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Study and Examination Regulations Master Program

Ulm University of Applied Sciences

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Chapter 1 Application

- (1) These Study and Examination Regulations shall apply to the Master programs
 - Information Systems,
 - Medical Devices – Research and Development,
 - Systems Engineering and Management,
 - Electrical Energy Systems and Electromobility.

Part A: General Part

I. General Information

Chapter 2 Admission requirements

- (1) Required for the enrollment in any Master program at Ulm University of Applied Sciences is a more than average graduation from a professionally qualifying study program at a university. Details are indicated in the statutes of Ulm University of Applied Sciences for the regulation of the admission procedure in the Master programs "Systems Engineering and Management", "Electrical Energy Systems and Electromobility", "Medical Engineering", and "Information Systems".

Chapter 3 Standard period of studies

- (1) The standard period of studies is three semesters. During the standard period of studies, examinations including the Master's thesis shall be completed successfully.
- (2) The standard period of studies is divided into curriculum semesters. The individual period of studies of a student in a study program is counted in semesters of his/her program.

Chapter 4 Structure and extent of studies

- (1) The contents of studies in the study programs, pursuant to chapter 1 sec. 1, is divided into modules, i.e. into thematically and temporally concluded units. In order to clarify the structure of the studies, several modules of the same discipline may be assigned to so-called discipline groups.
- (2) In the Special Part, the obligatory and elective modules shall be determined, the conclusion of which shall be required for the successful conclusion of the studies. A module shall be concluded successfully if all the study achievements and examinations determined in the Special Part are completed, giving evidence of the fact that the study target has been reached.
- (3) The Special Part contains the following information for each module:
 - the required study efforts in credits pursuant to the European Credit Transfer System (ECTS), where one credit point corresponds to a workload of 30 hours,
 - the study achievements and examinations required for the successful conclusion of the module,

- the required courses and their extent in semester hours per week,
- as far as such has been determined, the assignment of the modules or of the respective courses to the curriculum semesters,
- as far as such has been determined, the curriculum semester for which the student has been recommended the first registration for study achievements and examinations,
- the weighting of the examination marks as regards the calculation of the overall mark of the Master's examination.

The conclusion of certain study achievements and examinations may be required for the participation in other examinations (examination pre-achievements).

- (4) By resolution of the Faculty, the assignment of the courses to the winter or the summer semester as well as their type, as has been determined in the Special Part, may be changed in the individual case for one study semester on the grounds of mandatory reasons.
- (5) Major fields of studies may be offered. Details are regulated within the Special Part.
- (6) Upon application, the entire studies or individual semesters may be completed in part-time. The study duration shall be extended respectively. The term pursuant to chapter 5 (4) shall be prolonged accordingly. The modification of the course of studies shall be permitted by the competent examination committee.

Chapter 5 Terms, loss of admission to the study program, and loss of right to examination

- (1) The students shall complete the study achievements and examinations assigned to the modules within the curriculum semester, for which the respective courses are prescribed in the Special Part (examinations during degree courses). The students shall enroll in all the courses at the latest two weeks upon the beginning of lectures via the student internet portal. Enrollment shall result in the registration for the respective study achievements and examinations. Without having to indicate any reasons, students may deregister for the examinations via the student internet portal, up to four weeks before the beginning of the respective examination period.
- (2) Examinations regarding the Master's examination shall be completed until the end of the last curriculum semester. Examinations may also be completed before expiry of the determined terms, insofar as the required examination pre-achievements are substantiated.
- (3) Students shall be informed in due time about the type and number of the required examination pre-achievements and about the examinations to be completed, as well as about the deadlines when these shall be completed. Such information shall be provided via the respective area on the website of the Graduate School. The deadlines regarding the assignment of the Master's thesis are regulated in chapter 20.
- (4) The right to examination shall be lost and the admission to the study program shall expire if the examinations regarding the Master's examination are not completed at the latest two semesters after the deadline indicated in chapter 3 (1), unless the student is not responsible for the failure to meet the deadline (§ 32 (5) phrase 4 LHG - Higher Education Act of the State Baden-Württemberg).

