemester. [2]Der Antrag auf Zulassung einschließlich aller erforderlichen Unterlagen muss

bis zum 30.4. eines Jahres

beim KIT eingegangen sein **(Ausschlussfrist).**

§ 3

Form des Antrags

(1) [1]Die Form des Antrags richtet sich nach den allgemeinen für das Zulassungsverfahren geltenden Bestimmungen in der jeweils gültigen Zulassungs- und Immatrikulationsordnung des KIT.

(2) [1]Dem Antrag sind folgende Unterlagen beizufügen:

1. eine Kopie des Zeugnisses der Allgemeinen Hochschulzugangsberechtigung, einer einschlägigen fachgebundenen Hochschulzugangsberechtigung, bzw. einer gleichwertigen ausländischen oder sonstigen Hochschulzugangsberechtigung im Sinne des § 58 Absatz 2 LHG;
2. der Nachweis über die fachspezifische Studienfähigkeit gemäß § 7; die Nachweisführung erfolgt ausschließlich über den offiziellen Leistungsnachweis mit den erreichten Punktezahlen ausgestellt durch ein autorisiertes Testzentrum;
3. die in dem Zeugnis der Hochschulzugangsberechtigung oder einem vorläufigen Zeugnis nach § 3 Absatz 3 ausgewiesenen Noten in den Fächern Mathematik und Physik; alternativ kann der Leistungsnachweis durch einen der unter § 8 Absatz 1 Nummer 2 genannten Subject Tests mit der erreichten Punktzahl ausgestellt durch ein autorisiertes Testzentrum erbracht werden;
4. Nachweise über ausreichende englische Sprachkenntnisse nach § 5 Absatz 1 b;
5. sofern vorhanden: Nachweise über eine abgeschlossene Berufsausbildung und Berufstätigkeit in einem anerkannten Ausbildungsberuf, besondere Vorbildungen, praktische Tätigkeiten oder außerschulische Leistungen und Qualifikationen, die über die Eignung für den Studiengang besonderen Aufschluss geben;
6. ein Motivationsschreiben;
7. die in der jeweils gültigen Zulassungs- und Immatrikulationsordnung genannten sonstigen Unterlagen.

[2]Falls die vorgelegten Unterlagen und Zeugnisse nicht in deutscher oder englischer Sprache abgefasst sind, ist eine amtlich beglaubigte Übersetzung in deutscher oder englischer Sprache erforderlich. [3]Das KIT kann verlangen, dass diese der Zulassungsentscheidung zugrundeliegenden Dokumente bei der Einschreibung im Original vorzulegen sind.

(3) [1]Liegt das Zeugnis der Hochschulzugangsberechtigung nach Absatz 2 Ziffer 1 bis zum Ende der Antragsfrist nach § 2 noch nicht vor, kann der Zulassungsantrag auf ein vorläufiges Zeugnis gestützt werden, wenn zu erwarten ist, dass aufgrund der bisherigen Prüfungsergebnisse die Hochschulzugangsberechtigung rechtzeitig vor Beginn des Bachelorstudiengangs Mechanical Engineering erlangt wird.

[2]Das vorläufige Zeugnis muss eine Bewertung der bisher erbrachten Prüfungsleistungen enthalten, welche in die Note der Hochschulzugangsberechtigung mit einfließen oder Voraussetzung für den Erwerb der Hochschulzugangsberechtigung sind, und von einer für die Notengebung oder Zeugniserteilung autorisierten Stelle ausgestellt sein. [3]Weiterhin muss der angestrebte Abschluss im originalsprachlichen Wortlaut angegeben sein, entsprechend der Richtlinien der Zentralstelle für das ausländische Bildungswesen (ZAB).

[4]Bewerber und Bewerberinnen nach Satz 1 nehmen am Auswahlverfahren mit einer Durchschnittsnote, die aufgrund der bisherigen Prüfungsleistungen ermittelt wird, teil; das Ergebnis der endgültigen Hochschulzugangsberechtigung bleibt unbeachtet.

[5]Eine Zulassung ist im Fall einer Bewerbung nach Satz 1 unter dem Vorbehalt auszusprechen, dass die Hochschulzugangsberechtigung bis zur Immatrikulation nachgewiesen wird und sich die vorläufige Zulassung durch das endgültige Zeugnis bestätigt. [6]Im Übrigen bleibt das endgültige Zeugnis bei der Zulassung unbeachtlich. [7]Wird der Nachweis nicht fristgerecht erbracht, erlischt die Zulassung.

§ 4

Auswahlkommission

(1) [1]Zur Vorbereitung der Auswahlentscheidung setzt die KIT-Fakultät Maschinenbau mindestens eine Auswahlkommission ein. [2]Die Auswahlkommission besteht aus mindestens zwei Personen des hauptberuflich tätigen wissenschaftlichen Personals, davon ein/er Professor/in. [3]Ein/e Studierendenvertreter/in kann mit beratender Stimme an den Sitzungen der Auswahlkommission teilnehmen. [4]Ein/e Vertreter/in des Carl Benz School Office kann mit beratender Stimme an den Sitzungen teilnehmen. [5]Eines der Mitglieder der Auswahlkommission führt den Vorsitz.

(2) [1]Die Auswahlkommission berichtet dem KIT-Fakultätsrat nach Abschluss des Verfahrens über die gesammelten Erfahrungen und macht Vorschläge zur Verbesserung und Weiterentwicklung des Auswahlverfahrens.

ABSCHNITT 2

Auswahlverfahren

§ 5

Auswahlverfahren

(1) [1]Am Auswahlverfahren nimmt nur teil, wer

a) sich frist- und formgerecht um einen Studienplatz beworben hat

b) nicht im Rahmen einer vorweg abzuziehenden Quote am Vergabeverfahren teilnimmt und

c) ausreichende englische Sprachkenntnisse, die mindestens dem Niveau B2 oder gleichwertig des Gemeinsamen europäischen Referenzrahmens für Sprachen (GER) entsprechen, nachgewiesen durch einen der folgenden international anerkannten Tests:

   aa) Test of English as Foreign Language (TOEFL) mit mindestens 90 Punkten im internet-based Test oder

   bb) IELTS mit einem Gesamtergebnis von mindestens 6.5 und keiner Section unter 5.5 oder

   cc) University of Cambridge Certificate in Advanced English (CAE) oder

dd) University of Cambridge Certificate of Proficiency in English (CPE) oder

ee) UNIcert mindestens Stufe II.

Der Nachweis englischer Sprachkenntnisse entfällt für Bewerber/innen, die

- eine Bestätigung der Schule, an der sie ihre Hochschulzugangsberechtigung erworben haben, vorlegen, dass der Schulunterricht in den letzten zwei Jahren auf Englisch stattfand oder
- nachweisen, ein General Certificate of Education (GCE) auf dem Niveau eines „A-Level" oder „AS-Level" erworben zu haben, wobei im Fach „Englisch" mindestens die Note „B" erreicht worden sein muss, oder
- als Hochschulzugangsberechtigung ein „International Baccalaureate (IB)" erworben haben und im Fach „Englisch" mindestens die Note 5 nachweisen können.

[2]Ist die/der Bewerber/in an dem Auswahlverfahren nicht zu beteiligen, erhält sie/er einen Ausschlussbescheid.

(2) [1]Die Auswahlkommission trifft unter den eingegangenen Bewerbungen eine Auswahl aufgrund der in § 6 genannten Auswahlkriterien und erstellt eine Rangliste gemäß § 8.

§ 6

Auswahlkriterien

[1]Die Auswahl erfolgt nach folgenden Kriterien:

a) Ergebnis eines fachspezifischen Studierfähigkeitstests (§ 7),

b) die in dem Zeugnis der Hochschulzugangsberechtigung oder einem vorläufigen Zeugnis ausgewiesenen Profilnoten in Mathematik und Physik aus den letzten zwei Halbjahren vor dem 30.04., sofern diese in die Note der Hochschulzugangsberechtigung mit einfließen oder Voraussetzung für den Erwerb der Hochschulzugangsberechtigung sind. Die Profilnoten können durch einen der unter § 8 Absatz 1 Nummer 2 genannten Subject Tests ersetzt werden;

c) ein Motivationsschreiben,

d) berufliche und sonstige Leistungen.

§ 7

Fachspezifischer Studierfähigkeitstest (SAT-Test)

[1]Zur Feststellung der fachspezifischen Studierfähigkeit des Bewerbers/der Bewerberin für den Bachelorstudiengang Mechanical Engineering (International) werden ausschließlich die Ergebnisse eines der nachfolgenden Tests herangezogen:

1. SAT (Scholastic Assessment Test) bestehend aus den vier Teilen *Reading Test*, *Writing and Language Test* und *Math Test* mit insgesamt mindestens 1200 Punkten oder

2. ACT (American College Test) bestehend aus den drei Teilen *English Test*, *Mathematics Test*, *Reading Test* und *Science Test* mit einer Gesamt Punktzahl (*Composite Score*) von mindestens 24 Punkten oder

3. TestAS: Kerntest mit dem Prozentrang von 75

[2]Der Test dient der Überprüfung der zur Erfüllung der fachspezifischen Anforderungen des Bachelorstudiengangs Mechanical Engineering (International) notwendigen Fachkenntnisse und Fähigkeiten des Bewerbers/der Bewerberin, die im Nachweis der schulischen Leistungen nicht oder nur unzureichend abgebildet sind.

§ 8

Bildung der Rangliste für die Auswahlentscheidung

(1) [1]Die Rangliste wird nach einer Punktzahl, in die nachfolgende Leistungen eingehen, erstellt:

1. Ergebnis des fachspezifischen Studierfähigkeitstest gemäß § 7:

   Die im Test erreichte Punktzahl wird mit maximal 20 Punkten bewertet. Die Umrechnung erfolgt nach der Tabelle in Anlage 1 der Satzung.

2. Die im Zeugnis der Hochschulzugangsberechtigung oder im vorläufigen Zeugnis ausgewiesenen Profilnoten in Mathematik und Physik aus den letzten zwei Halbjahren vor dem 30.04., sofern diese in die Note der Hochschulzugangsberechtigung mit einfließen oder Voraussetzung für den Erwerb der Hochschulzugangsberechtigung sind. Die Profilnoten können ersetzt werden durch das Ergebnis eines der folgenden Tests:

   a) ACT International Subject Test Physics mit mindestens 24 Punkten

   b) TestAS Fachmodul Ingenieurwissenschaften mit dem Prozentrang 75.

   Die im Zeugnis der Hochschulzugangsberechtigung oder im vorläufigen Zeugnisausgewiesenen Profilnoten in Mathematik und Physik bzw. das Ergebnis eines der unter Buchstabe a) und b) genannten Tests werden mit maximal 10 Punkten bewertet. Ausländische Notenwerte werden entsprechend der Modifizierten bayerischen Formel umgerechnet. Aus den (umgerechneten) Profilnoten in Mathematik und Physik wird das arithmetische Mittel gebildet.

   Die Verteilung der maximal 10 Punkte auf das aus den Schulnoten gebildete arithmetische Mittel bzw. das Ergebnis eines der unter Buchstabe a) und b) genannten Tests erfolgt gemäß den Tabellen in den Anlagen 2 oder Anlage 3 der Satzung.

3. Motivationsschreiben:

   Im Motivationsschreiben soll der Bewerber/die Bewerberin zu folgenden Themen Stellung beziehen bzw. Angaben machen:

   Darstellung der

   a) eigenen Persönlichkeit und des Werdegangs

   b) fachspezifischen Interessen und Fähigkeiten

c) Entscheidung für die Studienrichtung Maschinenbau

d) persönliche Ziele für den Studienabschluss Bachelor of Science

e) spätere Studien- und Berufsziele.

Das Motivationsschreiben ist in englischer Sprache zu verfassen und soll einen Umfang von zwei DIN A4 Seiten nicht überschreiten.

Die Mitglieder der Auswahlkommission bewerten das Motivationsschreiben gemeinsam auf einer Skala von 0 bis 10. Dabei werden die Themen nach Nr. 3 Buchstabe a) bis e) mit jeweils maximal 2 Punkten bewertet, sofern sie über die Eignung des Bewerbers/der Bewerberin für das angestrebte Studium besonderen Aufschluss geben.

4. Berufliche und sonstige Leistungen:

Die Mitglieder der Auswahlkommission bewerten die beruflichen und sonstigen Leistungen gesondert auf einer Skala von 0 bis 5. Dabei werden die folgenden Kriterien berücksichtigt, sofern sie über die Eignung für das angestrebte Studium besonderen Aufschluss geben:

a) eine abgeschlossene Berufsausbildung in einem einschlägigen Ausbildungsberuf und bisherige, für den Studiengang einschlägige Berufsausübung auch ohne abgeschlossene Berufsausbildung,

b) praktische Tätigkeiten und besondere Vorbildungen,

c) außerschulische Leistungen und Qualifikationen (z.B. Preise und Auszeichnungen).

Aus der Summe der von den einzelnen Mitgliedern vergebenen Punktzahlen wird das arithmetische Mittel bis auf eine Dezimalstelle hinter dem Komma berechnet. Es wird nicht gerundet.

(2) [1]Die Punktzahlen nach Absatz 1 Nummer 1 (Ergebnis fachspezifischer Studierfähigkeitstest), nach Absatz 1 Nummer 2 (Profilnoten oder Ergebnis eines Subject Test), nach Absatz 1 Nummer 3 (Motivationsschreiben) und Absatz 1 Nummer 4 (berufliche und sonstige Leistungen) werden addiert (max. 45 Punkte). [2]Auf der Grundlage der so ermittelten Punktzahl wird unter allen Teilnehmenden des Auswahlverfahrens eine Rangliste erstellt.

(3) [1]Bei Ranggleichheit gilt § 6 Absatz 2 Satz 8 HZG.

§ 9

Auswahlverfahren für höhere Fachsemester

(1) [1]Sind für den Studiengang Zulassungszahlen für das zweite und die höheren Fachsemester nach der jeweils geltenden Verordnung des Ministeriums für Wissenschaft, Forschung und Kunst über die Festsetzung von Zulassungszahlen für die Studiengänge im Vergabeverfahren der Universitäten (ZZVO) festgesetzt, wird unter allen in dasselbe Fachsemester eingestuften Bewerber/innen gemäß § 7 HZG eine Rangliste nach folgenden Kriterien gebildet:

1. bisher erbrachte Studien- und Prüfungsleistungen sowie
2. Ergebnis eines fachspezifischen Studierfähigkeitstest gemäß § 7.

(2) [1]Bei der Bildung der Rangliste werden die bisher erbrachten Studien- und Prüfungsleistungen mit 0,5 Punkten je Leistungspunkt (maximal 60 Punkte) und das Ergebnis des fachspezifischen Studierfähigkeitstest mit maximal 20 Punkten bewertet. [2]Die Umrechnung der im fachspezifischen Studierfähigkeitstest erreichten Punktzahl erfolgt nach der Tabelle in Anlage 1. [3]Die so erreichten Punkte werden addiert (d.h. maximal können 50 Punkte vergeben werden, 60 aus ECTS Leistungen und 20 aus dem fachspezifischen Studierfähigkeitstest).

(3) [1]Bei Ranggleichheit entscheidet das Los.

(4) [1]Im Übrigen gelten § 3 Absatz 2 Ziffer 2 und 4, § 5 Absatz 1 Buchstabe b) dieser Satzung entsprechend.

ABSCHNITT 3

Zulassungsentscheidung und Schlussbestimmungen

§ 10

Zulassungsentscheidung

(1) [1]Die Entscheidung über die Zulassung trifft die/der Vizepräsident/in für akademische Angelegenheiten aufgrund der Empfehlung der Auswahlkommission.

(2) [1]Die Zulassung ist zu versagen, wenn

a) die Unterlagen nach § 3 Absatz 2 nicht frist- oder formgerecht vorgelegt wurden oder

b) im Bachelorstudiengang Mechanical Engineering oder einem verwandten Studiengang mit im Wesentlichen gleichem Inhalt eine nach der Prüfungsordnung erforderliche Prüfung endgültig nicht bestanden wurde oder der Prüfungsanspruch aus sonstigen Gründen nicht mehr besteht (§ 60 Absatz 2 Nummer 2 LHG, § 9 Absatz 2 HZG). Über die Festlegung der Studiengänge mit im Wesentlichen gleichem Inhalt entscheidet die Auswahlkommission des Bachelorstudiengangs Mechanical Engineering im Einvernehmen mit dem Prüfungsausschuss des Bachelorstudiengangs Mechanical Engineering.

(3) [1]Erreicht die/der Bewerber/in nach der Durchführung des Auswahlverfahrens keine Zulassung, wird ihr/ihm das Ergebnis des Auswahlverfahrens mitgeteilt. [2]Der Bescheid ist zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen.

(4) [1]Im Übrigen bleiben die allgemein für das Zulassungsverfahren geltenden Bestimmungen in der Zulassungs- und Immatrikulationsordnung des Karlsruher Instituts für Technologie (KIT) unberührt.

§ 11

Inkrafttreten

(1) [1]Diese Satzung tritt am Tage nach ihrer Bekanntmachung in den Amtlichen Bekanntmachungen des KIT in Kraft. [2]Sie gilt erstmals für das Bewerbungsverfahren zum Wintersemester 2024/25.

(2) [1]Gleichzeitig tritt die Satzung für das hochschuleigene Auswahlverfahren im internationalen englischsprachigen Bachelorstudiengang Mechanical Engineering (International) am Karlsruher Institut für Technologie (KIT), zuletzt geändert durch Satzung vom 28. April 2022 (Amtliche Bekanntmachung des KIT Nr. 24 vom 29. April 2022), außer Kraft.

Karlsruhe, den 24. Juli 2023

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

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Anlage 1:

Umrechnung der im SAT-Test, ACT-Test oder TestAS erreichten Punktezahl oder Prozentrang

SAT Test (Punktezahl 1-1600)	ACT Test Punktezahl (Punktezahl 1-36)	TestAS (Prozentränge von 1-100)	Zugeordnete Punkte für das Ranking
1200 Minimum	24	75	
1200 - 1215	25	76	1
1216 - 1230	25	77	2
1231 - 1245	26	78	3
1246 - 1260	26	79	4
1261 - 1275	27	80	5
1276 - 1290	27	81	6
1291 - 1305	28	82	7
1306 - 1320	28	83	8
1321 - 1335	29	84	9
1336 - 1350	29	85	10
1351 - 1365	30	86	11
1366 - 1380	30	87	12
1381 - 1395	31	88	13
1396 - 1410	31	89	14
1411 - 1425	32	90	15
1426 - 1440	32	91	16
1441 - 1455	33	93	17
1456 - 1470	33	94	18
1471 - 1495	34	95	19
>1496	>35	>96	20

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Anlage 2:

Verteilung der Punkte auf das arithmetische Mittel der Profilnoten Mathe und Physik

Note (arithmetisches Mittel)	Punkte
1,0 – 1,3	10 Punkte
1,4 – 1,6	9 Punkte
1,7 – 1,9	8 Punkte
2,0 – 2,2	7 Punkte
2,3 – 2,5	6 Punkte
2,6 – 2,8	5 Punkte
2,9 – 3,1	4 Punkte
3,2 - 3,4	3 Punkte
3,5 – 3,7	2 Punkte
3,8 -4,0	1 Punkte

Curriculum of the KIT Faculty for Mechanical Engineering, for the Bachelor Course Mechanical Engineering (International) according to SPO (Study and Examination Regulations) 2017

Released October 01, 2024

Inhalt

1. General Information

1.1. Scope of the Bachelor's Degree Program, Credit Points

The Bachelor's degree course in Mechanical Engineering (International) at the Karlsruhe Institute of Technology (KIT) comprises 180 credit points (CP), which are distributed evenly over the standard period of study of six semesters, so that students earn an average of 30 CP (± 3 CP) per semester.

The number of credit points is determined in accordance with the European Credit Transfer and Accumulation System (ECTS) and is based on the workload to be completed by the students. One CP corresponds to approximately 30 hours of student work. In the Bachelor's degree program, courses of 1.5 - 2 semester hours per week (SWS) are usually offered for one LP. One SWS lasts 45 minutes and takes place on average once a week during the lecture period. The remaining work is completed by the students through self-study.

1.2. Structure of the Degree Program, Learning Controls

The degree program is divided into subjects that consist of modules. A module is divided into one or more partial achievements (PA), each of which concludes with a learning control. Learning controls may be ungraded or graded. Ungraded learning controls are referred to as coursework, graded learning controls as examinations. Coursework is usually completed during the course. Each PA is assigned a fixed type of learning control. Detailed information on the form and, if applicable, design of the learning control can be found in the module handbook for the individual PA.

In some modules, individual PAs are linked to each other. For example, passing a course may be a prerequisite for admission to an examination. This is described in the module handbook.

1.3. Examination Procedures

At least one examination date is offered each semester. Registration and examination dates are announced in good time, in the case of written examinations at least six weeks before the examination.

The examiner decides which aids may be used in an examination. A list of permitted aids will be published at the same time as the examination date is announced.

As a rule, examinations may be repeated once. Coursework may be repeated until it has been successfully passed unless otherwise stated.

For the calculation of module and subject grades, please refer to § 7 of the Study and Examination Regulations (SPO). If necessary, additional information on the calculation of module grades can be found in the module descriptions.