- (5) In the case of de-enrollment due to the failure to meet a deadling pursuant to sec. 4, the right to be admitted to examinations of the Master's examination shall remain in effect for up to one year - unless these are to be completed during the studies -, if the remaining required examination pre-achievements and examinations during studies have been completed at the time of expiry of the admission.
- (6) If the requirements are fulfilled, the provisions of the Maternity Protection Act shall apply pursuant to § 2 (3) and § 61 (3) LHG, as well as analogously the statutory provisions of parental leave for employees, as amended from time to time. In cases of doubt, the examination committee shall decide on the extension of examination deadlines and on the duration of the leave of absence pursuant to § 61 (1) LHG.
- (7) Students with children or with relatives in need of care, students with handicaps or chronic diseases, as well as students who are substantially prevented from completing the study achievements and examinations in due time on the grounds of special circumstances, shall be entitled to apply for an extension of the respective deadlines before the examination committee. They may consult the chairman/woman of the examination committee as to such extensions. The examination committee shall decide on the applications in the individual case at their own dutiful discretion. The student shall provide the respective evidence, especially in the form of medical certificates; in cases of doubt, Ulm University of Applied Sciences may ask for the submission of a medical certificate issued by a physician indicated by the university, or by a medical officer. The student shall be obliged to indicate any changes of conditions without delay.

Chapter 6 Admission requirements for the Master's examination

- (1) The Master's examination can only be taken by any student who
 - has been enrolled in the Master program at Ulm University of Applied Sciences; any exceptions shall only be possible pursuant to chapter 5 (5),
 - has successfully completed the examination pre-achievements for the respective examination, determined in the Special Part (ch. 4 sec. 3), and who
 - makes a declaration indicating that he/she has not finally failed yet in another Master's examination in the same Master program or another Master program determined by the statutes of Ulm University of Applied Sciences pursuant to § 60 sec. 2 no. 2 LHG, at any other university of applied sciences within the domain of the Federal basic law.
- (2) Admission to any module examination may only be denied
 - if the requirements indicated in sec. 1 are not fulfilled entirely or in parts, or
 - if documents are incomplete, or
 - if the student has finally failed any examination during the studies or the Master's examination required pursuant to the study and examination regulations in the same Master program or in another Master program determined by the statutes of Ulm University of Applied Sciences pursuant to § 60 sec. 2 no. 2 LHG, or if the person is undergoing examination procedures, or
 - if the right to examination has expired.

- (3) Pursuant to § 61 LHG, it is not permissible that a student in leave of absence attends any courses or completes examinations or study achievements of Ulm University of Applied Sciences, to the exception of § 61 (3) LHG. In the framework of a learning agreement, it is possible to transfer study achievements or examinations completed at any university of applied sciences abroad during the leave of absence.

Chapter 7 Examinations

- (1) Examinations shall usually be held during the periods between terms, following the lecture period of the study semester. Additional examination periods may be determined by the competent examination committee or by being embedded in the Special Part.
- (2) Within the Special Part, it may be determined that examinations regarding individually indicated courses must be completed in English language, insofar as the course has also been held in English.
- (3) If a student shows probable cause that due to a long-term or continuous handicap or a chronic disease, it is impossible for him/her to complete examinations entirely or in parts in the intended form, the chairman/woman of the examination committee shall allow for the completion of the examinations within an extended period, or for the completion of equivalent examinations in another form. The submission of a medical certificate may be required. The same shall apply to the study achievements.

Chapter 8 Oral examinations

- (1) Oral examinations are intended to give evidence that the students are able to recognize relations within the examination area and to classify special problems according to these relations. Besides, it shall be examined whether they have acquired a broad basic knowledge.
- (2) Oral examinations shall usually be taken before at least two examiners (collegial examination), or before one examiner in the presence of an observer (chapter 16), as a group examination or an individual examination.
- (3) The duration of oral examinations usually is 30 minutes for each examinee and each subject, at least, however, 25 minutes and at most 35 minutes.
- (4) The essential matters and results of the oral examination shall be recorded by official minutes. The result shall be announced to the examinees subsequent to the oral examinations, at the latest, however, on the same day.
- (5) Any students intending to take the same examination during a later examination period shall be admitted as listeners if the room is suitable, unless the examinee objects. Admission does however not refer to the consulting and the announcement of the examination results.

Chapter 9 Written examinations and other written tests

During the written examinations and other written tests, the students shall give evidence that they are able to solve problems and work on tasks in limited time and with limited tools, applying the usual methods of their subject. Besides, the written examination shall prove whether they have acquired the necessary basic knowledge. It is possible to offer a choice of topics.

Written examinations for study achievements and examinations shall take 90 minutes, unless anything is determined to the contrary in the Special Part. The duration of other written tests shall be determined in the Special Part.

Chapter 10 Evaluation of examinations

- (1) The marks of the individual examinations shall be determined by the respective examiners. Examinations shall be evaluated by the following marks:

1 = very good	= excellent performance;
2 = good	= performance substantially above average;
3 = satisfactory	= performance corresponding to average requirements;
4 = sufficient	= performance still meeting the requirements despite defects;
5 = insufficient	= performance not meeting the requirements due to material defects.

In order to evaluate examinations in a more differentiated way, individual marks can be increased or decreased by 0.3 to intermediate values; the marks 0.7 or 4.3 or 5.3 are excluded.

- (2) If an examination is evaluated by several examiners, the mark shall be calculated on the basis of the average of the determined marks. If a module examination consists of several examinations, the module mark shall be calculated on the basis of the average of the marks of the individual examinations. The marks of individual examinations may be attached a particular weight in the Special Part. The evaluation of the Master's thesis is regulated in chapter 21.
- (3) The module mark shall be as follows:
- | | |
|--|-----------------|
| at an average of up to 1.5 (included) | = very good; |
| at an average of 1.6 to 2.5 (included) | = good; |
| at an average of 2.6 to 3.5 (included) | = satisfactory; |
| at an average of 3.6 to 4.0 (included) | = sufficient; |
| at an average from 4.1 | = insufficient. |
- Chapter 12 sec. 1 phrase 2 shall remain unaffected.
- (4) The overall mark (chapter 23) shall be calculated according to section 2.
- (5) When the average mark is calculated, only the first decimal place shall be accounted for; all the other places shall be deleted without rounding.

Chapter 11 Omission, withdrawal, deception, ordinance violation

- (1) An examination shall be considered as evaluated by "insufficient" (5.0) if an examination date has been omitted without good reason in the case of a valid registration. The same shall hold if a written examination is not completed within the given working time.
- (2) The reason claimed for the withdrawal or the omission shall be indicated in writing and substantiated without delay. In the case of disease, a medical certificate shall be submitted and, in cases of doubt, a certificate of a physician indicated by Ulm University of Applied Sciences, containing the medical findings and listing the circumstances that are substantial for the justification of the inability to take an examination. The examination committee shall decide on the validity of the reason mentioned.
- (3) Diseases of children or of relatives in need of care that are to be cared for by the student, may be accepted as a good reason for not taking examinations in due time according to sec. 2 in equal measure, in the same way as the student's own diseases.
- (4) If a student tries to influence the result of his/her examination by deception or the use of tools not permitted, the examiner shall evaluate the respective examination by "insufficient" (5.0). If a student disturbs the proper course of the examination date, he/she may be excluded from the continuation of the examination by the respective examiner or supervisor; in such a case, the examination shall be evaluated by "insufficient" (5.0). In serious cases, the examination committee may exclude the examinee from the participation in any further examinations.
- (5) The person affected by the decision may request within a term of one month that the decision shall be reviewed by the examination committee pursuant to sec. 4 phrases 1-2. Any incriminating decisions are to be indicated immediately to such person, to be justified, and to be provided with information on rights of legal appeal.
- (6) The determination and sanctioning of a violation of honesty in the case of term papers, seminar papers, and final papers shall be regulated by the statutes of Ulm University of Applied Sciences with respect to honesty in the case of term papers, seminar papers, and final papers, as amended from time to time.