1.4. Orientation Exams

The Advanced Mathematics I and Engineering Mechanics I examinations are orientation examinations. They must be taken by the end of the second semester. For further regulations, please refer to § 8 of the SPO.

2. Structure of the Degree Program

2.1. Overview of Subjects, Modules and Partial Achievements (PAs)

The table on the next two pages shows an overview of subjects, modules and PAs in the Bachelor's degree program in Mechanical Engineering (International). The corresponding CPs are given for both modules and PAs and, in the case of PAs, the weighting of the grade within the module and the type of assessment. The weighting of the examinations within a module takes into account the workload of the preliminary work (workshops or exercises).

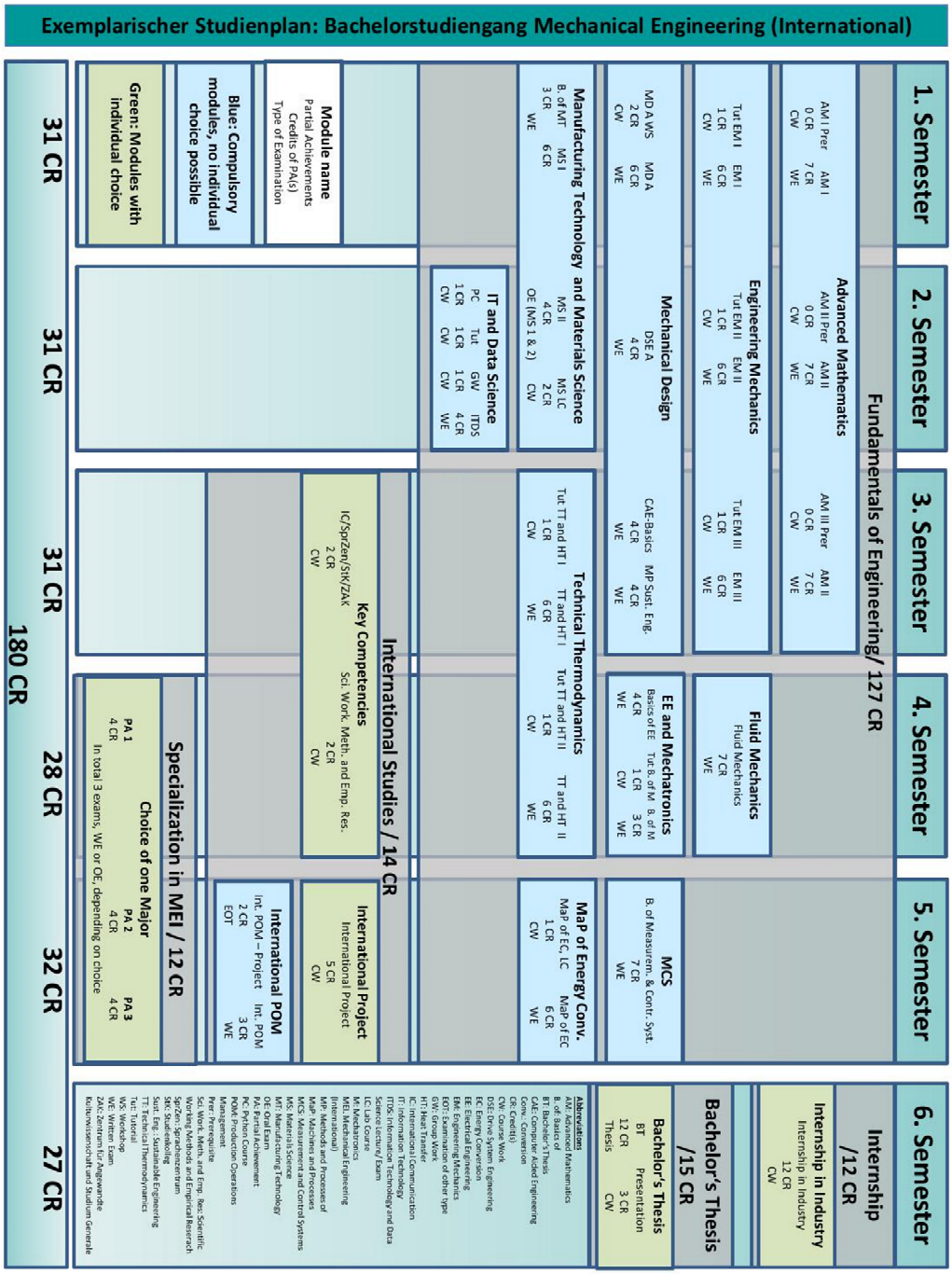
2.2. Sample Curriculum

The sample curriculum on p. 5 shows how the modules and partial achievements of the degree course can be spread over six semesters of standard study time. In the overview, compulsory modules (blue) are distinguished from modules in which students can make an individual choice (green). These modules with options are explained in more detail in chapter 3.

Subject	Module and the person responsible for it	CP	Partial Achievement (PA)		CP	Weighting of the PA within the module	Type of learning control
Fundamentals of Engineering	M-MATH-106718 Advanced Mathematics (AM) Aksenovich/ Kühnlein	21	T-MATH-113496	AM I Prerequisite	0	0	Coursework
			T-MATH-113493	AM I	7	7	Written exam
			T-MATH-113497	AM II Prerequisite	0	0	Coursework
			T-MATH-113494	AM II	7	7	Written exam
			T-MATH-113498	AM III Prerequisite	0	0	Coursework
			T-MATH-113495	AM III	7	7	Written exam
	M-MACH-106705 Engineering Mechanics (EM) Böhlke	21	T-MACH-113502	Tutorial EM I	1	0	Coursework
			T-MACH-113501	EM I	6	7	Written exam
			T-MACH-113504	Tutorial EM II	1	0	Coursework
			T-MACH-113503	EM II	6	7	Written exam
			T-MACH-113506	Tutorial EM III	1	0	Coursework
			T-MACH-113505	EM III	6	7	Written exam
	M-MACH-106706 Mechanical Design (MD) Düser/ Matthiesen	20	T-MACH-113499	MD A Workshop	2	0	Coursework
			T-MACH-113500	MD A	6	2	Written exam
			T-MACH-113405	Drive System Engineering A	4	1	Written exam
			T-MACH-113406	Methods and Processes of Sustainable Engineering	4	1	Written exam
			T-MACH-113507	CAE-Basics	4	1	Written exam
	M-MACH-106707 Manufacturing Technology (MT) and Materials Science (MS) Gibmeier/ Heilmaier/ Schulze	15	T-MACH-113509	Basics of MT	3	3	Written exam
			T-MACH-113511	MS Lab Course	2	0	Coursework
			T-MACH-113510	MS I and II	10	12	Oral exam
	M-MACH-106708 IT and Data Science (DS) Meyer	7	T-MACH-113512	Python Course on IT and DS	1	0	Coursework
			T-MACH-113513	Tutorial IT ad DS	1	0	Coursework
			T-MACH-113514	Group Work IT and DS	1	0	Coursework
			T-MACH-113515	IT and DS	4	7	Written exam
	M-MACH-106709 Technical Thermodynamics (TT) Maas	14	T-MACH-113542	Tutorial TT and Heat Transfer I	1	0	Coursework
			T-MACH-113544	TT and Heat Transfer I	6	7	Written exam
			T-MACH-113543	Tutorial TT and Heat Transfer II	1	0	Coursework
			T-MACH-113545	TT and Heat Transfer II	6	7	Written exam
	M-MACH-106711 Electrical Engineering (EE) and Mechatronics Fidlin	8	T-ETIT-113567	Basics of EE	4	4	Written exam
			T-MACH-113524	Tutorial Basics of Mechatronics	1	0	Coursework
			T-MACH-113525	Basics of Mechatronics	3	4	Written exam

Subject	Module and the person responsible for it	CP	Partial Achievement (PA)		CP	Weighting of the PA within the module	Type of learning control
Fundamentals of Engineering	M-MACH-106710 Fluid Mechanics Frohnapfel	7	T-MACH-113523	Fluid Mechanics	7	7	Written exam
	M-MACH-106712 Measurement and Control Systems (MCS) Stiller	7	T-MACH-113526	Basics in MCS	7	7	Written exam
	M-MACH-106713 Machines and Processes of Energy Conversion (MPEC) Kubach	7	T-MACH-113555	MPEC, Lab Course	1	0	Coursework
			T-MACH-113554	MPEC	6	7	Written exam
Specialization in Mechanical Engineering (International)	Choice of one module from the four majors: M-MACH-106738 Global Production Management Lanza M-MACH-106739 Mobility Systems Cichon M-MACH-106740 Energy Banuti M-MACH-106741 Applied Materials Kirchlechner	12	Students choose a major (compulsory elective module) and select a total of 12 CP in three courses from the range of courses offered in the major. The courses offered in the major are listed in the module handbook. A compulsory course can be specified in the major. This is indicated in the module handbook.		3 x 4	Jede der drei Prüfungen: 4	Depending on choice of Major and PAs
International Studies	M-MACH-106734 Intern. Project Heilmaier	5	T-MACH-113548	Intern. Project	5	0*	Coursework
	M-MACH-106735 Intern. Production Operations Management Furmans	5	T-MACH-113552	Intern. Production Operations Management	3	3	Written exam
			T-MACH-113553	Intern. Production Operations Management: Project	2	2	Examination of other type
	M-MACH-106733 Key Competencies Deml	4	T-MACH-113546	Scientific Work and Empirical Research Methods	2	0*	Coursework
			Participation in Empirical Research or courses offered by the Studienkolleg or Sprachenzentrum as well as selected courses offered by the FORUM (formerly ZAK), see module handbook		2	0*	Depending on choice
Internship	M-MACH-106736 Internship in Industry Heilmaier	12	T-MACH-113549	Internship in Industry	12	0*	Coursework
Bach. Thesis	M-MACH-106737 Bachelor's Thesis Heilmaier	15	T-MACH-113550	Bachelor's Thesis	12	15**	Thesis
			T-MACH-113551	Presentation	3	0**	Coursework

* The module is ungraded.
** The grade of the module Bachelor's thesis is taken into account with double the weight of the grades of the other subjects.


Exemplarischer Studienplan: Bachelorstudiengang Mechanical Engineering (International)
1. Semester
2. Semester
3. Semester
4. Semester
5. Semester
6. Semester
Fundamentals of Engineering/ 127 CR
Advanced Mathematics
AM I Prer AM I
0 CR 7 CR
CW WE
AM II Prer AM II
0 CR 7 CR
CW WE
AM III Prer AM II
0 CR 7 CR
CW WE
Engineering Mechanics
Tut EM I EM I
1 CR 6 CR
CW WE
Tut EM II EM II
1 CR 6 CR
CW WE
Tut EM III EM III
1 CR 6 CR
CW WE
Mechanical Design
MD A WS MD A
2 CR 6 CR
CW WE
DSE A
4 CR
WE
CAE-Basics MP Sust. Eng.
4 CR 4 CR
WE WE
Manufacturing Technology and Materials Science
B. of MT MS I
3 CR 6 CR
WE
MS II MS LC
4 CR 2 CR
OE (MS 1 & 2) CW
Technical Thermodynamics
Tut TT and HT I TT and HT I
1 CR 6 CR
CW WE
Tut TT and HT II TT and HT II
1 CR 6 CR
CW WE
IT and Data Science
PC Tut GW ITDS
1 CR 1 CR 1 CR 4 CR
CW CW CW WE
Fluid Mechanics
Fluid Mechanics
7 CR
WE
EE and Mechatronics
Basics of EE Tut B. of M B. of M
4 CR 1 CR 3 CR
WE CW WE
MCS
B. of Measurem. & Contr. Syst.
7 CR
WE
MaP of Energy Conv.
MaP of EC LC MaP of EC
1 CR 6 CR
CW WE
International Studies / 14 CR
Key Competencies
IC/SprZen/StK/ZAK Sci. Work. Meth. and Emp. Res.
2 CR 2 CR
CW CW
International Project
International Project
5 CR
CW
International POM
Int. POM – Project Int. POM
2 CR 3 CR
EOT WE
Specialization in MEI / 12 CR
Choice of one Major
PA 1 PA 2 PA 3
4 CR 4 CR 4 CR
In total 3 exams, WE or OE, depending on choice
Internship /12 CR
Internship in Industry
Internship in Industry
12 CR
CW
Bachelor's Thesis /15 CR
Bachelor's Thesis
BT Presentation
12 CR 3 CR
Thesis CW
Module name
Partial Achievements
Credits of PA(s)
Type of Examination
Blue: Compulsory modules, no individual choice possible
Green: Modules with individual choice
31 CR
31 CR
31 CR
28 CR
32 CR
27 CR
180 CR
Abbreviations
AM: Advanced Mathematics
B. of: Basics of
BT: Bachelor's Thesis
CAE: Computer Aided Engineering
CAE-Introduction
CR: Credit(s)
CW: Course Work
DSE: Drive System Engineering
EC: Energy Conversion
EE: Electrical Engineering
EM: Engineering Mechanics
Exp. Exercise: Experiment of other type
GW: Group Work
HT: Heat Transfer
IC: Interkulturelle Communication
IT: Information Technology
ITDS: Information Technology and Data Science
Lab: Laboratory/ Exam
LC: Lab Course
M: Mechatronics
MEI: Mechanical Engineering (International)
MP: Methods and Processes of Manufacturing
MS: Materials Science and Control Systems
MT: Manufacturing Technology
OE: Oral Exam
PA: Partial Achievement
PC: Python Course
POM: Production Operations Management
Prer: Prerequisite
Sci. Work. Meth. and Emp. Res: Scientific Working Methods and Empirical Research
SprZen: Sprachenzentrum
StK: Studienkolleg
Sust. Eng.: Sustainable Engineering
Tut: Tutorial
TT: Technical Thermodynamics
WS: Workshop
WE: Written Exam
ZAK: Zentrum für Angewandte Kulturwissenschaft und Studium Generale

3. Modules With Individual Options

3.1. Key Competencies

The Key Competencies module consists of two PAs, each worth 2 CP. One of the two PAs can be the PA Participation in Empirical Research. Alternatively, students can also take a course from the selection offered by the Studienkolleg or the Language Center or from preselected FORUM (formerly ZAK) courses. A complete overview of the elective components can be found in the module handbook. Scientific Work and Empirical Research Methods is a compulsory PA of the Key Competencies module. It concludes with a written examination. If students opt for an elective component that concludes with an examination, its grade is not included in the final grade, as the module is ungraded. In addition, interdisciplinary qualifications amounting to 2 CP are taught in the International Studies module International Project.

3.2. Specialization in Mechanical Engineering (International)

In the Specialization in Mechanical Engineering (International), there are four different majors to choose from, which allow students to set an individual focus in the Bachelor's degree course. Each major is represented by one module worth 12 CP.

Module ID	Major	Resonsible
M-MACH-106738	Global Production Management	Lanza
M-MACH-106739	Mobility Systems	Cichon
M-MACH-106740	Energy	Banuti
M-MACH-106741	Applied Materials	Kirchlechner

Within the major, students take three courses of 4 CP each, chosen from the courses offered in the major. Those responsible for the major can specify a maximum of one compulsory course worth 4 CP. This will be indicated in the module handbook if necessary. In that case, students are free to choose a further two courses of 4 CP each from the range of courses offered in the major. The courses offered in the major are listed in the module handbook.

3.3. International Project

In a team of 2-5 people, students solve a simple engineering or technical problem from the field of Mechanical Engineering (International) and related subject areas. Before the start of a semester, projects are proposed by the institutes and chosen by the students. The project is carried out as teamwork during the lecture period. The team is supervised by lecturers from the institute. The results of the work are presented and documented by the team. In addition, all students individually prepare a written reflection on their work as a team. The project is completed with a coursework of 5 CP.

3.4. Internship in Industry

A minimum 12-week internship in industry is anchored in the curriculum of the Bachelor's degree program Mechanical Engineering (International). The internship is recognized by the Internship Office of the KIT Faculty of Mechanical Engineering. However, the Internship Office does not arrange internships. It is the responsibility of the student to find a suitable internship placement. The employment relationship becomes legally binding through the internship contract to be concluded between the company and the intern. A report of 0.5 pages per week must be written about the internship. Further information on the internship can be found in the module handbook, on the website of the Internship Office (https://www.mach.kit.edu/english/seite407.php) and in the internship regulations (https://www.mach.kit.edu/english/4295.php). 12 CP are awarded for the successful completion of the internship.

3.5. Bachelor’s Thesis

The Bachelor's Thesis module consists of a written thesis (Bachelor's Thesis, 12 CP) and an oral presentation (3 CP). The presentation should take place no later than six weeks after submission of the Bachelor's thesis. The presentation should last approx. 20 minutes and is then discussed with the specialist audience present.
The requirements, implementation and grading of the Bachelor's thesis are described in § 14 of the SPO for the Bachelor's degree program in Mechanical Engineering (International) and in the module handbook. The grade of the Bachelor's Thesis module is considered with double the weight of the grades of the other subjects.

8 Study Program Structure

Mandatory	
Orientation Exam *This field will not influence the calculated grade of its parent.*	
Bachelor's Thesis	15 CP
Internship *This field will not influence the calculated grade of its parent.*	12 CP
Fundamentals of Engineering	127 CP
Specialization in Mechanical Engineering (International)	12 CP
International Studies	14 CP
Voluntary	
Additional Examinations *This field will not influence the calculated grade of its parent.*	

8.1 Orientation Exam

Mandatory				
M-MACH-106721	Orientation Exam	EN	WS+SS	0 CP

8.2 Bachelor's Thesis

Credits
15

Mandatory				
M-MACH-106737	Bachelor's Thesis	EN	WS+SS	15 CP

8.3 Internship

Credits
12

Mandatory				
M-MACH-106736	Internship in Industry	EN	WS+SS	12 CP

8.4 Fundamentals of Engineering

Credits
127

Mandatory				
M-MATH-106718	Advanced Mathematics	EN	WS	21 CP
M-MACH-106711	Electrical Engineering and Mechatronics	EN	SS	8 CP
M-MACH-106705	Engineering Mechanics	EN	WS	21 CP
M-MACH-106710	Fluid Mechanics	EN	SS	7 CP
M-MACH-106708	IT and Data Science	EN	SS	7 CP
M-MACH-106713	Machines and Processes of Energy Conversion	EN	WS	7 CP
M-MACH-106707	Manufacturing Technology and Materials Science	EN	WS	15 CP
M-MACH-106712	Measurement and Control Systems	EN	WS	7 CP
M-MACH-106706	Mechanical Design	EN	WS	20 CP
M-MACH-106709	Technical Thermodynamics	EN	WS	14 CP

8.5 Specialization in Mechanical Engineering (International)

Credits
12

Major (Election: 1 item)				
M-MACH-106741	Applied Materials	EN	SS	12 CP
M-MACH-106740	Energy	EN	SS	12 CP
M-MACH-106738	Global Production Management	EN	SS	12 CP
M-MACH-106739	Mobility Systems	EN	SS	12 CP

8.6 International Studies

Credits
14

Mandatory				
M-MACH-106735	International Production Operations Management	EN	WS	5 CP
M-MACH-106734	International Project	EN	WS+SS	5 CP
M-MACH-106733	Key Competencies	EN	WS+SS	4 CP

8.7 Additional Examinations

Additional Examinations (Election: at most 30 credits)				
M-FORUM-106753	Supplementary Studies on Science, Technology and Society *First usage possible from Oct 01, 2024.*	DE	WS+SS	16 CP

9 Modules

M 9.1 Module: Advanced Mathematics [M-MATH-106718]

Coordinators: Prof. Dr. Maria Aksenovich
PD Dr. Stefan Kühnlein
Organisation: KIT Department of Mathematics
Part of: Fundamentals of Engineering

Credits	Grading	Recurrence	Duration	Language	Level	Version
21 CP	graded	Each winter term	3 terms	English	1	1

Mandatory			
T-MATH-113496	Advanced Mathematics I Prerequisite *This item will not influence the grade calculation of this parent.*	0 CP	Aksenovich, Kühnlein
T-MATH-113493	Advanced Mathematics I	7 CP	Aksenovich, Kühnlein
T-MATH-113497	Advanced Mathematics II Prerequisite *This item will not influence the grade calculation of this parent.*	0 CP	Aksenovich, Kühnlein
T-MATH-113494	Advanced Mathematics II	7 CP	Aksenovich, Kühnlein
T-MATH-113498	Advanced Mathematics III Prerequisite *This item will not influence the grade calculation of this parent.*	0 CP	Aksenovich, Kühnlein
T-MATH-113495	Advanced Mathematics III	7 CP	Aksenovich, Kühnlein

Assessment
Three written exams for the parts I-III of length 120 minutes each.

Prerequisites
None.

Competence Goal
The students know the foundations of calculus of one and several variables, linear algebra, theory of differential equations, and probability theory. They know and can apply techniques in these fields.

Content
Basic set theoretic notions, proofs, sequences and convergence, functions and continuity, series, derivatives, integrals, vector spaces, matrices, Laplace transform, functions of several variables, applications of multivariate calculus, Fourier analysis, differential equations, probability.

Module Grade Calculation
The grade for the module is composed from equally weighted grades for the examinations in Advanced Mathematics I-III.

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

Literature

- Lecture notes
- K. F. Riley, M. P. Hobson, S. J. Bence “Mathematical methods for physics and engineering”, Cambridge University Press, 2015

M 9.2 Module: Applied Materials [M-MACH-106741]

Coordinators: Prof. Dr. Christoph Kirchlechner
Organisation: KIT Department of Mechanical Engineering
Part of: Specialization in Mechanical Engineering (International)

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each summer term	2 terms	English	2	1

Applied Materials (Election: 12 credits)			
T-MACH-113573	Advanced Ceramics: Functionality and Mechanics	4 CP	Fang, Kirchlechner
T-MACH-113557	Contact Mechanics	4 CP	Greiner
T-MACH-113571	Functional Materials	4 CP	Gruber
T-MACH-113559	Introduction to High Temperature Materials	4 CP	Gorr
T-MACH-113576	Introduction to Powder Metallurgy	4 CP	Heilmaier, Kestler
T-MACH-113574	Materials for Nuclear Fusion and Accelerator Applications	4 CP	Kirchlechner, Rieth
T-MACH-113569	Phase Diagrams	4 CP	Wagner
T-MACH-113572	Structural Materials	4 CP	Guth

Assessment
see individual courses

Prerequisites
none

Competence Goal
Students acquire a sound knowledge in all engineering-related material classes as well as materials mechanics. This applies above all to metals, ceramics and polymers as well as composite materials.

After completing this module, students will be able to

- select a suitable structural or functional material and its targeted processing, which defines tailor-made properties.
- define and select experimental methods to characterize the microstructure of the materials and the material properties and to interpret the experimental results.
- classify and if needed apply different methods of materials modelling and simulation.

Content
The aim of the specialization in "Applied Materials" ist to give the students a comprehensive insight in the world of structural and/or functional materials. Such competences are essential in order to address societal issues - climate change, circular economy, resource efficiency - by applying mechanical engineering approaches using appropriate, modern materials.

The topics in detail are:

- structural materials
- functional materials
- metallic and ceramic high-performance materials
- materials selection
- materials processing
- modern testing and characterization methods
- thermodynamics and mechanics of materials

Module Grade Calculation
The module grade is made up of the arithmetic mean of the grades of the three examinations of the module.

Workload
The workload is approx. 360 hours, corresponding to 12 credit points. This results in 135 (180) hours of presence time for courses with a volume of 9 (12) SWS. A further 225 (180) hours are spent in self-study.

Recommendations
none

Teaching and Learning Methods
lectures/tutorials, depending on the choice of courses

M 9.3 Module: Bachelor's Thesis [M-MACH-106737]

Coordinators: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering
Part of: Bachelor's Thesis

Credits	Grading	Recurrence	Duration	Language	Level	Version
15 CP	graded	Each term	1 term	English	3	1

Mandatory			
T-MACH-113550	Bachelor's Thesis	12 CP	Böhlke
T-MACH-113551	Presentation	3 CP	Böhlke

Assessment
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.

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 Prerequisites
The following conditions have to be fulfilled:

1. You need to have earned at least 120 credits in the following fields:
   - Fundamentals of Engineering
   - International Studies
   - Internship
   - Specialization in Mechanical Engineering (International)

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.

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 9.4 Module: Electrical Engineering and Mechatronics [M-MACH-106711]

Coordinators: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering
Part of: Fundamentals of Engineering

Credits	Grading	Recurrence	Duration	Language	Level	Version
8 CP	graded	Each summer term	1 term	English	2	1

Mandatory			
T-MACH-113524	Tutorial Basics of Mechatronics *This item will not influence the grade calculation of this parent.*	1 CP	Fidlin
T-MACH-113525	Basics of Mechatronics	3 CP	Fidlin
T-ETIT-113567	Basics of Electrical Engineering	4 CP	De Carne

Assessment
see individual courses

Prerequisites
none

Competence Goal
Students will be able to describe the dynamic behavior of electromechanical systems in a uniform mathematical way. They can analyze the interactions between mechanical and electromagnetic subsystems. They know the essential feedback effects, can recognize them and calculate their effects. Students have an overview of simple electro-, magneto-mechanical and piezoelectric transducers and their applications in sensor and actuator operation. They can analyze dynamic behavior of simple mechatronic systems (including simple control) in terms of steady-state operation and stability.

Students have gained an overview of electrical engineering fundamentals (electric field, magnetic field) and basic elements of electrical networks (resistor, capacitor, coil). They know the synthetic methods for calculating direct and alternating current electrical circuits. The students have an overview of the most important semiconductor components and their mode of operation and understand elementary basic power electronic circuits. They know the structure and the steady-state operating behavior of the most important electrical machines.

Content

- Variation principles and general formulation of physical laws
- Electro-mechanical transducers and the equations of Lagrange-Maxwell
- Capacitive transducers, inductive transducers, piezo-electric transducers
- Elementary methods of dynamic analysis: rest positions, stability, singular perturbed systems
- Dynamics of coupled electro-mechanical systems
- Capacitive and inductive sensors, magnetic suspension, oscillating un-exciters, piezo-sensors and -actuators
- Basic concepts, electric field, magnetic field, magnetic materials, transition to concentrated parameters
- Basic elements: ohmic resistance, capacitor, coil, linear networks
- Complex alternating current calculation, power terms, three-phase current
- transformer, synchronous machine, asynchronous machine
- Semiconductor devices, diodes, transistors, MOSFET and IGBT, power electronics, modulation

Module Grade Calculation
The module grade is computed as an average of the grades of the two written exams (50% each).

Workload
240 hours of which 90 hours presence during lectures/ tutorials, and 150 hours self-study time

Teaching and Learning Methods
Lecture, tutorials

M 9.5 Module: Energy [M-MACH-106740]

Coordinators: Prof. Dr.-Ing. Daniel Banuti
Organisation: KIT Department of Mechanical Engineering
Part of: Specialization in Mechanical Engineering (International)

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each summer term	2 terms	English	2	1

Energy (Election: 12 credits)			
T-MACH-113627	Fundamentals of Nuclear Energy and Radiation Protection	4 CP	Dagan
T-MACH-113621	Heat Transfer and Thermal Fluid Flow	4 CP	Ruck
T-MACH-113622	Introduction to Energy Topology and Resilience	4 CP	Ottenburger
T-MACH-113623	Introduction to Hydrogen Technologies	4 CP	Banuti, Jedicke
T-MACH-113620	Introduction to Thermodynamics of the Energy Transition	4 CP	Banuti
T-MACH-113624	Renewable Energies I: Solar Systems	4 CP	Dagan
T-MACH-113602	Sustainable Internal Combustion Energy Conversion for Combined Heat Power and Mobility Applications	4 CP	Koch

Assessment
see individual courses

Prerequisites
none

Competence Goal
The students acquire a sound knowledge of technologies and principles to enable the sustainable energy transition. The module provides information about a range of mechanical engineering contributions to this task, so that the students can weigh the advantages and disadvantages, and assess applications of technologies for specific tasks.

The module is organized in a way that allows students to choose their own topical spectrum, including

- Physical fundamentals (such as thermodynamics or heat transfer)
- Technologies (such as hydrogen, solar energy, internal combustion engines, or nuclear)
- Systems (such as energy topologies & resilience or thermodynamics)

After completing this module, depending on the specific set of chosen topics, students will be able to

- compare different technologies and describe their suitability for given tasks,
- use physical and thermodynamic principles to analyze different energy technologies,
- evaluate advantages, disadvantages, and limits of different technologies,
- assess individual technologies as part of an energy system and their specific role in it.

Content
The goal of the Major "Energy" is to provide students with a comprehensive picture of different energy technologies and their physical foundations.

Specifically, the topics are:

- Introduction to Thermodynamics of the Energy Transition
- Introduction to Hydrogen Technologies
- Heat Transfer and Thermal Fluid Flow
- Introduction to Energy Topology and Resilience
- Renewable Energies I: Solar Systems
- Sustainable Internal Combustion Energy Conversion for Combined Heat Power and Mobility Applications
- Fundamentals of Nuclear Energy and Radiation Protection

Module Grade Calculation
The module grade is the arithmetic mean of the grades of the three examinations of the module.

Workload
The workload is approx. 360 hours, corresponding to 12 credit points. This results in 135 (180) hours of presence time for courses with a volume of 9 (12) SWS. A further 225 (180) hours are spent in self-study.

Recommendations
none

Teaching and Learning Methods
Lectures, exercises

M 9.6 Module: Engineering Mechanics [M-MACH-106705]

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

Part of: Fundamentals of Engineering

Credits	Grading	Recurrence	Duration	Language	Level	Version
21 CP	graded	Each winter term	3 terms	English	1	1

Mandatory			
T-MACH-113502	Tutorial Engineering Mechanics I *This item will not influence the grade calculation of this parent.*	1 CP	Böhlke, Langhoff
T-MACH-113501	Engineering Mechanics I	6 CP	Böhlke, Langhoff
T-MACH-113504	Tutorial Engineering Mechanics II *This item will not influence the grade calculation of this parent.*	1 CP	Böhlke, Langhoff
T-MACH-113503	Engineering Mechanics II	6 CP	Böhlke, Langhoff
T-MACH-113506	Tutorial Engineering Mechanics III *This item will not influence the grade calculation of this parent.*	1 CP	Fidlin
T-MACH-113505	Engineering Mechanics III	6 CP	Fidlin

Assessment
Engineering Mechanics I (T-MACH-113501): written exam, 90 minutes, graded. Additives as announced

Engineering Mechanics II (T-MACH-113503): written exam, 90 minutes, graded. Additives as announced

Engineering Mechanics III (T-MACH-113505): written exam, 180 minutes, graded. Additives as announced

Coursework in *Tutorial Engineering Mechanics I* (T-MACH-113502) must be passed for admission to the exam Engineering Mechanics I.

Coursework in *Tutorial Engineering Mechanics II* (T-MACH-113504) must be passed for admission to the exam Engineering Mechanics II.

Coursework in *Tutorial Engineering Mechanics III* (T-MACH-113506) must be passed for admission to the exam Engineering Mechanics III.

Prerequisites
none

Competence Goal
After completion of this module the students can

- compute internal forces and moments for linear structures
- compute and evaluate 3D stress and strain states within the framework of linear elasticity and thermoelasticity
- apply the principle of virtual displacements
- apply energy methods and evaluate approximate solutions
- evaluate the stability of equilibrium positions

The students know some possibilities to describe the position and orientation of a rigid body for an arbitrary 3D motion. They realize that the rotational velocity is a vector which may change both magnitude and orientation. They can apply the principle of linear momentum and the principle of moment of momentum to a spatial motion of a rigid body and notice that this is much more complicated compared to a plain motion. The students can calculate the coordinates of the inertia tensor. They see that many effects which may be seen with gyroscopes can be explained by the principle of moment of momentum. For systems with many particles or bodies but only few degrees of freedom the students know that the application of analytical methods like the principle of D'Alembert in Lagrangian form or the Lagrange equations may be advantageous. They can apply these principles to simple problems. For vibration problems the students can interpret the most important expressions like eigenfrequency, resonance or eigenvalue problem. Forced vibration of systems with one degree of freedom can be investigated by the students.

Content
Contents of "Engineering Mechanics I"

- basics of vector calculus
- force systems
- statics of rigid bodies
- internal forces and moments in bars and beam
- friction
- center of gravity, center of mass
- work, energy, principle of virtual work
- statics of undeformable 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 theory in 3D
- energy methods in elastostatics
- approximation methods
- stability of elastic bars

Contents of "Engineering Mechanics III"

- Kinematics of mass points
- Kinematics of continua
- Guided motion
- Mass kinematic quantities
- Dynamic quantities
- Dynamic axioms and theorems
- Analytical methods
- Impacts
- Vibrations
- Gyroscopes

Module Grade Calculation
The module grade is calculated from the CP-weighted average of the graded partial exams.

Workload
155 hours regular attendance, 475 hours self-study

Teaching and Learning Methods
Lectures, Tutorials, Lab course groups, attestation of solved work sheets, consultation hours

M 9.7 Module: Fluid Mechanics [M-MACH-106710]

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

Part of: Fundamentals of Engineering

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

Mandatory			
T-MACH-113523	Fluid Mechanics	7 CP	Frohnapfel

Assessment
Written exam

Prerequisites
none

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

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

Module Grade Calculation
result of exam

Workload
In presence: 90 hours
Self study time: 120 hours

Recommendations
none

Teaching and Learning Methods
Lectures + tutorials

Literature
Zierep J., Bühler, K.: Principles of Fluid Mechanics, Fundamentals, Statics and Dynamics of Fluids, Springer 2022

Spurk, J.H.: Fluid Mechanics, 2nd edition, Springer 2008

M 9.8 Module: Global Production Management [M-MACH-106738]

Coordinators: Prof. Dr.-Ing. Gisela Lanza
Organisation: KIT Department of Mechanical Engineering
Part of: Specialization in Mechanical Engineering (International)

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each summer term	2 terms	English	2	2

Mandatory			
T-MACH-112972	Smart Factory	4 CP	Lanza
Global Production Management (Election: 8 credits)			
T-MACH-113566	Automation and Autonomy in Logistics	4 CP	Brenner, Furmans
T-MACH-113563	Automated Production Systems	4 CP	Fleischer
T-MACH-113565	Global Logistics	4 CP	Furmans

Assessment
See individual courses

Prerequisites
none

Competence Goal
The students acquire in the mandatory subject a profound knowledge of 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.

After completing this module, students will be able to

- 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.

Content
The aim of the specialization in "Global Production Management" is to present the challenges of globally operating companies and to give an overview of the central aspects of global production networks as well as to gain in-depth knowledge of common methods and procedures for designing them. For this purpose, methods for site selection, approaches for the site-specific adaptation of production technologies as well as planning approaches for setting up a new production location will be imparted during the module. The module will be rounded off by presenting Industry 4.0 methods and technologies.

The topics in detail are:

- Framework conditions and influencing factors of global production (historical development, goals, opportunities and risks)
- Site selection
- Site-specific production adaptation
- Planning a new production site
- Design and management of global production networks
- Integration of Industry 4.0 methods and technologies

Module Grade Calculation
The module grade is made up of the arithmetic mean of the grades of the three examinations of the module.

Workload
The workload is approx. 360 hours, corresponding to 12 credit points. This results in 135 (180) hours of presence time for courses with a volume of 9 (12) SWS. A further 225 (180) hours are spent in self-study.

Recommendations
none

Teaching and Learning Methods
Lectures, seminars, workshops, excursions

M 9.9 Module: International Production Operations Management [M-MACH-106735]

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

Part of: International Studies

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

Mandatory			
T-MACH-113552	International Production Operations Management	3 CP	Furmans, Lanza, Schultmann
T-MACH-113553	International Production Operations Management: Project	2 CP	Furmans, Lanza

Assessment
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.

Prerequisites
none

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

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.

Module Grade Calculation
The module grade is made up of the grades of the courses in the module weighted by credit points.

Additional Information
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

Teaching and Learning Methods

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

M 9.10 Module: International Project [M-MACH-106734]

Coordinators: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering
Part of: International Studies

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

Mandatory			
T-MACH-113548	International Project	5 CP	Böhlke

Assessment
see course

Prerequisites
none, but see recommendations

Competence Goal
Students are able to work in teams to analyze simple engineering or technical engineering or technical problems from the field of mechanical engineering and related disciplines. They are able to find one or more solutions for the problem, to compare, discuss and evaluate different solutions if necessary, and finally to pursue a solution and work it out. In doing so, they apply engineering methods for problem solving as well as methods for developing technical solutions. They incorporate the previously defined requirements and development goals and define indicators to verify the achievement of the goals.

Students are able to define and plan individual work steps from the task definition. They are able to communicate their own results in a team, discuss them professionally and sufficiently document the results of the discussion. In addition, they can record and analyze the work results of team members and derive a common solution. In doing so, they apply the knowledge they have acquired in their studies in time, conflict and project management and gain practical experience in these areas.

Students are able to independently research relevant, current scientific and technical literature in a structured manner and to include this in their solution. The students are able to document their technical results, whereby they orientate themselves on the statutes for the safeguarding of good scientific practice at KIT and pay particular attention to scientific language expression and citation rules. Furthermore, they are able to reflect in writing on their work as a team and to critically analyze their experiences. The students are able to present their project results and put them up for discussion.

Content

- Students solve a simple engineering or technical problem from the field of mechanical engineering and related disciplines, in a team of 2-5 students.
- Application of time, conflict and project management
- Research of technical and scientific literature
- Presentation of the results (as team)
- Documentation of the results (as team)
- Preparation of a written reflection on their work as a team (individual)

Module Grade Calculation
The module is ungraded.

Workload
150 hours, including at least three meetings with supervisor. Additional attendance hours as required and assessed by the project team.

Recommendations
Successful completion of the course *Scientific Work and Empirical Research Methods* (Interdisciplinary Qualifications).

Teaching and Learning Methods
Project work in a team of 2-5 students, at least three meetings with the supervisor.

Base For
Some skills acquired during the project work (literature research, writing a project report) is required in the Bachelor's thesis.

M 9.11 Module: Internship in Industry [M-MACH-106736]

Coordinators: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering
Part of: Internship

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	pass/fail	Each term	1 term	English	3	1

Mandatory			
T-MACH-113549	Internship in Industry	12 CP	Böhlke

Assessment
See partial achievement

Prerequisites
none

Competence Goal
After their internship, the students will be able to

- describe the principles of organisational structure and process organization (e.g. production plannung and control) in an industrial company,
- perform complex technical tasks under realistic conditions,
- apply key qualifications such as personal initiative, teamwork and communication skills in addition to their technical practical experience and skills and
- describe the subject-related and interdisciplinary requirements in the individually aspired later field of activity and can take this into account for further studies.

Content
In order to ensure a sufficient breadth of the practical work experience, activities from at least two different fields of work must be selected. The activities in the professional internship must correspond to the occupational profile of engineering in terms of content. The activities can be chosen from the following areas:

- (industrial) research and development,
- design and process planning,
- production planning and control,
- logistics and operations management,
- modelling and simulation,
- design of experiments, experimental procedure and evaluation,
- project and planning tasks,
- engineering services and
- other subject-related complex activities (projects) according to the chosen specialisation.

Module Grade Calculation
Certification without grade.

Additional Information
As part of the bachelor's program, a professional internship must be completed in accordance with SPO § 14a. The prescribed minimum duration is 12 weeks full-time. Missed work time must be made up in any case. In case of absences, the intern must ask the company for an extension of the contract in order to be able to carry out the professional internship to the required extent.
The Internship Office does not arrange internships. It is the responsibility of the student to find a suitable internship placement. The contract of employment becomes legally binding through the internship contract to be concluded between the company and the intern. The contract defines all rights and obligations of the intern and the company as well as the type and duration of the internship. Company here stands synonymously for engineering offices, companies etc. However, the professional internship cannot have been carried out at universities, equivalent institutions of higher education or in comparable research institutions.

Workload
Attendance time in the company incl. preparation of the internship report: 12 weeks x 35 h/week = 420 h

Teaching and Learning Methods
Professional internship

M 9.12 Module: IT and Data Science [M-MACH-106708]

Coordinators: Prof. Dr.-Ing. Anne Meyer
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Engineering

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

Mandatory			
T-MACH-113512	Python Course on IT and Data Science	1 CP	Meyer
T-MACH-113513	Tutorial IT and Data Science	1 CP	Meyer
T-MACH-113515	IT and Data Science	4 CP	Meyer
T-MACH-113514	Group Work IT and Data Science	1 CP	Meyer, Rönnau

Assessment
see individual courses

Prerequisites
none

Competence Goal
Students can justify the necessity and importance of IT systems, programming and data science in mechanical engineering and explain how these tools can be used to solve practical challenges in mechanical engineering.

Students have a basic understanding of computers and can use relevant parts of an operating system. They have sufficient knowledge of the Python programming language to be able to understand and execute Python programs and to be able to solve simple tasks relevant to mechanical engineering independently through programming.

Technical concepts such as data types and data structures, as well as procedural implementation and object orientation are known. Furthermore, theoretical and practical basic knowledge of algorithms in general, as well as data analysis and data evaluation are available.

Students know the importance of data formats, models and communication protocols for communication in networks. They are familiar with various hardware and software architectures. Furthermore, they have acquired a basic understanding of the transmission of data between software and hardware components and have consolidated this through practical experience.

This provides a solid IT background for further studies in mechanical engineering and enables students to use Python with external libraries (e.g. sympy) to solve problems in other (compulsory) courses such as HM and TM.

Content
Programming environment Jupyter Notebook/Anaconda for Python, Python libraries for mechanical engineering and data science, IT basics, basic concepts of programming, objects, classes, methods, object orientation, algorithmic thinking, basics/ application of data science in mechanical engineering. Programming tasks individually and in groups.

Module Grade Calculation
Result of written exam

Additional Information
Python crash course in lecture week 0 or 1

Workload
210 hours, of which

- on campus (presence) 90 hours
- self study time 120 hours

Teaching and Learning Methods
Lecture, Python crash course, exercises, group work

M 9.13 Module: Key Competencies [M-MACH-106733]

Coordinators: Prof. Dr.-Ing. Barbara Deml
Organisation: KIT Department of Mechanical Engineering

Part of: International Studies

Credits	Grading	Recurrence	Duration	Language	Level	Version
4 CP	pass/fail	Each term	1 term	English	2	2

Election Notes
Interdisciplinary qualifications (IQ) completed at the Sprachenzentrum (SpZ) or Studienkolleg (StK), can be assigned in self-service.