Chapter 12 Pass and fail

- (1) An examination shall be passed if the mark is at least "sufficient" (4.0). A module examination consisting of several partial examinations shall be passed if each of the partial examinations taken in the framework of the module is at least evaluated by the mark "sufficient".
- (2) The Master's examination shall be passed if all the module examinations of the Master's examination have been passed and the Master's thesis has at least been evaluated by "sufficient" (4.0).
- (3) If an examination assigned to the modules has not been passed, or if the Master's thesis has been evaluated worse than "sufficient" (4.0), the examinee shall be informed accordingly. He/she shall also be notified whether, to which extent, and within which period the examination or the Master's thesis may be repeated, if possible.

- (4) If the Master's examination has finally not been passed, a certificate shall be issued upon request and upon submission of the respective evidence and the de-enrollment certificate, containing the completed examinations and their marks, as well as the missing examinations, and indicating that the Master's examination has not been passed.

Chapter 13 Repetition of examinations

- (1) Failed examinations may be repeated twice at most. The repetition of a passed examination is not permissible. Any unsuccessful attempts at Ulm University of Applied Sciences or at any other university of applied sciences within the Federal Republic of Germany shall be recognized. If any and all of the repetition possibilities of an examination pertaining to a module examination have been made use of unsuccessfully, the module examination to which the examination is assigned shall be considered as finally failed. If it is an examination required pursuant to the examination regulations, the right to examination shall be lost and the admission to the study program shall expire.
- (2) In the Special Part, it may be determined for a study program that the second repetition may be bound to certain conditions for students of this Master program, which must be fulfilled before the registration for the repetition. In the case of non-fulfilment, the second repetition of the examination shall be evaluated by "failed".
- (3) The date for the repetition of failed examinations or for examinations for which withdrawal was permissible or omission was determined pursuant to chapter 5 sec. 1, 6-7, or chapter 11, shall be the next regular examination date for the respective subject, unless the affected person has been informed to the contrary.
- (4) A third repetition of any examination is not permissible.

Chapter 14 Recognition of periods of studies, study achievements, and examinations

- (1) Any study achievements and examinations, as well as final degrees of study programs at other state or state-approved universities of applied sciences and vocational academies in the Federal Republic of Germany, or of study programs of foreign state or state-approved universities of applied sciences, shall be recognized insofar as there is no substantial difference between the achieved competences and the performance or final degrees that are substituted. The recognition shall serve for the continuation of studies, the completion of examinations, the taking up of further studies, or the admission to do a doctorate (pursuant to § 36a sec. 1 LHG).
- (2) It is the applicant's duty to provide the required information regarding the performance to be recognized. In particular, information shall be provided regarding the institution certifying the performance to be recognized, and regarding the teachers and the learning results connected to the performance to be recognized. The burden of proof that an application does not fulfil the requirements for recognition shall be with the authority competent for the recognition procedure (pursuant to § 36a sec. 2 LHG).

- (3) Insofar as any agreements and accords of the Federal Republic of Germany with other states concerning the equivalency in the area of universities (equivalency agreements) favour students from foreign countries, sections (1) and (2) notwithstanding, the provisions of the equivalency agreement shall prevail (pursuant to § 35 (5) LHG).
- (4) Any knowledge and skills acquired outside the university system may only substitute at most 50 % of the university studies. At the time of recognition, the requirements in effect for the admission at a university must be fulfilled, and the knowledge and skills to be recognized for the university studies must be equivalent to the study achievements and examinations which they shall substitute, as regards contents and levels (§ 35 (3) LHG). Usually, only such knowledge and skills can be recognized that have been given evidence of by an examination before an education institution according to the LHG, or before an institution responsible for vocational training in the sense of the German Vocational Training Act. Unless the recognition has been regulated by a cooperation agreement between Ulm University of Applied Sciences and an extra-university education institution, a placement test shall be taken as a rule.
- (5) If any study achievements and examinations are recognized, the marks - as far as the mark systems are comparable - shall be transferred and integrated into the calculation of the overall mark. Concerning the transfer of the mark, the procedure according to the ECTS Users' Guide shall apply. If mark systems cannot be compared, the remark "pass" shall be transferred. It is permissible to indicate the recognition in the certificate.
- (6) Application for recognition shall be submitted to the competent examination committee. The examination committee shall decide on the recognition. At the time of decision, the applicant must be enrolled in a study program of Ulm University of Applied Sciences.
- (7) The acknowledgment and recognition of a Master's thesis is principally excluded.