First, select a partial accomplishment named "self-assignment" in your study schedule and second, assign an IQ-achievement via the tab "IQ achievements".

Mandatory			
T-MACH-113546	Scientific Work and Empirical Research Methods	2 CP	Deml
Key Competences (Election: 2 credits)			
T-ZAK-112807	Civil Society and non-profit Organizations in democratic socities	2 CP	
T-ZAK-112565	Deconstructing Unconscious Bias into Intercultural Competence: A neurological look into how the brain constructs reality	2 CP	
T-FORUM-113833	How does the European Union work? Functions, institutions and ongoing challenges (Jean Monnet Circle Seminar)	2 CP	
T-ZAK-112564	Intercultural Communications: USA and Germany	2 CP	
T-FORUM-113834	International Management - Practical insights	2 CP	
T-MACH-113547	Participation in Empirical Research	2 CP	Deml
T-MACH-110961	Steering of a Global Operating Company - The Robert BOSCH GmbH as an Example	2 CP	Grube
T-ZAK-113411	The impact of sustainable steering: Insights for holistic decision-making	2 CP	
T-FORUM-113835	World history of state and law	2 CP	
T-MACH-112568	Self-Booking-BSc-SPZ-Non-Graded	2 CP	Heilmaier
T-MACH-112569	Self-Booking-BSc-SPZ-Graded	2 CP	Heilmaier
T-MACH-112680	Self-Booking-BSc-StK-Non-Graded	2 CP	Heilmaier
T-MACH-112681	Self-Booking-BSc-StK-Graded	2 CP	Heilmaier

Assessment
see individual courses

Prerequisites
see individual courses

Competence Goal
The students are able to write a scientific qualification paper, such as a Bachelor's thesis, in a formally correct way. They can research scientific literature, professionally evaluate the quality of a literature reference and present specialised information in a clear and convincingly argued manner. They know methods to obtain data scientifically and to evaluate it with the help of suitable statistical procedures. The students are also able to apply these methods to questions from mechanical engineering. Furthermore, after completing the module they are better able to cope with supra-disciplinary and supra-professional requirement situations.

Content
The module imparts knowledge and skills that can be used for a relatively long period of time in order to cope with demanding professional situations. It addresses both the competence fields of professional competence (scientific work) and methodological competence (empirical research methods), as well as social and individual competence. In the latter area, students can choose from a catalogue of subjects so that, among other things, social-cultural or creative-communicative content can be integrated into the programme.

Module Grade Calculation
The module is not graded.

Workload
A total of 120 time hours.

The division into attendance and self-study time depends on the individual choice of courses. The following applies to all courses: One SWS corresponds to 15 hours of attendance time. The remaining time is spent in self-study.

Teaching and Learning Methods
Lectures, tutorials, practical work, depending on choice of courses

Literature
Depending on choice of courses; will be announced in course if applicable

M 9.14 Module: Machines and Processes of Energy Conversion [M-MACH-106713]

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

Part of: Fundamentals of Engineering

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

Mandatory			
T-MACH-113555	Machines and Processes of Energy Conversion, Lab Course	1 CP	Kubach
T-MACH-113554	Machines and Processes of Energy Conversion	6 CP	Kubach

Assessment
see individual courses

Prerequisites
none

Competence Goal
Students can name and describe the basic energy conversion processes and executed energy converting machines. They can explain the application of the energy conversion processes in different machines. They can draw up energy balances for the various energy conversion processes. They can analyze and evaluate the processes and machines with regard to functionality and efficiency and solve simple technical problems concerning the operation of the machines.

Content

- Introduction to power engineering
- Radial and axial turbines
- Pumps
- Compressors
- Blowers
- Wind turbines
- Fuel cells
- Energy storage
- E-motors
- Heat pumps
- Combined heat and power
- Diesel engines
- Gasoline engines
- Hydrogen engines

Module Grade Calculation
The module grade corresponds to the grade of the written exam.

Workload
210 h, 54 of which in presence

Teaching and Learning Methods
Lecture with tutorial and lab course

M 9.15 Module: Manufacturing Technology and Materials Science [M-MACH-106707]

Coordinators: Dr.-Ing. Jens Gibmeier
Prof. Dr.-Ing. Martin Heilmaier
Prof. Dr.-Ing. Volker Schulze

Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Engineering

Credits	Grading	Recurrence	Duration	Language	Level	Version
15 CP	graded	Each winter term	2 terms	English	1	1

Mandatory			
T-MACH-113509	Basics of Manufacturing Technology	3 CP	Schulze
T-MACH-113510	Materials Science I and II	10 CP	Gibmeier, Heilmaier, Pundt
T-MACH-113511	Materials Science Lab Course	2 CP	Gibmeier, Heilmaier, Pundt

Assessment
see individual courses

Prerequisites
keine

Competence Goal
Within this module the students should

MS I/II

- 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

Basics of Manufacturing Technology

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 product

Content
MS 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

MS II

- Iron based alloys
- Non-iron based alloys
- Ceramics
- Glases
- Polymers
- Composite Materials

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. Regard is paid to classic manufacturing processes as well as new developments like additive manufacturing processes.

Basics of Manufacturing Technology

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

Module Grade Calculation
The module grade is computed from the two graded courses and weighted by their credit points, including credit points of respective prerequisite.

The grade earned in the exam corresponding to T-MACH-113509 is thus weighted by a factor of 3, while the grade earned in the exam corresponding to T-MACH-113510 is weighted by a factor of 12.

Workload
T-MACH-113510: In presence: 90 hours; Self study time: 210 hours

T-MACH-113509: In presence: 30 hours; Self study time: 60 hours

T-MACH-113511: In presence: 25 hours; Self study time: 35 hours

Teaching and Learning Methods
T-MACH-113509: lectures and tutorials

T-MACH-113510: lectures and tutorials

T-MACH-113511: lab course

M 9.16 Module: Measurement and Control Systems [M-MACH-106712]

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

Part of: Fundamentals of Engineering

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

Mandatory			
T-MACH-113526	Basics in Measurement and Control Systems	7 CP	Stiller

Assessment
written exam, duration 2.5 hours

Prerequisites
none

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.

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

Module Grade Calculation
result of exam

Workload
84 hours attendance time, 126 hours self-study.

Recommendations
Basic knowledge of physics and electrical engineering, ordinary linear differential equations, Laplace transformation

Teaching and Learning Methods
Lecture, exercises

Literature
C. Stiller: Grundlagen der Mess- und Regelungstechnik, Shaker Verlag, Aachen, 2005R.H. Cannon: Dynamics of Physical Systems, McGraw-Hill Book Comp., New York,
1967
G.F. Franklin: Feedback Control of Dynamic Systems, Addison-Wesley Publishing Company,
USA, 1988
R. Dorf and R. Bishop: Modern Control Systems, Addison-Wesley
C. Phillips and R. Harbor: Feedback Control Systems, Prentice-Hall

M 9.17 Module: Mechanical Design [M-MACH-106706]

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

Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Engineering

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

Mandatory			
T-MACH-113499	Mechanical Design A, Workshop	2 CP	Düser, Matthiesen
T-MACH-113500	Mechanical Design A	6 CP	Düser, Matthiesen
T-MACH-113405	Drive System Engineering A: Automotive Systems	4 CP	Ott
T-MACH-113406	Methods and Processes of Sustainable Engineering	4 CP	Ott
T-MACH-113507	CAE-Basics	3 CP	Düser
T-MACH-113899	CAE-Basics Workshop	1 CP	Düser

Assessment
see individual courses

Prerequisites
None

Competence Goal
In machine design theory, students acquire skills in the analysis and synthesis of systems, starting at the operating level, through components (e.g. bearings) to more complex systems (e.g. electric motors). After completing machine design theory, students can apply the content they have learned to other technical systems - including those not familiar from the lecture - by transferring the principles of action and basic functions learned as examples to other contexts. This enables students to independently analyze unknown technical systems and synthesize suitable systems for given problems.

Content
Mechanical Design A + Workshop

- Springs
- Technical systems
- Bearings and mountings
- Seals
- Component connection
- Gearboxes

Drive Systems Engineering A

Fundamentals of energy-efficient and comfortable drivetrains with a focus on

- Drive train system
- Driver system
- System environment
- System components
- Development process

Methods and Processes of Sustainable Engineering

- Fundamentals and boundary conditions for the sustainable development and operation of technical systems
- Fundamentals of the concept of sustainability: definitions and interpretations
- Methods for developing technical systems and subsystems with sustainability in mind

CAE basics + Workshop

- Basics of computer-aided design (CAD)
- Parameter-based modeling of assemblies
- Introduction to finite element analysis (FEA)

Strength and deformation analysis of solids using FE models

Module Grade Calculation
The module grade is made up of the graded partial performances and is weighted according to their credit points including the corresponding previous performance(s).

Additional Information
None

Workload
MD A + WS

Total workload corresponds to 240 hours, of which 75 hours in attendance and the rest self-study.

DSE A

Total workload corresponds to 120 hours, of which 45 hours in attendance and the rest self-study.

MPSE

Total workload corresponds to 120 hours, of which 45 hours in attendance and the rest self-study.

CAE-Basics

Total workload corresponds to 120 hours, of which 10 hours in attendance and the rest self-study.

Recommendations
None

Teaching and Learning Methods
Lectures, exercises and workshops during the semester

Literature
MD A + WS

Fundamentals of calculation and design of machine elements; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X Add title to Citavi project using this ISBN or access full text via the university library catalog

Fundamentals of machine elements for drive tasks; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-29629-8 Add title to Citavi project using this ISBN

DSE A

Kirchner, E.; "Power transmission in vehicle transmissions: Fundamentals of design, development and validation of vehicle transmissions and their components", Springer Verlag Berlin Heidelberg 2007

Naunheimer, H.; "Fahrzeuggetriebe: Grundlagen, Auswahl, Auslegung und Konstruktion", Springer Verlag Berlin Heidelberg 2007

MPSE

-

CAE-Basics

-

Base For
None

M 9.18 Module: Mobility Systems [M-MACH-106739]

Coordinators: Prof. Dr.-Ing. Martin Cichon
Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering
Part of: Specialization in Mechanical Engineering (International)

Credits	Grading	Recurrence	Duration	Language	Level	Version
12 CP	graded	Each summer term	2 terms	English	2	2

Mobility Systems (Election: 12 credits)			
T-MACH-114096	Computational Vehicle Dynamics	4 CP	Proppe
T-MACH-113603	Fluid Power	4 CP	Geimer
T-ETIT-113612	Hybrid and Electric Vehicles	4 CP	Doppelbauer
T-MACH-113602	Sustainable Internal Combustion Energy Conversion for Combined Heat Power and Mobility Applications	4 CP	Koch
T-MACH-113605	Vehicles in Sustainable Mobility Systems	4 CP	Cichon, Geimer

Assessment
see individual courses

Prerequisites
none

Competence Goal
The students have a basic understanding of the various mobility systems and their specifics and can assess the possible applications and effects in practice. They apply basic methods in the areas of conception, calculation and development. The students can plan and design vehicle systems from an engineering perspective and assess aspects of the interaction between people and technology as well as production.

Content
The Mobility Systems subject area teaches the fundamentals that are significant for the development, design, production and operation of vehicle systems. The essential technical solutions that make operation safe, comfortable and sustainable are considered.
In the subject area of mobility systems, the focus is on road and rail vehicles as well as mobile machines, taking into account future mobility systems.
Further information: See brick courses.

Module Grade Calculation
Average of graded exams (with equal weight).

Workload
360 hours, of which 135 - 180 hours of attendance time, depending on the choice of courses.

Recommendations
none

Teaching and Learning Methods
The teaching and learning procedures (lecture, tutorials) are described for each course of the module separately.

M 9.19 Module: Orientation Exam [M-MACH-106721]

Organisation: University
Part of: Orientation Exam

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

Mandatory			
T-MATH-113493	Advanced Mathematics I	7 CP	Aksenovich, Kühnlein
T-MACH-113501	Engineering Mechanics I	6 CP	Böhlke, Langhoff

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

M 9.20 Module: Supplementary Studies on Science, Technology and Society [M-FORUM-106753]

Coordinators: Dr. Christine Mielke
Christine Myglas

Organisation: General Studies. Forum Science and Society (FORUM)

Part of: Additional Examinations (Usage from 10/1/2024)

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

Election Notes
Students have to self-record the achievements obtained in the Supplementary Studies on Science, Technology and Society in their study plan. FORUM (formerly ZAK) records the achievements as "non-assigned" under "ÜQ/SQ-Leistungen". Further instructions on self-recording of achievements can be found in the FAQ at https://campus.studium.kit.edu/ and on the FORUM homepage at https://www.forum.kit.edu/english/. The title of the examination and the amount of credits override the modules placeholders.

If you want to use FORUM achievements for both your Interdisciplinary Qualifications and for the Supplementary Studies, please record them in the Interdisciplinary Qualifications first. You can then get in contact with the FORUM study services (stg@forum.kit.edu) to also record them in your Supplementary Studies.

In the Advanced Unit you can choose examinations from three subject areas: "About Knowledge and Science", "Science in Society" and "Science in Social Debates". It is advised to complete courses from each of the three subject areas in the Advanced Unit.

To self-record achievements in the Advanced Unit, you have to select a free placeholder partial examination first. The placeholders' title do *not* affect which achievements the placeholder can be used for!

Mandatory			
T-FORUM-113578	Lecture Series Supplementary Studies on Science, Technology and Society - Self Registration	2 CP	Mielke, Myglas
T-FORUM-113579	Basic Seminar Supplementary Studies on Science, Technology and Society - Self Registration	2 CP	Mielke, Myglas
Advanced Unit Supplementary Studies on Science, Technology and Society (Election: at least 12 credits)			
T-FORUM-113580	Elective Specialization Supplementary Studies on Science, Technology and Society / About Knowledge and Science - Self-Registration	3 CP	Mielke, Myglas
T-FORUM-113581	Elective Specialization Supplementary Studies on Science, Technology and Society / Science in Society - Self-Registration	3 CP	Mielke, Myglas
T-FORUM-113582	Elective Specialization Supplementary Studies on Science, Technology and Society / Science in Public Debates - Self Registration	3 CP	Mielke, Myglas
Mandatory			
T-FORUM-113587	Registration for Certificate Issuance - Supplementary Studies on Science, Technology and Society	0 CP	Mielke, Myglas

Assessment
The monitoring is explained in the respective partial achievement.

They are composed of:
- Protocols
- Reflection reports
- Presentations
- Preparation of a project work
- An individual term paper
- An oral examination
- A written exam

Upon successful completion of the supplementary studies, graduates receive a graded report and a certificate issued by the FORUM.

Prerequisites
The course is offered during the course of study and does not have to be completed within a defined period. Enrollment is required for all assessments of the modules in the supplementary studies.
Participation in the supplementary studies is regulated by § 3 of the statutes. KIT students register for the supplementary studies by selecting this module in the student portal and booking a performance themselves. Registration for courses, assessments, and exams is regulated by § 8 of the statutes and is usually possible shortly before the start of the semester.
The course catalog, module description (module manual), statutes (study regulations), and guidelines for creating the various written performance requirements can be downloaded from the FORUM homepage at https://www.forum.kit.edu/begleitstudium-wtg.php.

Registration and exam modalities
PLEASE NOTE:
Registration on the FORUM, i.e. additionally via the module selection in the student portal, enables students to receive up-to-date information about courses or study modalities. In addition, registering on the FORUM ensures that you have proof of the credits you have earned. As it is currently (as of winter semester 24-25) not yet possible to continue additional credits acquired in the Bachelor's programme electronically in the Master's programme, we strongly advise you to digitally secure the credits you have earned by archiving the Bachelor's transcript of records yourself and by registering on FORUM.
In the event that a transcript of records of the Bachelor's certificate is no longer available - we can only assign the achievements of registered students and thus take them into account when issuing the certificate.

Competence Goal
Graduates of the Supplementary Studies on Science, Technology, and Society gain a solid foundation in understanding the interplay between science, the public, business, and politics. They develop practical skills essential for careers in media, political consulting, or research management. The program prepares them to foster innovation, influence social processes, and engage in dialogue with political and societal entities. Participants are introduced to interdisciplinary perspectives, encompassing social sciences and humanities, to enhance their understanding of science, technology, and society. The teaching objectives of this supplementary degree program include equipping participants with both subject-specific knowledge and insights from epistemological, economic, social, cultural, and psychological perspectives on scientific knowledge and its application in various sectors. Students are trained to critically assess and balance the implications of their actions at the intersection of science and society. This training prepares them for roles as students, researchers, future decision-makers, and active members of society.

Through the program, participants learn to contextualize in-depth content within broader frameworks, independently analyze and evaluate selected course materials, and communicate their findings effectively in both written and oral formats. Graduates are adept at analyzing social issues and problem areas, reflecting on them critically from a socially responsible and sustainable standpoint.

Content
The Supplementary Studies on Science, Technology and Society can be started in the 1st semester of the enrolled degree programme and is not limited in time. The wide range of courses offered by FORUM makes it possible to complete the program usually within three semesters. The supplementary studies comprises 16 or more credit points (LP). It consists of **two modules: the Basic Module (4 LP) and the Advanced Module (12 LP).**

The **basic Module** comprises the compulsory courses 'Lecture Series Supplementary Studies on Science, Technology and Society' and a basic seminar with a total of 4 LP.

The **Advanced Module** comprises courses totalling 12 LP in the humanities and social sciences subject areas 'On Knowledge and Science', 'Science in Society' and 'Science in Public Debates'. The allocation of courses to the accompanying study programme can be found on the homepage https://www.forum.kit.edu/wtg-aktuelland in the printed FORUM course catalogue.

The 3 thematic subject areas:

Subject area 1: About Knowledge and Science

This is about the internal perspective of science: students explore the creation of knowledge, distinguishing between scientific and non-scientific statements (e.g., beliefs, pseudo-scientific claims, ideological statements), and examining the prerequisites, goals, and methods of knowledge generation. They investigate how researchers address their own biases, analyze the structure of scientific explanatory and forecasting models in various disciplines, and learn about the mechanisms of scientific quality assurance.

After completing courses in the "Knowledge and Science" area, students can critically reflect on the ideals and realities of contemporary science. They will be able to address questions such as: How robust is scientific knowledge? What are the capabilities and limitations of predictive models? How effective is quality assurance in science, and how can it be improved? What types of questions can science answer, and what questions remain beyond its scope?

Subject area 2: Science in Society

This focuses on the interactions between science and different areas of society, such as how scientific knowledge influences social decision-making and how social demands impact scientific research. Students learn about the specific functional logics of various societal sectors and, based on this understanding, estimate where conflicts of goals and actions might arise in transfer processes—for example, between science and business, science and politics, or science and journalism. Typical questions in this subject area include: How and under what conditions does an innovation emerge from a scientific discovery? How does scientific policy advice work? How do business and politics influence science, and when is this problematic? According to which criteria do journalists incorporate scientific findings into media reporting? Where does hostility towards science originate, and how can social trust in science be strengthened?

After completing courses in the "Sciene in Society" area, students can understand and assess the goals and constraints of actors in different societal sectors. This equips them to adopt various perspectives of communication and action partners in transfer processes and to act competently at various social interfaces with research in their professional lives.

Subject area 3: Science in Public Debates

The courses in this subject area provide insights into current debates on major social issues such as sustainability, digitalization, artificial intelligence, gender equality, social justice, and educational opportunities. Public debates on complex challenges are often polarized, leading to oversimplifications, defamation, or ideological thinking. This can hinder effective social solution-finding processes and alienate people from the political process and from science. Debates about sustainable development are particularly affected, as they involve a wide range of scientific and technological knowledge in both problem diagnosis (e.g., loss of biodiversity, climate change, resource consumption) and solution development (e.g., nature conservation, CCS, circular economy).

By attending courses in "Science in Public Debates," students are trained in an application-oriented way to engage in factual debates—exchanging arguments, addressing their own prejudices, and handling contradictory information. They learn that factual debates can often be conducted more deeply and with more nuance than is often seen in public discourse. This training enables them to handle specific factual issues in their professional lives independently of their own biases and to be open to differentiated, fact-rich arguments.

Supplementary credits:
Additional LP (supplementary work) totalling a maximum of 12 LP can also be acquired from the complementary study programme (see statutes for the WTG complementary study programme § 7). § 4 and § 5 of the statutes remain unaffected by this. These supplementary credits are not included in the overall grade of the accompanying study programme. At the request of the participant, the supplementary work will be included in the certificate of the accompanying study programme and marked as such. Supplementary coursework is listed with the grades provided for in § 9.

Module Grade Calculation
The overall grade of the supplementary course is calculated as a credit-weighted average of the grades that were achieved in the advanced module.

Additional Information
Climate change, biodiversity crisis, antibiotic resistance, artificial intelligence, carbon capture and storage, and gene editing are just a few areas where science and technology can diagnose and address numerous social and global challenges. The extent to which scientific findings are considered in politics and society depends on various factors, such as public understanding and trust, perceived opportunities and risks, and ethical, social, or legal considerations.
To enable students to use their expertise as future decision-makers in solving social and global challenges, we aim to equip them with the skills to navigate the interfaces between science, business, and politics competently and reflectively. In the Supplementary Studies, they acquire foundational knowledge about the interactions between science, technology, and society.

They learn:
- How reliable scientific knowledge is produced,
- how social expectations and demands influence scientific research, and
- how scientific knowledge is adopted, discussed, and utilized by society.

The program integrates essential insights from psychology, philosophy, economics, social sciences, and cultural studies into these topics. After completing the supplementary studies programme, students can place the content of their specialized studies within a broader social context. This prepares them, as future decision-makers, to navigate competently and reflectively at the intersections between science and various sectors of society, such as politics, business, or journalism, and to contribute effectively to innovation processes, public debates, or political decision-making.

Workload
The workload is made up of the number of hours of the individual modules:

- Basic Module approx. 120 hours
- Advanced Module approx. 360 hours
> Total: approx. 480 hours

In the form of supplementary services, up to approximately 360 hours of work can be added.

Recommendations
It is recommended to complete the supplementary study program in three or more semesters, beginning with the lecture series on science, technology, and society in the summer semester. Alternatively, you can start with the basic seminar in the winter semester and then attend the lecture series in the summer semester.

Courses in the Advanced Module can be taken simultaneously. It is also advised to complete courses from each of the three subject areas in the advanced unit.

Teaching and Learning Methods
- Lectures
- Seminars/Project Seminars
- Workshops

M 9.21 Module: Technical Thermodynamics [M-MACH-106709]

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

Part of: Fundamentals of Engineering

Credits	Grading	Recurrence	Duration	Language	Level	Version
14 CP	graded	Each winter term	2 terms	English	2	1

Mandatory			
T-MACH-113542	Tutorial Technical Thermodynamics and Heat Transfer I	1 CP	Maas
T-MACH-113544	Technical Thermodynamics and Heat Transfer I	6 CP	Maas
T-MACH-113543	Tutorial Technical Thermodynamics and Heat Transfer II	1 CP	Maas
T-MACH-113545	Technical Thermodynamics and Heat Transfer II	6 CP	Maas

Assessment
See individual courses

Prerequisites
None

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

An integral part of the module is that students can define the fundamental laws of thermodynamics and their applications. The students are competent in describing and comparing the main processes in energy conversion that are important in mechanical engineering. Using tools also applied in industry, they are capable of analyzing and rating the efficiency of processes. The students are capable of discussing the thermodynamic correlation of ideal gas mixtures, real gases, and humid air, as well as explaining the properties on a molecular basis and analyzing them with the help of the laws of thermodynamics. Furthermore, the students are capable of explaining chemical reactions in the context of thermodynamics as well as defining and applying the heat and mass transfer mechanisms.

Content
Thermodynamics I:

- System, properties of state
- Absolute temperature, model systems
- 1st law of thermodynamics for resting and moving systems
- Entropy and 2nd law of thermodynamics
- Behavior of real substances described by tables, diagrams and equations of state
- Machine processes
- Mixtures of ideal and real compounds
- Behavior of mixtures
- Moist air

Thermodynamics II:

- Repetition of the topics of "Thermodynamics and Heat Transfer I"
- Structure of matter, chemical fundamentals
- Kinetic theory of gases
- Behavior of real substances described by equations of state
- Chemical reactions and applications of the laws of thermodynamics to chemical reactions
- Reaction kinetics
- Heat and mass transfer

Module Grade Calculation
Grade of the written examinations, weighted according to credit points.

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

It will be offered for the first time starting from the winter semester of 2025/2026.

Workload
Lecture and exercises: 150h

Homework and preparation of examination: 270h

Teaching and Learning Methods
Lecture
Exercise course
Tutorial

Literature
Script

Additional literature will be provided in the lecture.

10 Module components

T 10.1 Module component: Advanced Ceramics: Functionality and Mechanics [T-MACH-113573]

Coordinators: Dr. Xufei Fang
Prof. Dr. Christoph Kirchlechner
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106741 - Applied Materials

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Assessment
Oral examination, duration approx. 30 minutes

Prerequisites
none

Recommendations
Basic knowledge of Engineering Mechanics and Materials Science.

Workload
120 hours

T 10.2 Module component: Advanced Mathematics I [T-MATH-113493]

Coordinators: Prof. Dr. Maria Aksenovich
PD Dr. Stefan Kühnlein

Organisation: KIT Department of Mathematics

Part of: M-MACH-106721 - Orientation Exam
M-MATH-106718 - Advanced Mathematics

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

Exams			
ST 2025	7700100	Advanced Mathematics I	Lytchak

Assessment
Assessment is carried out in form of a written examinations of 120 minutes length.

Prerequisites
Passing scores for homework are prerequesites for the examination.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MATH-113496 - Advanced Mathematics I Prerequisite must have been passed.

T 10.3 Module component: Advanced Mathematics I Prerequisite [T-MATH-113496]

Coordinators: Prof. Dr. Maria Aksenovich
PD Dr. Stefan Kühnlein

Organisation: KIT Department of Mathematics

Part of: M-MATH-106718 - Advanced Mathematics

Type	Credits	Grading	Term offered	Version
Coursework (written)	0 CP	pass/fail	Each winter term	1

Assessment
Assessment is carried out based on written homework assignments. Exact requirements will be detailed in class.

Prerequisites
None.

T 10.4 Module component: Advanced Mathematics II [T-MATH-113494]

Coordinators: Prof. Dr. Maria Aksenovich
PD Dr. Stefan Kühnlein
Organisation: KIT Department of Mathematics
Part of: M-MATH-106718 - Advanced Mathematics

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

Exams			
ST 2025	7700067	Advanced Mathematics II	Nepechiy

Assessment
Assessment is carried out in form of a written examinations of 120 minutes length.

Prerequisites
Passing scores for homework and the midterm test are prerequesites for the examination.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MATH-113497 - Advanced Mathematics II Prerequisite must have been passed.

T 10.5 Module component: Advanced Mathematics II Prerequisite [T-MATH-113497]

Coordinators: Prof. Dr. Maria Aksenovich
PD Dr. Stefan Kühnlein

Organisation: KIT Department of Mathematics

Part of: M-MATH-106718 - Advanced Mathematics

Type	Credits	Grading	Term offered	Version
Coursework (written)	0 CP	pass/fail	Each summer term	1

Exams			
ST 2025	7700106	Advanced Mathematics II Prerequisite	Nepechiy

Assessment
Assessment is carried out based on written homework assignments. Exact requirements will be detailed in class.

Prerequisites
None.

T 10.6 Module component: Advanced Mathematics III [T-MATH-113495]

Coordinators: Prof. Dr. Maria Aksenovich
PD Dr. Stefan Kühnlein
Organisation: KIT Department of Mathematics
Part of: M-MATH-106718 - Advanced Mathematics

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

Assessment
Assessment is carried out in form of a written examinations of 120 minutes length.

Prerequisites
Passing scores for homework are prerequesites for the examination.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MATH-113498 - Advanced Mathematics III Prerequisite must have been passed.

T 10.7 Module component: Advanced Mathematics III Prerequisite [T-MATH-113498]

Coordinators: Prof. Dr. Maria Aksenovich
PD Dr. Stefan Kühnlein

Organisation: KIT Department of Mathematics

Part of: M-MATH-106718 - Advanced Mathematics

Type	Credits	Grading	Term offered	Version
Coursework (written)	0 CP	pass/fail	Each winter term	1

Assessment
Assessment is carried out based on written homework assignments. Exact requirements will be detailed in class.

Prerequisites
None.

T 10.8 Module component: Automated Production Systems [T-MACH-113563]

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

Part of: M-MACH-106738 - Global Production Management

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Exams			
ST 2025	76-T-MACH-113563	Automated Production Systems	Fleischer

Assessment
oral exam (approx. 20 min)

Additional Information
The course is offered in English.

Workload
120 hours

T 10.9 Module component: Automation and Autonomy in Logistics [T-MACH-113566]

Coordinators: Carolin Brenner
Prof. Dr.-Ing. Kai Furmans

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106738 - Global Production Management

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	4 CP	graded	Each winter term	1 semesters	2

Courses					
WT 25/26	2117050	Automation and Autonomy in Logistics	2 SWS	Lecture / 🗣	Brenner
Exams					
WT 25/26	76T-MACH-113566	Automation and Autonomy in Logistics			Furmans

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

Assessment
Written exam, duration 60 minutes

Prerequisites
none

Recommendations
none

Additional Information
The course is offered in English.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Automation and Autonomy in Logistics

2117050, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
The course provides application-oriented knowledge on automated- and autonomous systems in logistics. The focus is on technologies such as mobile robots, humanoid robots, AI and control systems. The lecture is supplemented by practical exercises and impulses from industry in the form of guest lectures by companies. In a creative group exercise, students develop concepts for integrating autonomous/automated systems into logistics processes and evaluate their feasibility. In addition, participants program their own applications, which are then tested on real robots. The aim is to convey a deep understanding of the possibilities and limits of modern robotics in logistics and to gain practical experience with automated systems.

T 10.10 Module component: Bachelor's Thesis [T-MACH-113550]

Coordinators: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106737 - Bachelor's Thesis

Type	Credits	Grading	Term offered	Version
Final Thesis	12 CP	graded	Each term	1

Assessment
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 habilitated faculty member and one other 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).

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

Submission deadline	3 months
Maximum extension period	1 months
Correction period	6 weeks

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

Workload
360 hours

T 10.11 Module component: Basic Seminar Supplementary Studies on Science, Technology and Society - Self Registration [T-FORUM-113579]

Coordinators: Dr. Christine Mielke
Christine Myglas
Organisation: General Studies. Forum Science and Society (FORUM)
Part of: M-FORUM-106753 - Supplementary Studies on Science, Technology and Society

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	2 CP	pass/fail	Each summer term	1 semesters	1

Assessment
Study achievement in the form of a presentation or a term paper or project work in the selected course.

Prerequisites
None

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- FORUM (ehem. ZAK) Begleitstudium

Recommendations
It is recommended that the basic seminar be completed during the same semester as the lecture series "Science in Society". If it is not possible to attend the lecture series and the basic seminar in the same semester, the basic seminar can also be attended in the semesters before the lecture series.
However, attending courses in the advanced unit before attending the basic seminar should be avoided.

T 10.12 Module component: Basics in Measurement and Control Systems [T-MACH-113526]

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

Part of: M-MACH-106712 - Measurement and Control Systems

Type	Credits	Grading	Term offered	Version
Written examination	7 CP	graded	Each winter term	1

Assessment
written exam
2,5 hours

Prerequisites
none

Additional Information
The course is offered in English

Workload
210 hours

T 10.13 Module component: Basics of Electrical Engineering [T-ETIT-113567]

Coordinators: Prof. Dr.-Ing. Giovanni De Carne
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-106711 - Electrical Engineering and Mechatronics

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	4 CP	graded	Each summer term	1 semesters	1

Assessment
Success control takes place in the form of a written examination lasting 120 minutes. The module grade is the grade of the written exam.

Prerequisites
none

Additional Information
The workload includes:

1. attendance in lectures and exercises: 15*2 h = 30 h
2. preparation / follow-up: 15*3 h = 45 h
3. preparation of and attendance in examination: 45 h

   A total of 120 h = 4 CR

Workload
120 hours

T 10.14 Module component: Basics of Manufacturing Technology [T-MACH-113509]

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

Part of: M-MACH-106707 - Manufacturing Technology and Materials Science

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	3118092	Basics of Manufacturing Technology	2 SWS	Lecture / 🗣	Schulze
Exams					
ST 2025	76-T-MACH-108747	Basics of Manufacturing Technology (MEI)			Schulze

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

Assessment
written exam (duration: 60 min)

Prerequisites
none

Additional Information
The course is offered in English.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V Basics of Manufacturing Technology

3118092, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

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. Regard is paid to classic manufacturing processes as well as new developments like additive manufacturing processes.

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

Learning Outcomes:

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.

Workload:

regular attendance: 21 hours
self-study: 99 hours

Organizational issues
Vorlesungstermine, Vorlesungsunterlagen und weitere Informationen werden über Ilias bekannt gegeben.
The lecture notes and further information on onganisation of the lecture will be available on ILIAS.

Literature
Medien:
Skript zur Veranstaltung wird über ilias (https://ilias.studium.kit.edu/)
bereitgestellt.

Media:
Lecture notes will be provided in ilias (https://ilias.studium.kit.edu/).

T 10.15 Module component: Basics of Mechatronics [T-MACH-113525]

Coordinators: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106711 - Electrical Engineering and Mechatronics

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each summer term	1 semesters	1

Assessment
Written exam, 180 Min.

Prerequisites
The course T-MACH-113524 – Tutorial Basics of Mechatronics must have been passed.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-113524 - Tutorial Basics of Mechatronics must have been passed.

Additional Information
The course is offered in English.

Workload
120 hours

T 10.16 Module component: CAE-Basics [T-MACH-113507]

Coordinators: Prof. Dr.-Ing. Tobias Düser
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106706 - Mechanical Design

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	3 CP	graded	Each winter term	1 semesters	2

Courses					
WT 25/26	2145160	CAE-Basics	3 SWS	Lecture / Practice (/	Düser
Exams					
WT 25/26	76-T-MACH-113507	CAE-Basics			Düser

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

Assessment
Written exam with a duration of 60 minutes.

Prerequisites
Admission to the exam only with successful completion of CAE-Basics Workshop

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-113899 - CAE-Basics Workshop must have been passed.

Recommendations
Knowledge of the lectures Mechanical Design A and Engineering Mechanics 1 is assumed.

Additional Information

- Fundamentals of Computer Aided Design (CAD)
- Parameter-based modeling of assemblies
- Introduction to Finite Element Analysis (FEA)
- Strength and deformation analysis of solids using FE models

The course is offered in English.

Workload
90 hours

Below you will find excerpts from courses related to this module component:

V CAE-Basics

2145160, WS 25/26, 3 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content

- Fundamentals of Computer Aided Design (CAD)
- Parameter-based modeling of assemblies
- Introduction to Finite Element Analysis (FEA)
- Stress and modal analysis of FE models using state-of-the-art simulation tools

Organizational issues
Zusätzlich zum Besuch der Lehrveranstaltungen sind praktische Übungen eigenständig zu bearbeiten.
In addition to attending the courses, practical exercises must be completed independently.

T 10.17 Module component: CAE-Basics Workshop [T-MACH-113899]

Coordinators: Prof. Dr.-Ing. Tobias Düser
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106706 - Mechanical Design

Type	Credits	Grading	Term offered	Expansion	Version
Coursework (practical)	1 CP	pass/fail	Each winter term	1 semesters	1

Assessment
Students work independently on a computer task that includes the practical content from the CAD and FEM exercises. The completed task is then submitted and checked for correctness. Passing the test is required for successful participation.

Prerequisites
None

Recommendations
None

Additional Information
The course is offered in English.

Workload
30 hours

T 10.18 Module component: Civil Society and non-profit Organizations in democratic socities [T-ZAK-112807]

Organisation: General Studies. Forum Science and Society (FORUM)
Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Version
Coursework	2 CP	pass/fail	1

Courses					
WT 25/26	1130331	Civil society and non-profit organizations in democratic societies	2 SWS	Seminar /	Brozmanová Gregorová

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

Below you will find excerpts from courses related to this module component:

V Civil society and non-profit organizations in democratic societies

1130331, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S) Online

Content
The course is focused on the understanding of civil society and non-profit organizations' roles and functions in contemporary society. As a part of the course, students will take part in the regular online session and they will work individually or in groups on several assignments; they will discuss topics connected with civil society and non-profit organizations in the European context and critically reflect on the role of civil society in democratic societies.

A brief outline of the course:

- Civil society, the third sector, and non-governmental organizations: the basic assumptions and concepts
- Historical examples of NGOs
- The third sector in the EU at present
- Current challenges of NGOs
- Organisational management of NGOs
- Financing of NGOs
- Volunteering as part of the third sector

In the framework of this course, students have to create a portfolio containing the tasks assigned during the semester which are connected to the analysed problems during the classes. They should also individually write an academic essay in which they critically reflect on the role of civil society and non-profit organizations in democratic societies.

3 LP

Good English language skills are required

Organizational issues
Registration required at: https://plus.campus.kit.edu/signmeup/procedures/4977

T 10.19 Module component: Computational Vehicle Dynamics [T-MACH-114096]

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

Part of: M-MACH-106739 - Mobility Systems

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Assessment
oral exam, duration approx. 20 minutes

Prerequisites
none

Additional Information
The course is offered in English.

Workload
120 hours

T 10.20 Module component: Contact Mechanics [T-MACH-113557]

Coordinators: Prof. Dr. Christian Greiner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106741 - Applied Materials

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Assessment
oral exam ca. 30 minutes

Prerequisites
none

Recommendations
preliminary knowledge in mathematics, physics and materials science

Workload
120 hours

T 10.21 Module component: Deconstructing Unconscious Bias into Intercultural Competence: A neurological look into how the brain constructs reality [T-ZAK-112565]

Organisation: General Studies. Forum Science and Society (FORUM)
Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Version
Coursework	2 CP	pass/fail	1

Courses					
ST 2025	1130206	Deconstructing unconscious bias into intercultural competence: A neurological look into how the brain constructs reality	2 SWS	Seminar / 🗣	Schmidt
WT 25/26	1130206	Deconstructing unconscious bias into intercultural competence: A neurological look into how the brain constructs reality	2 SWS	Seminar / 🗣	Schmidt

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

Below you will find excerpts from courses related to this module component:

V Deconstructing unconscious bias into intercultural competence: A neurological look into how the brain constructs reality

Seminar (S) On-Site

1130206, SS 2025, 2 SWS, Language: English, Open in study portal

Content
One of the first steps towards intercultural competence is to recognize that we are all susceptible to unconscious bias and need support in understanding and overcoming hidden prejudices. This course examines the key characteristics and different kinds of unconscious bias that can influence our relationships in cross-cultural situations. Participants will learn why the brain receives and processes information in a biased manner, how to recognize unconscious bias, how bias can affect attitudes, behaviour and decision making, and why recognizing unconscious bias benefits us all.

Topics include:

- analyzing the neuroscience of a productive brain
- understanding the characteristics and reasons of unconscious bias
- examining the different kinds of unconscious bias
- recognizing unconscious bias in the intercultural setting and how to manage it
- developing intercultural competence

2-4 LP

Organizational issues
Registration required at: https://plus.campus.kit.edu/signmeup/procedures/3960

V Deconstructing unconscious bias into intercultural competence: A neurological look into how the brain constructs reality

Seminar (S) On-Site

1130206, WS 25/26, 2 SWS, Language: English, Open in study portal

Content
One of the first steps towards intercultural competence is to recognize that we are all susceptible to unconscious bias and need support in understanding and overcoming hidden prejudices. This course examines the key characteristics and different kinds of unconscious bias that can influence our relationships in cross-cultural situations. Participants will learn why the brain receives and processes information in a biased manner, how to recognize unconscious bias, how bias can affect attitudes, behaviour and decision making, and why recognizing unconscious bias benefits us all.

Topics include:

- analyzing the neuroscience of a productive brain
- understanding the characteristics and reasons of unconscious bias
- examining the different kinds of unconscious bias
- recognizing unconscious bias in the intercultural setting and how to manage it
- developing intercultural competence

2-4 LP

Organizational issues
Registration required at: https://plus.campus.kit.edu/signmeup/procedures/5006

Good English language skills required!

T 10.22 Module component: Drive System Engineering A: Automotive Systems [T-MACH-113405]

Coordinators: Sascha Ott
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106706 - Mechanical Design

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	4 CP	graded	Each summer term	1 semesters	1

Courses					
ST 2025	2146231	Drive System Engineering A: Automotive Systems	3 SWS	Lecture / Practice (/ 🗣	Ott, Düser
Exams					
ST 2025	76-T-MACH-113405	Drive System Engineering A: Automotive Systems			Ott, Düser
WT 25/26	76-T-MACH-113405	Drive System Engineering A: Automotive Systems			Ott

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

Assessment
written examination: 90 min duration

Prerequisites
None

Additional Information
The course is offered in English.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Drive System Engineering A: Automotive Systems

2146231, SS 2025, 3 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content
Students acquire the basic skills needed to develop future energy-efficient and at the same time comfortably drivable powertrains. This includes holistic development methods and evaluations of powertrain systems. The main topics can be divided into the following chapters:

- Powertrain System
- Driver System
- Environment System
- System Components
- Development Process

Literature
Kirchner, E.; "Leistungsübertragung in Fahrzeuggetrieben: Grundlagen der Auslegung, Entwicklung und Validierung von Fahrzeuggetrieben und deren Komponenten", Springer Verlag Berlin Heidelberg 2007

Naunheimer, H.; "Fahrzeuggetriebe: Grundlagen, Auswahl, Auslegung und Konstruktion", Springer Verlag Berlin Heidelberg 2007

T 10.23 Module component: Elective Specialization Supplementary Studies on Science, Technology and Society / About Knowledge and Science - Self-Registration [T-FORUM-113580]

Coordinators: Dr. Christine Mielke
Christine Myglas

Organisation: General Studies. Forum Science and Society (FORUM)

Part of: M-FORUM-106753 - Supplementary Studies on Science, Technology and Society

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Assessment
Another type of examination assessment under § 5, section 3 involves a presentation, term paper, or project work within the chosen course.

Prerequisites
None

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- FORUM (ehem. ZAK) Begleitstudium

Recommendations
The contents of the basic module are helpful. The basic module should be completed or attended in parallel, but not after the advanced module.
The reading recommendations for primary and specialist literature are determined individually by the respective lecturers according to the subject area and course.

Additional Information
This placeholder can be used for any achievement in the Advanced Unit of the Supplementary Studies.

In the Advanced Module, students can choose their own individual focus, e.g. sustainable development, data literacy, etc. The focus should be discussed with the module coordinator at the FORUM.

T 10.24 Module component: Elective Specialization Supplementary Studies on Science, Technology and Society / Science in Public Debates - Self Registration [T-FORUM-113582]

Coordinators: Dr. Christine Mielke
Christine Myglas

Organisation: General Studies. Forum Science and Society (FORUM)

Part of: M-FORUM-106753 - Supplementary Studies on Science, Technology and Society

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Assessment
Another type of examination assessment under § 5, section 3 involves a presentation, term paper, or project work within the chosen course.

Prerequisites
None

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- FORUM (ehem. ZAK) Begleitstudium

Recommendations
The contents of the basic module are helpful. The basic module should be completed or attended in parallel, but not after the advanced module.
The reading recommendations for primary and specialist literature are determined individually by the respective lecturers according to the subject area and course.

Additional Information
This placeholder can be used for any achievement in the Advanced Unit of the Supplementary Studies.

T 10.25 Module component: Elective Specialization Supplementary Studies on Science, Technology and Society / Science in Society - Self-Registration [T-FORUM-113581]

Coordinators: Dr. Christine Mielke
Christine Myglas

Organisation: General Studies. Forum Science and Society (FORUM)

Part of: M-FORUM-106753 - Supplementary Studies on Science, Technology and Society

Type	Credits	Grading	Term offered	Version
Examination of another type	3 CP	graded	Each term	1

Assessment
Another type of examination assessment under § 5, section 3 involves a presentation, term paper, or project work within the chosen course.

Prerequisites
None

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- FORUM (ehem. ZAK) Begleitstudium

Recommendations
The contents of the basic module are helpful. The basic module should be completed or attended in parallel, but not after the advanced module.
The reading recommendations for primary and specialist literature are determined individually by the respective lecturers according to the subject area and course.

Additional Information
This placeholder can be used for any achievement in the Advanced Unit of the Supplementary Studies.

T 10.26 Module component: Engineering Mechanics I [T-MACH-113501]

Coordinators: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106705 - Engineering Mechanics
M-MACH-106721 - Orientation Exam

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

Courses					
WT 25/26	3161010	Engineering Mechanics I (Lecture)	3 SWS	Lecture / 🗣	Langhoff, Kehrer, Böhlke
Exams					
ST 2025	76-T-MACH-100282-englisch	Engineering Mechanics I			Böhlke, Langhoff

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

Assessment
written exam, 90 minutes, graded. Additives as announced

Prerequisites
Coursework in *Tutorial Engineering Mechanics I* (T-MACH-113502) must be passed

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-113502 - Tutorial Engineering Mechanics I must have been passed.

Additional Information
The corresponding course is offered in English.

Workload
180 hours

T 10.27 Module component: Engineering Mechanics II [T-MACH-113503]

Coordinators: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106705 - Engineering Mechanics

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

Courses					
ST 2025	3162010	Engineering Mechanics II (Lecture)	3 SWS	Lecture / 🗣	Langhoff, Böhlke
Exams					
ST 2025	76-T-MACH-100283-englisch	Engineering Mechanics II			Böhlke, Langhoff

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

Assessment
written exam, 90 minutes, graded. Additives as announced

Prerequisites
Coursework in *Tutorial Engineering Mechanics II* (T-MACH-113504) must be passed

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-113504 - Tutorial Engineering Mechanics II must have been passed.

Additional Information
The corresponding course is offered in English.

Workload
180 hours

Below you will find excerpts from courses related to this module component:

V Engineering Mechanics II (Lecture)

3162010, SS 2025, 3 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

- 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 of elastic bars

T 10.28 Module component: Engineering Mechanics III [T-MACH-113505]

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

Part of: M-MACH-106705 - Engineering Mechanics

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

Courses					
WT 25/26	3161012	Engineering Mechanics III (Lecture)	3 SWS	Lecture / 🗣	Fidlin
WT 25/26	3161013	Engineering Mechanics III (Tutorial)	3 SWS	Practice / 🗣	Fidlin, Novelli

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

Assessment
Written exam, duration: 180 minutes

Prerequisites
Coursework in *Tutorial Engineering Mechanics III* (T-MACH-113506) must have been passed

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-113506 - Tutorial Engineering Mechanics III must have been passed.

Additional Information
The course is offered in English.

Workload
180 hours

Below you will find excerpts from courses related to this module component:

V Engineering Mechanics III (Lecture)

3161012, WS 25/26, 3 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
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 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 princicple 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.

V Engineering Mechanics III (Tutorial)

3161013, WS 25/26, 3 SWS, Language: English, Open in study portal

Practice (Ü)
On-Site

Content
Exercises related to the lecture

T 10.29 Module component: Fluid Mechanics [T-MACH-113523]

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

Part of: M-MACH-106710 - Fluid Mechanics

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	7 CP	graded	Each summer term	1 semesters	1

Assessment
Written exam 2h

Prerequisites
none

Additional Information
The course is offered in English.

Workload
210 hours

T 10.30 Module component: Fluid Power [T-MACH-113603]

Coordinators: Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106739 - Mobility Systems

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each winter term	2

Exams			
WT 25/26	76-T-MACH-102098	FluidPower (WiWi)	Geimer

Assessment
written exam, duration approx. 90 minutes

Prerequisites
none

Additional Information
The Course is offered in English.

Workload
120 hours

T 10.31 Module component: Functional Materials [T-MACH-113571]

Coordinators: Dr. Patric Gruber
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106741 - Applied Materials

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	4 CP	graded	Each summer term	1 semesters	1

Assessment
Oral examination, duration approx. 25 minutes

Prerequisites
none

Additional Information
The course is offered in English.

Workload
120 hours

T 10.32 Module component: Fundamentals of Nuclear Energy and Radiation Protection [T-MACH-113627]

Coordinators: apl. Prof. Dr. Ron Dagan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106740 - Energy

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	1

Assessment
oral exam, duration approx. 30 minutes

Prerequisites
none

Workload
120 hours

T 10.33 Module component: Global Logistics [T-MACH-113565]

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

Part of: M-MACH-106738 - Global Production Management

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Courses					
ST 2025	2118010	Global Logistics	2 SWS	Block / 🗣	Lehmann
Exams					
ST 2025	7600026	Global Logistics			Furmans

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

Assessment
oral exam (approx. 20 min)

Prerequisites
none

Additional Information
The course is offered in English.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Global Logistics

2118010, SS 2025, 2 SWS, Language: English, Open in study portal

Block (B)
On-Site

Content
Conveyor systems

- Basics of conveyor systems
- Key performance indicators
- Split elements
- Join elements

Queueing theory

- Basics of queueing theory
- Probability density functions and cumulative distribution functions
- Models M|M|1 and M|G|1

Storage and commissioning

- Automated storage and retrieval systems
- Single and dual command cycles
- Cycle times in single-deep storage systems
- Cycle times in multi-deep storage systems

Application for production logistics

- Location problame
- Distribution centers
- Inventory management

Organizational issues
Attendance during lecture is required. Admission to the exam is only possible when attending the lecture.

Literature

Arnold, D., & Furmans, K. (2019). *Materialfluss in logistiksystemen* (Vol. 7). Berlin, Heidelberg, New York: Springer.

T 10.34 Module component: Group Work IT and Data Science [T-MACH-113514]

Coordinators: Prof. Dr.-Ing. Anne Meyer
Prof. Dr.-Ing. Arne Rönnau
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106708 - IT and Data Science

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	1 CP	pass/fail	Each summer term	1 semesters	1

Courses					
ST 2025	2122374	Tutorial IT and Data Science	2 SWS	Practice / 🗣	Meyer, Rönnau
Exams					
ST 2025	76-T-MACH-113514	Group Work IT and Data Science			Rönnau, Meyer

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

Assessment
The continuous teamwork during the attendance period and the functional team solution developed are assessed.

Prerequisites
none

Recommendations
The course is offered in English.

Workload
30 hours

T 10.35 Module component: Heat Transfer and Thermal Fluid Flow [T-MACH-113621]

Coordinators: Dr. Sebastian Ruck
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106740 - Energy

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Assessment
oral exam of about 30 minutes

Prerequisites
none

Workload
120 hours

T 10.36 Module component: How does the European Union work? Functions, institutions and ongoing challenges (Jean Monnet Circle Seminar) [T-FORUM-113833]

Organisation: General Studies. Forum Science and Society (FORUM)
Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Version
Coursework	2 CP	pass/fail	1

Courses					
WT 25/26	1127303	How does the European Union work? Functions, Institutions and Ongoing Challenges (Jean Monnet Circle Seminar)	2 SWS	Seminar /	u.a., Post

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

Below you will find excerpts from courses related to this module component:

V How does the European Union work? Functions, Institutions and Ongoing Challenges (Jean Monnet Circle Seminar)

Seminar (S) Online

1127303, WS 25/26, 2 SWS, Language: English, Open in study portal

Content
The Jean Monnet Circle Seminar “How does the European Union work? Functions, institutions and ongoing challenges” offers a basic introduction into the major social, political, cultural, and economic developments in Europe and its interrelation with the process of globalization and European integration.

All topics are presented by alternating experts from different universities and institutions.
The seminar addresses the following topics, among others:

- Law within the European Union; Human Rights (Prof. Dr. Ingo Bott)
- Europe and the Stars – Images, Narratives, and the Embodiment of a Cultural Vision (PD Dr. Dr. Jesús Muñoz Morcillo)
- Institutions, Policies, Candidates, and Democracy after the European Elections. The New Institutional Cycle of the European Union (Julian Plottka)
- European Defense Policy (Dr. Antor Bada)
- The „Union of Equality“ – Milestones and missed Opportunities (Thomas Klöckner)
- Europe seen from Outside (Prof. Dr. Dirk Wentzel)
- Europe in Times of Change: Between the „Glocal“ and the „Global“ (Prof. Dr. Caroline Y. Robertson-von Trotha)

More information on the seminar program is available on the following website:
www.forum.kit.edu/english/2793.php

2 - 6 ECTS

Organizational issues
Registration required at:

T 10.37 Module component: Hybrid and Electric Vehicles [T-ETIT-113612]

Coordinators: Prof. Dr. Martin Doppelbauer
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-106739 - Mobility Systems

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each summer term	1

Assessment
The assessment takes place in the form of a written examination lasting 120 min

Prerequisites
none

Recommendations
Basic knowledge of electrical engineering is recommended (e.g. modules "Elektrische Maschinen und Stromrichter", "Elektrotechnik für Wirtschaftsingenieure I+II" or "Electrical Engineering and Electronics").

Workload
120 hours

T 10.38 Module component: Intercultural Communications: USA and Germany [T-ZAK-112564]

Organisation: General Studies. Forum Science and Society (FORUM)
Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Version
Coursework	2 CP	pass/fail	1

Courses					
WT 25/26	1130138	Intercultural communications: USA and Germany	2 SWS	Seminar / 🗣	Schmidt

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

Below you will find excerpts from courses related to this module component:

V Intercultural communications: USA and Germany

1130138, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
The premise is simple: understanding your culture and your own ‘mental software’ is a prerequisite to understanding other cultures. By first clarifying the (un-conscious) behavioral patterns of the Germans and then comparing them with Americans, we will increase cultural awareness, leading to more effective intercultural communications.

Topics include:

- Examining the term ‘culture’
- Overcoming ethnocentrism
- Discovering American and German cultural values
- Contrasting communication styles of the Germans and Americans
- Why was Donald Trump re-elected U.S. President

Germans and other nationalities, who plan to study and work in the USA, will benefit greatly from this course.

2-4 ECTS

Good English language skills are required

Organizational issues
Registration required at: https://plus.campus.kit.edu/signmeup/procedures/5007

Good English language skills required

T 10.39 Module component: International Management - Practical insights [T-FORUM-113834]

Organisation: General Studies. Forum Science and Society (FORUM)
Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Version
Coursework	2 CP	pass/fail	1

Courses					
ST 2025	1130758	International Management. Practical insights	2 SWS	Seminar / 🗣	Gerhardt
WT 25/26	1130758	International Management. Practical insights	2 SWS	Seminar / 🗣	Gerhardt

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

Below you will find excerpts from courses related to this module component:

V International Management. Practical insights

1130758, SS 2025, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
International Management involves understanding geopolitical, cultural, competitive and technological factors to manage global operations. The seminar covers the complexities of conducting business across borders through 6 relevant lectures on theoretical and practical aspects:

- Corporate Footprint and Value Chain Coordination
- Global Efficiency
- Corporate Responsibility
- Corporate Culture and Diversity
- Employee Retention and Talent Management
- Cybersecurity

Students have the opportunity to develop own presentations based on own research, hand in an essay and have an oral exam at the end.

Organizational issues
Registration required at: https://plus.campus.kit.edu/signmeup/procedures/3996

V International Management. Practical insights

1130758, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S)
On-Site

Content
International Management involves understanding geopolitical, cultural, competitive and technological factors to manage global operations. The seminar covers the complexities of conducting business across borders through 6 relevant lectures on theoretical and practical aspects:

- Corporate Footprint and Value Chain Coordination
- Global Efficiency
- Corporate Responsibility
- Corporate Culture and Diversity
- Employee Retention and Talent Management
- Cybersecurity

Students have the opportunity to develop own presentations based on own research, hand in an essay and have an oral exam at the end.

Organizational issues
Registration required at: https://plus.campus.kit.edu/signmeup/procedures/4987

T 10.40 Module component: International Production Operations Management [T-MACH-113552]

Coordinators: Prof. Dr.-Ing. Kai Furmans
Prof. Dr.-Ing. Gisela Lanza
Prof. Dr. Frank Schultmann

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106735 - International Production Operations Management

Type	Credits	Grading	Term offered	Version
Written examination	3 CP	graded	Each winter term	1

Assessment
written exam (duration: 180 min)

Prerequisites
T-MACH-113553 - Production Operations Management: Project must have been completed successfully.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-113553 - International Production Operations Management: Project must have been passed.

Workload
90 hours

T 10.41 Module component: International Production Operations Management: Project [T-MACH-113553]

Coordinators: Prof. Dr.-Ing. Kai Furmans
Prof. Dr.-Ing. Gisela Lanza

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106735 - International Production Operations Management

Type	Credits	Grading	Term offered	Version
Examination of another type	2 CP	graded	Each winter term	1

Assessment
Assignments during the semester consisting of solving and presenting case studies, whereof:

- 70% assessment of the case study as group work
- 30% evaluation of the defense of the case studies as an individual grade

Prerequisites
none

Workload
60 hours

T 10.42 Module component: International Project [T-MACH-113548]

Coordinators: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106734 - International Project

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	5 CP	pass/fail	Each term	1 semesters	1

Assessment
Presentation of the project results, written elaboration of the project results, written reflection. Students are provided with two documents with instructions on how to prepare the written documents (instructions on the report on the project results, guiding questions on the reflection report).

Recommendations
Successful completion of the course *Scientific Work and Empirical Research Methods* (Interdisciplinary Qualifications).

Workload
150 hours

T 10.43 Module component: Internship in Industry [T-MACH-113549]

Coordinators: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106736 - Internship in Industry

Type	Credits	Grading	Expansion	Version
Coursework	12 CP	pass/fail	1 semesters	1

Assessment
Submission of the internship documents (employment contract, internship certificate) as well as an internship report in the form of a written report (0.5 pages of text per week). The internship reports should be reviewed by the person supervising the internship in the company and must be confirmed by company stamp and signature.

Prerequisites
none

Workload
360 hours

T 10.44 Module component: Introduction to Energy Topology and Resilience [T-MACH-113622]

Coordinators: Dr. Sadeeb Simon Ottenburger
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106740 - Energy

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Assessment
oral, duration: approx. 30 minutes

No auxiliary meand

Prerequisites
none

Recommendations
Basic knowledge of graph theory and stochastics is an advantage, but not necessary.

Additional Information
The course is offered in English.

Workload
120 hours

T 10.45 Module component: Introduction to High Temperature Materials [T-MACH-113559]

Coordinators: Prof. Dr.-Ing. Bronislava Gorr
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106741 - Applied Materials

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each winter term	1

Courses					
WT 25/26	2193022	Introduction to High Temperature Materials	3 SWS	Lecture / 🗣	Gorr

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

Assessment
oral examination (ca. 30 Minuten)

Prerequisites
none

Recommendations
Knowledge from the basic materials science lecture

Additional Information
The course is offered in English.

Workload
120 hours

T 10.46 Module component: Introduction to Hydrogen Technologies [T-MACH-113623]

Coordinators: Prof. Dr.-Ing. Daniel Banuti
Olaf Jedicke

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106740 - Energy

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	4 CP	graded	Each summer term	1 semesters	1

Assessment
Written exam, Duration: 90 minutes

Auxiliary: no tools or reference materials may be used during the exam

Prerequisites
none

Recommendations
Fundamentals of thermodynamics, fundamentals of the natural sciences of physics and chemistry (STEM without computer science), basic knowledge of electrochemistry.

Additional Information
The course is offered in English.

Workload
120 hours

T 10.47 Module component: Introduction to Powder Metallurgy [T-MACH-113576]

Coordinators: Prof. Dr.-Ing. Martin Heilmaier
Dr.-Ing. Heinrich Kestler

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106741 - Applied Materials

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each winter term	1

Courses					
WT 25/26	2173531	Introduction to Powder Metallurgy	2 SWS	Lecture / 🗣	Kestler, Heilmaier

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

Assessment
The assessment is carried out as a written exam of 2 h.

Prerequisites
none

Recommendations
Lectures in physics, chemistry, physical chemistry. Basic knowledge of thermodynamic phase diagrams is helpful.

Additional Information
The course is offered in English.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Introduction to Powder Metallurgy

2173531, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Powder metallurgy (PM) is an important manufacturing technology for a number of high-tech applications in our modern. These manufacturing technologies are starting from metallic powders which are mostly formed to so-called “green parts” which are subsequently sintered to their final geometry by usually avoiding liquid phases. These mass production suitable technologies which are also strongly connected to the manufacturing used for modern ceramics, lead to fine-grained individual parts with excellent mechanical, thermal and magnetic properties just to name a few and also providing a high geometrical precision.
Students will get an overview about the history of powder metallurgy and also a background on powder-based production technologies. Furthermore they will get an introduction to industrial powder production techniques followed by a closer look on mechanical and chemical powder characterisation. The important steps of forming and densifying powders via pressing, sintering, hot-isostatic pressing and also alternative compaction methodes like 3D-printing will be addressed in detail. Students will also get information about the manufacturing and properties of modern PM-materials (e.g. Fe-based, superalloys, refractory metals, hard-materials etc.). A two day excursion to the PM facilities of the Plansee Group in Reutte, Austria, should provide practical support to the lectures.

Literature
W. Schatt, K.-P. Wieters, B. Kieback, Pulvermetallurgie, Springer-Verlag, Berlin, ISBN 978-3-540-23652-8

F. Thümmler and R. Oberacker, Introduction to Powder Metallurgy, The Institute of Materials Series on Powder Metallurgy, University Press Cambridge, ISBN 0-90171626 X

R.M. German, Powder Metallurgy Science, MPIF, 1984, ISBN 0-918404-60-6

T 10.48 Module component: Introduction to Thermodynamics of the Energy Transition [T-MACH-113620]

Coordinators: Prof. Dr.-Ing. Daniel Banuti
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106740 - Energy

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	4 CP	graded	Each winter term	1 semesters	1

Assessment
Oral exam, duration: approximately 25 minutes

no tools of reference materials may be used during the exam

Prerequisites
none

Additional Information
The course is offered in English.

Workload
120 hours

T 10.49 Module component: IT and Data Science [T-MACH-113515]

Coordinators: Prof. Dr.-Ing. Anne Meyer
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106708 - IT and Data Science

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	4 CP	graded	Each summer term	1 semesters	1

Courses					
ST 2025	2122373	IT and Data Science	4 SWS	Lecture / 🗣	Meyer, Rönnau
Exams					
ST 2025	76-T-MACH-113515	IT and Data Science			Rönnau, Meyer

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

Assessment
written exam, duration 90 minutes

Prerequisites
T-MACH-113512 - *Python Course on IT and Data Science* must have been passed.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-113512 - Python Course on IT and Data Science must have been passed.

Additional Information
The course is offered in English.

Workload
120 hours

T 10.50 Module component: Lecture Series Supplementary Studies on Science, Technology and Society - Self Registration [T-FORUM-113578]

Coordinators: Dr. Christine Mielke
Christine Myglas
Organisation: General Studies. Forum Science and Society (FORUM)
Part of: M-FORUM-106753 - Supplementary Studies on Science, Technology and Society

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	2 CP	pass/fail	Each summer term	1 semesters	1

Assessment
Active participation, learning protocols, if applicable.

Prerequisites
None

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- Studium Generale. Forum Wissenschaft und Gesellschaft (FORUM) (ehem. ZAK)
- FORUM (ehem. ZAK) Begleitstudium

Recommendations
It is recommended that you complete the lecture series "Science in Society" before attending events in the advanced module and in parallel with attending the basic seminar.
If it is not possible to attend the lecture series and the basic seminar in the same semester, the lecture series can also be attended after attending the basic seminar.
However, attending events in the advanced module before attending the lecture series should be avoided.

Additional Information
The basic module consists of the lecture series "Science in Society" and the basic seminar. The lecture series is only offered during the summer semester.
The basic seminar can be attended in the summer or winter semester.

T 10.51 Module component: Machines and Processes of Energy Conversion [T-MACH-113554]

Coordinators: Dr.-Ing. Heiko Kubach
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106713 - Machines and Processes of Energy Conversion

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

Exams			
WT 25/26	76-T-MACH-113554	Machines and Processes of Energy Conversion	Kubach, Bauer, Pritz

Assessment
Written exam, duration 2 h.

Prerequisites
The coursework T-MACH-113555 Machines and Processes of Energy Conversion, Lab Course, must have been passed.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-113555 - Machines and Processes of Energy Conversion, Lab Course must have been passed.

Additional Information
This course is offered in English.

Workload
180 hours

T 10.52 Module component: Machines and Processes of Energy Conversion, Lab Course [T-MACH-113555]

Coordinators: Dr.-Ing. Heiko Kubach
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106713 - Machines and Processes of Energy Conversion

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	1 CP	pass/fail	Each winter term	1 semesters	1

Exams			
WT 25/26	76-T-MACH-113555	Machines and Processes of Energy Conversion, Lab Course	Kubach, Bauer, Pritz

Assessment
As coursework, a report about the Lab Course has to be prepared. Further information will be provided in the course.

Prerequisites
none

Additional Information
The coursework is a prerequisite for the course T-MACH-113554 Machines and Processes of Energy Conversion.

This course is offered in English.

Workload
30 hours

T 10.53 Module component: Materials for Nuclear Fusion and Accelerator Applications [T-MACH-113574]

Coordinators: Prof. Dr. Christoph Kirchlechner
Dr. Michael Rieth

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106741 - Applied Materials

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Assessment
oral exam about 30 minutes

Prerequisites
none

Additional Information
The course is offered in English.

Workload
120 hours

T 10.54 Module component: Materials Science I and II [T-MACH-113510]

Coordinators: Dr.-Ing. Jens Gibmeier
Prof. Dr.-Ing. Martin Heilmaier
Prof. Dr. Astrid Pundt

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106707 - Manufacturing Technology and Materials Science

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	10 CP	graded	Each winter term	2 semesters	1

Courses					
ST 2025	3174015	Materials Science and Engineering II (Lecture)	3 SWS	Lecture / 🗣	Gibmeier
ST 2025	3174026	Materials Science and Engineering II (Tutorials)	1 SWS	Practice / 🗣	Gibmeier, Mitarbeiter
WT 25/26	3173008	Materials Science and Engineering I (Lecture)	4 SWS	Lecture / 🗣	Gibmeier
WT 25/26	3173009	Materials Science and Engineering I (Tutorial)	1 SWS	Practice / 🗣	Gibmeier
Exams					
ST 2025	76-T-MACH-113510	Materials Science I and II			Gibmeier, Heilmaier, Pundt
WT 25/26	76-T-MACH-113510	Materials Science I and II			Heilmaier, Pundt, Gibmeier

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

Assessment
oral exam, duration approx. 25 minutes

Prerequisites
Prerequisite for oral exam: T-MACH-113511 Materials Science Lab Course has to be passed.

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-113511 - Materials Science Lab Course must have been passed.

Additional Information
The course is offered in English.

Workload
300 hours

Below you will find excerpts from courses related to this module component:

V Materials Science and Engineering II (Lecture)

3174015, SS 2025, 3 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

Ferrous materials

Non-ferrous metals and alloys

Engineering ceramics

Glasses

Polymers

Composites

learning objectives:

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

The students can name representative materials for different material classes and can describe the differences.

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

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

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

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

requirements:
Materials Science and Engineering I
workload:

regular attendance: 42 hours
self-study: 108 hours

examination:

Combined with 'Materials Science and Engineering I'; oral; about 30 minutes

The successful partcipation in the lab course is obligatory for the admission to the examination.

Literature
Vorlesungsskript; Übungsaufgabenblätter;

Shackelford, J.F.
Werkstofftechnologie für Ingenieure
Verlag Pearson Studium, 2005

V **Materials Science and Engineering II (Tutorials)** **Practice (Ü) On-Site**
3174026, SS 2025, 1 SWS, Language: English, Open in study portal

Content
Examplary calculations

learning objectives:

The students can apply the knowledge gained through the lacture as well as self-studies and transfer this knowledge to problems given.

They can carry out calculations independantly dealing with different subjects of materials science. Therefore, they are able to decide which formulas allow the calculation based on the question given.

Theyare able to discuss aspects of materials science both quantitatively and qualitatively and can present these results oraly.

requirements:
Lecture Materials Science and Engineering II
workload:

Literature
see lecture notes

V Materials Science and Engineering I (Lecture)

3173008, WS 25/26, 4 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content

Ferrous materials

Non-ferrous metals and alloys

Engineering ceramics

Glasses

Polymers

Composites

learning objectives:

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

The students can name representative materials for different material classes and can describe the differences.

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

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

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

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

requirements:
Materials Science and Engineering I
workload:

regular attendance: 42 hours
self-study: 108 hours

examination:

Combined with 'Materials Science and Engineering I'; oral; about 30 minutes

The successful partcipation in the lab course is obligatory for the admission to the examination.

Literature
Vorlesungsskript; Übungsaufgabenblätter;

Shackelford, J.F.
Werkstofftechnologie für Ingenieure
Verlag Pearson Studium, 2005

V Materials Science and Engineering I (Tutorial)

3173009, WS 25/26, 1 SWS, Language: English, Open in study portal

Practice (Ü)
On-Site

Content
Examplary calculations

learning objectives:

The students can apply the knowledge gained through the lacture as well as self-studies and transfer this knowledge to problems given.

They can carry out calculations independantly dealing with different subjects of materials science. Therefore, they are able to decide which formulas allow the calculation based on the question given.

Theyare able to discuss aspects of materials science both quantitatively and qualitatively and can present these results oraly.

requirements:
Lecture Materials Science and Engineering II
workload:

Literature
see lecture notes

T 10.55 Module component: Materials Science Lab Course [T-MACH-113511]

Coordinators: Dr.-Ing. Jens Gibmeier
Prof. Dr.-Ing. Martin Heilmaier
Prof. Dr. Astrid Pundt

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106707 - Manufacturing Technology and Materials Science

Type	Credits	Grading	Term offered	Expansion	Version
Coursework (practical)	2 CP	pass/fail	Each summer term	1 semesters	1

Courses					
ST 2025	3174016	Materials Science and Engineering Lab Course	3 SWS	Practical course / 🗣	Gibmeier, Heilmaier, Pundt
Exams					
ST 2025	76-T-MACH-113511	Materials Science Lab Course			Heilmaier, Pundt

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

Assessment
The lab course consists of five topics. An oral colloquium takes place at the beginning of each topic. Once the colloquium is passed, the experiment is carried out. The course is passed after all colloquia have been passed and all experiments have been carried out.

Prerequisites
none

Additional Information
The course is offered in English.

Workload
60 hours

Below you will find excerpts from courses related to this module component:

V Materials Science and Engineering Lab Course

3174016, SS 2025, 3 SWS, Language: English, Open in study portal

Practical course (P)
On-Site

Content
Performing and evaluating of laboratory experiments in the following topics:

Mechanical testing of materials
Nonmetallic materials
Microstructure and properties
Cyclic loading / fatigue
Influence of manufacturing technique on materials

learning objectives:

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

The students can name standard materials characterization methods and can describe the execution of the tests as well as the evaluation of the results. The students are able to asses materials on base of the data obtained by these methods.

The students are capable to select appropriate experiments to clarify probelms regarding the materials behaviour. They can describe the experimental procedures and can carry out experiments. They can derive material properties from data gained in experiments. They can interpret these properties regarding microstructure-propety-relations.

requirements:
Materials Science and Engineering I & II
workload:

regular attendance: 22 hours
self-study: 68 hours

Organizational issues
Registration required. Note announcements (MSE lecture and ILIAS)

Literature
Praktikumsskriptum

Shackelford, J.F.
Werkstofftechnologie für Ingenieure
Verlag Pearson Studium, 2005

T 10.56 Module component: Mechanical Design A [T-MACH-113500]

Coordinators: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106706 - Mechanical Design

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

Courses					
WT 25/26	2145191	Mechanical Design A (Lecture)	3 SWS	Lecture / 🗣	Matthiesen, Düser
WT 25/26	2145192	Mechanical Design A (Tutorial)	1 SWS	Practice / 🗣	Matthiesen, Düser
Exams					
ST 2025	76-T-MACH-113500	Mechanical Design A			Düser, Matthiesen
WT 25/26	76-T-MACH-113500	Mechanical Design A			Düser, Matthiesen

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

Assessment
Written exam with a duration of 90 Minutes

Prerequisites
Admission to the exam only with succesful completion of Workshop Mechanical Design A (T-MACH-113499)

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-113499 - Mechanical Design A, Workshop must have been passed.

Recommendations
None

Additional Information
Students are familiar with the basic machine elements of technical systems and are able to analyze them in a system context

The course is offered in English.

Workload
180 hours

Below you will find excerpts from courses related to this module component:

V Mechanical Design A (Lecture)

2145191, WS 25/26, 3 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Students are introduced to fundamental topics in Mechanical Design A. The focus is on the analysis of existing systems and the development of knowledge for fundamental elements and functionality of technical systems. The course is divided into the following topics:

- Springs
- Technical systems
- Bearings
- Seals
- Component connection
- Gearbox

Literature

- Grundlagen der Berechnung und Gestaltung von Maschinenelementen; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X oder Volltextzugriff über Uni-Katalog der Universitätsbibliothek
- Grundlagen von Maschinenelementen für Antriebsaufgaben; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-29629-8

V

Mechanical Design A (Tutorial)

2145192, WS 25/26, 1 SWS, Language: English, Open in study portal

Practice (Ü)
On-Site

Content
Specific applications and tasks in the subject areas of MKL A:

- Springs
- Technical systems
- Bearings
- Seals
- Component connection
- Gearbox

Literature

- Grundlagen der Berechnung und Gestaltung von Maschinenelementen; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X oder Volltextzugriff über Uni-Katalog der Universitätsbibliothek
- Grundlagen von Maschinenelementen für Antriebsaufgaben; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-29629-8

T 10.57 Module component: Mechanical Design A, Workshop [T-MACH-113499]

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

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106706 - Mechanical Design

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	2 CP	pass/fail	Each winter term	1 semesters	1

Courses					
WT 25/26	2145193	Mechanical Design A (Workshop)	1 SWS	Practical course / 🗣	Matthiesen, Düser
Exams					
WT 25/26	76-T-MACH-112981	Mechanical Design A, Workshop			Düser, Matthiesen

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

Assessment
Concomitant to the lecture, a workshop with 3 workshop sessions takes place over the semester. During the workshop the students are divided into groups and their mechanical design knowledge will be tested during a colloquium at the beginning of every single workshop session. The attendance is mandatory and will be controlled.

The pass of the colloquia and the process of the workshop task are required for the successful participation.

Prerequisites
None

Recommendations
None

Additional Information
The course is offered in English.

Workload
60 hours

Below you will find excerpts from courses related to this module component:

V Mechanical Design A (Workshop)

2145193, WS 25/26, 1 SWS, Language: English, Open in study portal

Practical course (P)
On-Site

Content
In addition to the MD A lecture, the students are familiarized with the design process in a series of three workshops. The focus here is on application-oriented learning and understanding. For example, the students independently disassemble and assemble small demonstrator systems and thus gain a better understanding of the relevant problems in the field of mechanical design.

Organizational issues
Duration of a workshop slot: 1,5 h (information regarding slots and registration in MD A ILIAS Kurs)

Literature

- Grundlagen der Berechnung und Gestaltung von Maschinenelementen; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X oder Volltextzugriff über Uni-Katalog der Universitätsbibliothek
- Grundlagen von Maschinenelementen für Antriebsaufgaben; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-29629-8

T 10.58 Module component: Methods and Processes of Sustainable Engineering [T-MACH-113406]

Coordinators: Sascha Ott
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106706 - Mechanical Design

Type	Credits	Grading	Term offered	Expansion	Version
Written examination	4 CP	graded	Each winter term	1 semesters	1

Courses					
WT 25/26	2145130	Methods and Processes of Sustainable Engineering	2 SWS	Lecture / 🗣	Ott, Düser
Exams					
WT 25/26	76-T-MACH-113406	Methods and Processes of Sustainable Engineering			Ott, Düser

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

Assessment
written exam (90 min)

Prerequisites
none

Recommendations
none

Additional Information
The course is offered in English.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Methods and Processes of Sustainable Engineering

2145130, WS 25/26, 2 SWS, Language: English, Open in study portal

Lecture (V)
On-Site

Content
Students acquire fundamental competencies to systematically integrate sustainability aspects into engineering development processes. The course covers technical, economic, and social dimensions of sustainability, as well as key concepts of the circular economy. The content is structured into the following main topics:

- Holistic definitions of sustainability
- Methods of Life Cycle Assessment (LCA)
- Approaches to Circular Economy (e.g. Cradle-to-Cradle)
- Sustainability indicators and certifications (e.g. ESG)
- Identification of optimization potentials in sustainable product development

Literature

1. Sapuan, S. M., & Mansor, M. R. (2021). *Design for Sustainability: Green Materials and Processes*. Elsevier.
2. Grayson, D., Coulter, C., & Lee, M. (2022). *The Sustainable Business Handbook: A Guide to Becoming More Innovative, Resilient and Successful*. Kogan Page Incorporated.

T 10.59 Module component: Participation in Empirical Research [T-MACH-113547]

Coordinators: Prof. Dr.-Ing. Barbara Deml
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	2 CP	pass/fail	Each term	1 semesters	1

Courses					
ST 2025	2109040	Participation in Empirical Research	2 SWS	Others (sons / 🗣	Deml
WT 25/26	2109040	Participation in Empirical Research		Others (sons	Deml

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

Assessment
The students participate as test subjects, spread over one or more semesters, in various empirical studies (e.g. laboratory experiments, questionnaire studies) of the KIT with a total of at least ten hours. Students are free to take studies from all faculties (e.g. mechanical engineering, sports science, industrial engineering, business informatics, see selected list on ifab-homepage). Participation and the scope (total of at least 10 hours) are confirmed on a form by the respective study leader and finally checked by the person responsible for the module and confirmed as academic achievement.

Prerequisites
none

Workload
60 hours

Below you will find excerpts from courses related to this module component:

V Participation in Empirical Research

2109040, SS 2025, 2 SWS, Language: English, Open in study portal

Others (sonst.)
On-Site

Content
[T-MACH-112935] Component of M-MACH-106389-Key Qualifications

Our research thrives on the participation of people in scientific studies, allowing us to gain new insights into human experience and behavior. For this, we need motivated volunteers to take part in our studies. Participation not only provides you with insights into empirical work and our research focus but can also help you in finding suitable projects and thesis topics.

As part of the new teaching concept for participant hours, you can have 10 participant hours credited as two ECTS points. No additional examination is required.

To provide both you and us with an up-to-date overview of available studies, open participation periods, and the participant hours you have already collected, we use the SONA system (https://kit.sona-systems.com/main.aspx). Participant hours are exclusively managed through this system.

There are no general participation requirements, and participant hours can be collected throughout the entire duration of your studies. You do not need to complete them within a single semester.

T 10.60 Module component: Phase Diagrams [T-MACH-113569]

Coordinators: Dr. rer. nat. Stefan Wagner
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106741 - Applied Materials

Type	Credits	Grading	Term offered	Expansion	Version
Oral examination	4 CP	graded	Each winter term	1 semesters	1

Assessment
Oral examination, duration: approx. 30 minutes

Recommendations
D.A. Porter, K. Easterling, M.Y. Sherif, Phase Transformations in Metals and Alloys, 3rd edition, CRC Press, 2009.

Additional Information
The course is offered in English.

Workload
120 hours

T 10.61 Module component: Presentation [T-MACH-113551]

Coordinators: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106737 - Bachelor's Thesis

Type	Credits	Grading	Term offered	Version
Coursework	3 CP	pass/fail	Each term	1

Assessment
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 Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-113550 - Bachelor's Thesis must have been started.

Additional Information
The workload for the presentation of the bachelor thesis is about 90 hours.

Workload
90 hours

T 10.62 Module component: Python Course on IT and Data Science [T-MACH-113512]

Coordinators: Prof. Dr.-Ing. Anne Meyer
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106708 - IT and Data Science

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	1 CP	pass/fail	Each summer term	1 semesters	1

Courses					
ST 2025	2122375	Python course on IT and Data Science	1 SWS	Block / 🗣	Meyer
Exams					
ST 2025	76-T-MACH-113512	Python Course on IT and Data Science (Prerequisite)			Meyer

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

Assessment
Successful participation in a colloquium in individual performance at the end of the Python course.

Successful completion of the coursework is a prerequisite for participation in the written exam (T-MACH-113515 - IT and Data Science).

Prerequisites
none

Recommendations
The course is offered in English.

Workload
30 hours

T 10.63 Module component: Registration for Certificate Issuance - Supplementary Studies on Science, Technology and Society [T-FORUM-113587]

Coordinators: Dr. Christine Mielke
Christine Myglas
Organisation: General Studies. Forum Science and Society (FORUM)
Part of: M-FORUM-106753 - Supplementary Studies on Science, Technology and Society

Type	Credits	Grading	Term offered	Version
Coursework	0 CP	pass/fail	Each term	1

Prerequisites
In order to register, it is mandatory that the basic module and the advanced module have been completed and that the grades for the partial performances in the advanced module are available.

Registration as a partial achievement means the issue of a certificate.

T 10.64 Module component: Renewable Energies I: Solar Systems [T-MACH-113624]

Coordinators: apl. Prof. Dr. Ron Dagan
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106740 - Energy

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Assessment
oral exam, duration approx. 30 minutes

Prerequisites
none

Recommendations
Successful attendance of the basic lectures: Thermodynamics and/or fluid mechanics

Workload
120 hours

T 10.65 Module component: Scientific Work and Empirical Research Methods [T-MACH-113546]

Coordinators: Prof. Dr.-Ing. Barbara Deml
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	2 CP	pass/fail	Each summer term	1 semesters	1

Courses					
ST 2025	2111023	Scientific Work and Empirical Research Methods	2 SWS	Lecture / 🗣	Deml
Exams					
ST 2025	76-T-MACH-113546	Scientific Work and Empirical Research Methods			Deml
WT 25/26	76-T-MACH-113546	Scientific Work and Empirical Research Methods			Deml

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

Assessment
Ungraded written exam (pass/fail), duration 60 minutes. The written exam can be repeated as often as necessary until it is passed.

Prerequisites
none

Additional Information
The course is offered in English.

Workload
60 hours

T 10.66 Module component: Self-Booking-BSc-SPZ-Graded [T-MACH-112569]

Coordinators: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Term offered	Version
Examination of another type	2 CP	graded	Each term	1

Assessment
Completed coursework

Prerequisites
None

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- Sprachenzentrum

Additional Information
Interdisciplinary qualifications (IQ) completed at the Sprachenzentrum (SpZ) can be assigned in self-service.

First, select a partial accomplishment named "self-assignment" in your study schedule and second, assign an IQ-achievement via the tab "IQ achievements".

Workload
60 hours

T 10.67 Module component: Self-Booking-BSc-SPZ-Non-Graded [T-MACH-112568]

Coordinators: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Term offered	Version
Coursework	2 CP	pass/fail	Each term	1

Assessment
Completed coursework

Prerequisites
None

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- Sprachenzentrum

Additional Information
Interdisciplinary qualifications (IQ) completed at the Sprachenzentrum (SpZ) can be assigned in self-service.

First, select a partial accomplishment named "self-assignment" in your study schedule and second, assign an IQ-achievement via the tab "IQ achievements".

Workload
60 hours

T 10.68 Module component: Self-Booking-BSc-StK-Graded [T-MACH-112681]

Coordinators: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Version
Examination of another type	2 CP	graded	1

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- Studienkolleg

Additional Information
Interdisciplinary qualifications (IQ) completed at the Studienkolleg (StK) can be assigned in self-service.

First, select a partial accomplishment named "self-assignment" in your study schedule and second, assign an IQ-achievement via the tab "IQ achievements".

Workload
60 hours

T 10.69 Module component: Self-Booking-BSc-StK-Non-Graded [T-MACH-112680]

Coordinators: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Version
Coursework	2 CP	pass/fail	1

Self Service Assignment of Supplementary Studies
This module component can be used for self service assignment of grades acquired from the following study providers:

- Studienkolleg

Additional Information
Interdisciplinary qualifications (IQ) completed at the Studienkolleg (StK) can be assigned in self-service.

First, select a partial accomplishment named "self-assignment" in your study schedule and second, assign an IQ-achievement via the tab "IQ achievements".

Workload
60 hours

T 10.70 Module component: Smart Factory [T-MACH-112972]

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

Part of: M-MACH-106738 - Global Production Management

Type	Credits	Grading	Term offered	Expansion	Version
Examination of another type	4 CP	graded	Each summer term	1 semesters	2

Courses					
ST 2025	2150701	Smart Factory	3 SWS	Lecture / Practice (/ 🗣	Lanza
Exams					
ST 2025	76-T-MACH-112972	Smart Factory			Lanza

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

Assessment
Alternative test achievement (graded).

A maximum of 100 points can be earned. More information about the conversion of points to grades will be distributed in the first lecture.

The achievement consists of

- Oral exam (max. 70 points)
- Colloquium (max. 30 points)

Note: Attendance on the days of the colloquium is mandatory. In the event of absence, an alternative performance (e.g. seminar paper) is required.

Prerequisites
none

Additional Information
The course is offered in English.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V **Smart Factory** — **Lecture / Practice (VÜ) On-Site**
2150701, SS 2025, 3 SWS, Language: English, Open in study portal

Content
The modern manufacturing industry faces a multitude of challenges that require a paradigm shift from traditional production systems to intelligent, networked factories – so-called smart factories. Increasing scarcity of resources, growing and rapidly changing customer requirements, the trend towards product customisation, as well as failure-prone global supply chains and the need to increase efficiency and flexibility are just some of the factors driving this change.

A smart factory is characterised by the end-to-end digitalisation of all processes and systems, as well as the real-time networking of machines, products and people. Sensors and IoT technologies are used to enable seamless communication and data collection. The data collected is used to optimise processes, for example by means of big data analytics. Predictive maintenance helps to avoid breakdowns, while AI-supported decision-making increases the efficiency and flexibility of production processes. Changeability is another core element. Adaptive production lines dynamically adjust to changing requirements, and autonomous in-house logistics systems ensure a smooth flow of materials.

The course aims to teach methods and tools for planning, controlling and operating a smart factory. A particular focus of this lecture is on how Industry 4.0 and digital solutions can be used in synergy with lean management methods to make factory planning and operations more efficient, less complicated and more sustainable. The content and theoretical foundations are supplemented by practical examples, application-oriented exercises and full-day workshops in the Global Production Learning Factory.

The lecture focuses on the following topics:

- Introduction to production, lean management and smart manufacturing/industry 4.0
- Fundamentals of production planning and control
- Classic methods of factory planning and lean management
- Workshops on production planning with lean management using the example of the Global Production Learning Factory
- Technological fundamentals of industry 4.0 and smart factories
- Digital modelling of production systems
- Digital methods of factory planning and control
- Workshops on production planning with digital tools and methods of smart manufacturing and artificial intelligence using the example of the Global Production Learning Factory.

Learning Outcomes:

The students...

- are familiar with the opportunities and challenges associated with the paradigm shift from traditional production systems to smart factories.
- are able to analyse and evaluate the methods, procedures and techniques of production planning and can reflect on the presented content and challenges as well as fields of action in practice.
- know the characteristics and operating principles of smart production systems and can explain the changed requirements for planning and operating these smart production systems.
- can practically apply the methods and tools of production planning for smart production systems to new problems.
- can apply their knowledge in a targeted manner for efficient planning and control of smart production systems.

Workload:

regular attendance: 51 hours
self-study: 69 hours

Organizational issues
Bekanntgabe der konkreten Termine erfolgt im Rahmen der Informationsveranstaltung sowie über die Homepage des wbk.

Aus organisatorischen Gründen ist die Teilnehmerzahl für die Lehrveranstaltung auf 20 Teilnehmende begrenzt. Infolgedessen wird ein Auswahlprozess stattfinden. Die Bewerbung erfolgt über die Homepage des wbk (http://www.wbk.kit.edu/).
Aufgrund der begrenzten Anzahl an Teilnehmenden ist eine Voranmeldung erforderlich. Weitere Informationen dazu erhalten Sie auch im Rahmen der Informationsveranstaltung.

The specific dates will be announced during the information event, in the first lecture and via Ilias/the wbk homepage.

For organisational reasons, the number of participants for the course is limited to 20. Consequently, a selection process will take place. Applications can be made via the wbk homepage (http://www.wbk.kit.edu/).
Due to the limited number of participants, pre-registration is required. Further information will also be provided at the information event.

Literature
Medien:
Skript zur Veranstaltung wird über (https://ilias.studium.kit.edu/) bereitgestellt.

Media:
Lecture notes will be provided in Ilias (https://ilias.studium.kit.edu/).

T 10.71 Module component: Steering of a Global Operating Company - The Robert BOSCH GmbH as an Example [T-MACH-110961]

Coordinators: Bernd Grube
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Term offered	Version
Coursework	2 CP	pass/fail	Each winter term	1

Courses					
WT 25/26	2149663	Steering of a Global Operating Company - The Robert BOSCH GmbH as an Example	2 SWS	Seminar / 🗣	Grube

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

Assessment
alternative achievement (ungraded):
- attendance on at least 12 lecture units

Prerequisites
T-MACH-106375 – The Value Stream in an Industrial Company - The Value Chain at BOSCH as an Example must not have been startet.

Additional Information
The course is offered in German.

Workload
60 hours

Below you will find excerpts from courses related to this module component:

V Steering of a Global Operating Company - The Robert BOSCH GmbH as an Example

Seminar (S) On-Site

2149663, WS 25/26, 2 SWS, Language: German, Open in study portal

Content
The lecture series provides an insight into the main functional areas of a global company and is based on close interaction with the students. Top managers from Bosch explain the technical and business processes of a company using examples from their business areas. The tasks of the engineer working at an innovative and globally active automotive supplier is addressed. These range from technical competence and an understanding of economic aspects to questions of personnel responsibility.

In addition, insights are provided into the careers of the Bosch managers giving the lectures. The focus of the course is therefore not only on business processes but also on first-hand accounts of challenges, successes, failures and product and process innovations.

The topics in detail are:

- Introduction, Strategy, Innovation
- R&D, Product Development Process
- Production
- Quality Assurance
- Market, Marketing, Sales
- Aftermarket, Service
- Finance, Controlling
- Logistics
- Purchasing, Supply Chain
- IT
- HR, Leadership, Compliance

Learning Outcomes:

The students …

- are able to deduce, understand and assess the structure of a global operating enterprise.
- are capable to identify and compare the work flows and processes within a global operating enterprise.
- are able to recognize and assess the problems within interfaces between functional and organizational units which are identified by the experts. Furthermore the students can develop solutions based on this knowledge in order to overcome these problems.

Workload:

regular attendance: 21 hours
self-study: 39 hours

Organizational issues
Die Anmeldung zum Seminar erfolgt über Ilias. (https://ilias.studium.kit.edu/)
Das Passwort wird im ersten Termin bekanntgegeben.

The registration for the seminar is via Ilias. (https://ilias.studium.kit.edu/)
The password will be announced in the first appointment.

Literature
Skript zur Veranstaltung wird über
(https://ilias.studium.kit.edu/) bereitgestellt.

Lecture notes will be provided in Ilias
(https://ilias.studium.kit.edu/).

T 10.72 Module component: Structural Materials [T-MACH-113572]

Coordinators: Dr.-Ing. Stefan Guth
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106741 - Applied Materials

Type	Credits	Grading	Term offered	Version
Oral examination	4 CP	graded	Each summer term	1

Assessment
Oral exam, about 25 minutes

Prerequisites
none

Additional Information
The course is offered in English.

Workload
120 hours

T 10.73 Module component: Sustainable Internal Combustion Energy Conversion for Combined Heat Power and Mobility Applications [T-MACH-113602]

Coordinators: Prof. Dr. Thomas Koch
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106739 - Mobility Systems
M-MACH-106740 - Energy

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each summer term	1

Assessment
written exam (60 minutes)

Prerequisites
none

Additional Information
Starting in summer term 26, the course consists of a lecture (2h / week) and a tutorial (1 h / week).

Workload
120 hours

T 10.74 Module component: Technical Thermodynamics and Heat Transfer I [T-MACH-113544]

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

Part of: M-MACH-106709 - Technical Thermodynamics

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

Courses					
WT 25/26	3165014	Technical Thermodynamics and Heat Transfer I	4 SWS	Lecture / 🗣	Schießl, Maas
Exams					
WT 25/26	76-T-MACH-113544	Technical Thermodynamics and Heat Transfer I			Maas, Schießl

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

Assessment
Written exam; duration 3 hours

Prerequisites
Successful participation in the tutorial (T-MACH-113542 - Tutorial Technical Thermodynamics and Heat Transfer I)

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-113542 - Tutorial Technical Thermodynamics and Heat Transfer I must have been passed.

Additional Information
The course is offered in English.

Workload
180 hours

Below you will find excerpts from courses related to this module component:

V Technical Thermodynamics and Heat Transfer I

Lecture (V) On-Site

3165014, WS 25/26, 4 SWS, Language: English, Open in study portal

Content

- System, properties of state
- Absolute temperature, model systems
- 1st law of thermodynamics for resting and moving systems
- Entropy and 2nd law of thermodynamics
- Behavior of real substances described by tables, diagrams and equations of state
- Machine processes
- Mixtures of ideal and real compounds
- Behavior of mixtures
- Moist air

Literature
Vorlesungsskriptum

Elsner, N.; Dittmann, A.: Energielehre und Stoffverhalten (Grundlagen der technischen Thermodynamik Bd. 1 und 2), 8. Aufl., Akademie-Verlag, 680 S. 1993.

Baehr, H.D.: Thermodynamik: eine Einführung in die Grundlagen und ihre technischen Anwendungen, 9. Aufl., Springer-Verlag, 460 S., 1996.

T 10.75 Module component: Technical Thermodynamics and Heat Transfer II [T-MACH-113545]

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

Part of: M-MACH-106709 - Technical Thermodynamics

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

Exams			
WT 25/26	76-T-MACH-113545	Technical Thermodynamics and Heat Transfer II	Maas, Schießl

Assessment
Written exam; duration 3 hours

Prerequisites
Successful participation in the tutorial (T-MACH-113543 - Tutorial Technical Thermodynamics and Heat Transfer II)

Modeled Prerequisites
The following conditions have to be fulfilled:

1. The module component T-MACH-113543 - Tutorial Technical Thermodynamics and Heat Transfer II must have been passed.

Additional Information
The course is offered in English.

Workload
180 hours

T 10.76 Module component: The impact of sustainable steering: Insights for holistic decision-making [T-ZAK-113411]

Organisation: General Studies. Forum Science and Society (FORUM)
Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Version
Coursework	2 CP	pass/fail	1

Courses					
ST 2025	1130701	The Impact of Sustainable Steering: Insights for Holistic Decision-Making	2 SWS	Seminar / 🗣	Konrad
WT 25/26	1130701	The impact of sustainable steering: Insights for holistic decision-making	2 SWS	Seminar	Konrad

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

Below you will find excerpts from courses related to this module component:

V The Impact of Sustainable Steering: Insights for Holistic Decision-Making

Seminar (S) On-Site

1130701, SS 2025, 2 SWS, Language: English, Open in study portal

Content
You can't manage what you don't measure – to make meaningful progress towards more sustainable practices, we are relying on accurate data and holistic insights. But why do we mostly still rely on "traditional reporting" which clearly reaches its limits in the context of sustainability? How can operations report and steer more holistically and thereby successfully achieve its sustainability ambitions? What are concrete methodologies and what might be potential limitations of these?

We all are involved in one way or another in decision making at different levels. To allow critically questioning existing indicators and formulating informed, sustainable decisions, this seminar aims at discussing answers to the above-mentioned questions by offering key insights into sustainable steering. A specific focus will be laid on concrete methodologies and the implementation of such in a business context.

Designed to be interactive, dialogue and active participation will be encouraged. No prior experience is necessary and participants from all backgrounds are welcomed, but a willingness to learn and contribute is a must.
Participants will present on a chosen topic.

2 – 3 LP

Organizational issues
Registration required via: https://plus.campus.kit.edu/signmeup/procedures/3997

V The impact of sustainable steering: Insights for holistic decision-making

Seminar (S)

1130701, WS 25/26, 2 SWS, Language: English, Open in study portal

Content
You can't manage what you don't measure – to make meaningful progress towards more sustainable practices, we are relying on accurate data and holistic insights. But why do we mostly still rely on "traditional reporting" which clearly reaches its limits in the context of sustainability? How can operations report and steer more holistically and thereby successfully achieve its sustainability ambitions? What are concrete methodologies and what might be potential limitations of these?

We all are involved in one way or another in decision making at different levels. To allow critically questioning existing indicators and formulating informed, sustainable decisions, this seminar aims at discussing answers to the above-mentioned questions by offering key insights into sustainable steering. A specific focus will be laid on concrete methodologies and the implementation of such in a business context.

Designed to be interactive, dialogue and active participation will be encouraged. No prior experience is necessary and participants from all backgrounds are welcomed, but a willingness to learn and contribute is a must.
Participants will present on a chosen topic.

2 – 3 LP

Organizational issues
Registration required at: https://plus.campus.kit.edu/signmeup/procedures/4991

T 10.77 Module component: Tutorial Basics of Mechatronics [T-MACH-113524]

Coordinators: Prof. Dr.-Ing. Alexander Fidlin
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106711 - Electrical Engineering and Mechatronics

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	1 CP	pass/fail	Each summer term	1 semesters	1

Assessment
Passing this course allows to register to the exam "Basics of Mechatronics" (T-MACH-113525).

Prerequisites
None

Additional Information
The course is offered in English.

Workload
30 hours

T 10.78 Module component: Tutorial Engineering Mechanics I [T-MACH-113502]

Coordinators: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106705 - Engineering Mechanics

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	1 CP	pass/fail	Each winter term	1 semesters	1

Courses					
WT 25/26	3161011	Engineering Mechanics I (Tutorial)	2 SWS	Practice / 🗣	Gisy, Kehrer, Langhoff

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

Assessment
Successful solution of worksheets. Details are given in the first lecture "Engineering Mechanics I"

Passing this course allows to register to the exam "Engineering Mechanics I" (see T-MACH-113501).

Prerequisites
none

Additional Information
The corresponding course is offered in English.

Workload
30 hours

Below you will find excerpts from courses related to this module component:

V Engineering Mechanics I (Tutorial)

3161011, WS 25/26, 2 SWS, Language: English, Open in study portal

Practice (Ü)
On-Site

Content
See Lecture "Engineering Mechanics I"

Organizational issues
The first tutorial takes place on Fri 31/10/2025

Literature
See Lecture "Engineering Mechanics I"

T 10.79 Module component: Tutorial Engineering Mechanics II [T-MACH-113504]

Coordinators: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106705 - Engineering Mechanics

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	1 CP	pass/fail	Each summer term	1 semesters	1

Exams			
ST 2025	76-T-MACH-100284-englisch	Tutorial Engineering Mechanics II	Böhlke, Langhoff

Assessment
Successful solution of worksheets. Details are given in the first lecture "Engineering Mechanics II"

Passing this course allows to register to the exam "Engineering Mechanics II" (see T-MACH-113503).

Prerequisites
none

Additional Information
The corresponding course is offered in English.

Workload
30 hours

T 10.80 Module component: Tutorial Engineering Mechanics III [T-MACH-113506]

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

Part of: M-MACH-106705 - Engineering Mechanics

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	1 CP	pass/fail	Each winter term	1 semesters	1

Assessment
Passing this course allows to register to the exam "Engineering Mechanics III" (see T-MACH-113505).

Prerequisites
none

Additional Information
The course is offered in English.

Workload
30 hours

T 10.81 Module component: Tutorial IT and Data Science [T-MACH-113513]

Coordinators: Prof. Dr.-Ing. Anne Meyer
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106708 - IT and Data Science

Type	Credits	Grading	Term offered	Expansion	Version
Coursework	1 CP	pass/fail	Each summer term	1 semesters	1

Courses					
ST 2025	2122374	Tutorial IT and Data Science	2 SWS	Practice / 🗣	Meyer, Rönnau
Exams					
ST 2025	76-T-MACH-113513	Tutorial IT and Data Science			Meyer, Rönnau

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

Assessment
Successful completion of exercise sheets. Details will be announced in the first lecture "IT and Data Science".

Prerequisites
none

Recommendations
The course is offered in English.

Workload
30 hours

T 10.82 Module component: Tutorial Technical Thermodynamics and Heat Transfer I [T-MACH-113542]

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

Part of: M-MACH-106709 - Technical Thermodynamics

Type	Credits	Grading	Term offered	Expansion	Version
Coursework (written)	1 CP	pass/fail	Each winter term	1 semesters	1

Exams			
WT 25/26	76-T-MACH-113542	Tutorial Technical Thermodynamics and Heat Transfer I	Maas, Schießl

Assessment
Successful completion of written preliminary tests.

Prerequisites
none

Additional Information
The course is offered in English.

Workload
30 hours

T 10.83 Module component: Tutorial Technical Thermodynamics and Heat Transfer II [T-MACH-113543]

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

Part of: M-MACH-106709 - Technical Thermodynamics

Type	Credits	Grading	Term offered	Expansion	Version
Coursework (written)	1 CP	pass/fail	Each summer term	1 semesters	1

Exams			
WT 25/26	76-T-MACH-113543	Tutorial Technical Thermodynamics and Heat Transfer II	Maas, Schießl

Assessment
Successful completion of written preliminary tests.

Prerequisites
none

Additional Information
The course is offered in English.

Workload
30 hours

T 10.84 Module component: Vehicles in Sustainable Mobility Systems [T-MACH-113605]

Coordinators: Prof. Dr.-Ing. Martin Cichon
Prof. Dr.-Ing. Marcus Geimer
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-106739 - Mobility Systems

Type	Credits	Grading	Term offered	Version
Written examination	4 CP	graded	Each winter term	2

Courses					
WT 25/26	2115917	Vehicles in Sustainable Mobility Systems	3 SWS	Lecture / Practice (/ 🗣	Cichon, Geimer
Exams					
WT 25/26	76-T-MACH-00057	Vehicles in Sustainable Mobility Systems			Cichon, Geimer

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

Assessment
Written exam, duration 90 minutes

Prerequisites
none

Recommendations
Basic lectures of the first three semesters.

Additional Information
The course is offered in English.

This course comprises the lecture (2 SWS) and exercises (1 SWS) on vehicles in mobility systems. In the winter semester, a course with the same content is offered in English (T-MACH-113605 Vehicles in Sustainable Mobility Systems).
Lecture notes will be made available on ILIAS. ILIAS access is password-protected. You will receive the password after entering your KIT e-mail address on the institute's website under Studies and Teaching\Lectures.

Workload
120 hours

Below you will find excerpts from courses related to this module component:

V Vehicles in Sustainable Mobility Systems

2115917, WS 25/26, 3 SWS, Language: English, Open in study portal

Lecture / Practice (VÜ)
On-Site

Content

- Mobility as a basic human need
- Changes in mobility and their characteristics under temporal, spatial and capacity aspects;History and future of vehicles
- Classification of vehicles;Energy conversion, energy sources, basic requirements for vehicle drives
- Driving resistance, design fundamentals, power performance requirements
- Driving dynamics and vehicle dynamics
- Components of energy conversion, propulsion, engine characteristics, torque conversion, power transmission components
- Motorized vehicle systems: passenger cars, commercial vehicles, rail vehicles, trams, magnetic levitation trains, forestry and agricultural machines as well as construction machines
- Sustainability aspects for mobility systems

T 10.85 Module component: World history of state and law [T-FORUM-113835]

Organisation: General Studies. Forum Science and Society (FORUM)
Part of: M-MACH-106733 - Key Competencies

Type	Credits	Grading	Version
Coursework	2 CP	pass/fail	1

Courses					
WT 25/26	1130603	World history of state and law	2 SWS	Seminar /	Balykin

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

Below you will find excerpts from courses related to this module component:

V World history of state and law

1130603, WS 25/26, 2 SWS, Language: English, Open in study portal

Seminar (S)
Blended (On-Site/Online)

Content
"World History of State and Law" is a historical interdisciplinary course, which explains the development of state construction, the legal system, and social structure throughout history (from Ancient Egypt to contemporary times):

- General characteristics of the History of State and Law of the countries of the Ancient East. History of the State and Law (HSL) of Ancient Egypt. History of State and Law of Ancient Babylon. HSL of Ancient China and Ancient India.
- HSL of Ancient Greece. History of State and Law of Ancient Rome.
- General characteristics of the feudal State and Law. History of the Kingdom of the Franks.
- HSL of feudal France and Germany. History of State and Law of feudal England.
- HSL of Byzantium and the Arabian Caliphate.
- The emergence and development of bourgeois State and Law in England (mid XVII–XIX centuries.). The emergence and development of the bourgeois State and Law of the US (XVII–XIX centuries). Formation and development of the bourgeois State and Law in France (the end of the XVIII – 30th years of the XX century).
- Formation and development of bourgeois Germany and Japan (XIX – 30th years of the XX century).
- HSL of contemporary Germany. History of State and Law of modern France.
- HSL of contemporary USA. History of State and Law of modern UK.
- HSL of contemporary Ukraine.
- HSL of contemporary China. History of State and Law of contemporary Japan.

2-3 LP

Organizational issues
Registration required at: https://plus.campus.kit.edu/signmeup/procedures/4972

Literature
Good English language skills B2, willingness to dabate and make oral presentation