Chapter 15 Examination committee

- (1) For the organization of the Master's examinations and of the tasks assigned by the study and examination regulations, an examination committee shall be appointed for each study program; a common examination committee may be appointed for related Master programs. There shall be five members, whose term of office shall be two years.
- (2) The chairman/woman, his/her deputy, the other members of the examination committee, and their deputies shall be appointed by the faculty to which the study program is assigned, from the circle of professors of this faculty and from the circle of professors of other faculties, who hold regular courses in the study program. Other professors, visiting lecturers, and teachers for special tasks may be included as consultants. As a rule, the chairman/woman shall manage the business of the examination committee.
- (3) For the Master program "Systems Engineering and Management" and for the Master program "Electrical Energy Systems and Electromobility", examination committees shall be appointed with one member from each of the following faculties: Electrical Engineering and Information Technology, Mathematics, Natural Sciences and Economics, Mechanical Engineering and Automotive Engineering, Production Technology and Production Management, and Mechatronics and Medical Engineering. Besides, the Chief Scientist of the Graduate School shall be a member of both of these examination committees by virtue of his/her office.

The examination committees shall appoint the chairmen/women from their members.

- (4) The examination committee shall make sure that the provisions of the study and examination regulations are observed. The committee shall regularly report to the faculty about the development of examination periods and periods of studies, including the de facto working time for the Master's thesis, and about the distribution of module and overall marks. The report shall be made public appropriately by Ulm University of Applied Sciences. The examination committee shall make suggestions as to the reform of the curriculum and of the study and examination regulations. The examination committee may transfer particular incumbent tasks to the chairman/woman.
- (5) The members of the examination committee shall be entitled to participate in the examinations.
- (6) The members of the examination committee and their deputies shall be subject to official confidentiality. As far as they are not employed in the framework of civil service, they shall be bound to confidentiality by the chairman/woman.
- (7) A central examination committee shall be appointed at Ulm University of Applied Sciences. The central examination committee shall consist of the Vice President competent for teaching matters as chairman/woman, and of the chairmen/chairwomen of the examination committees.
The central examination committee shall have the following tasks:
 - handling of basic questions concerning the structure of study programs and the organization of studies;
 - coordination of the uniform application of the study and examination regulations at Ulm University of Applied Sciences.

Chapter 16 Examiners and observers

- (1) As a rule, only professors shall be entitled to conduct examinations that do not take place during the studies in connection with the courses. Visiting lecturers and teachers for special tasks may be appointed as examiners. Persons with experience in professional practice and training may also be appointed as examiners if they have at least the qualification to be ascertained by the examination, or an equivalent qualification.
- (2) The examinee may suggest the examiner or a group of examiners for the Master's thesis and the oral examinations (chapter 21). The suggestion shall not represent any claim.
- (3) The names of the examiners shall be announced in due time.
- (4) Only such persons shall be appointed as observers who at least have the qualification to be ascertained by the examination, or an equivalent qualification.
- (5) Chapter 15 sec. 6 shall hold for examiners and observers, respectively.

Chapter 17 Responsibilities

- (1) The examination committee shall be responsible for:
 - decisions concerning the consequences of violations of the examination regulations (ch. 11),
 - the determination whether an examination has been passed or failed (ch. 12) and the evaluation of examinations (ch. 10),
 - the appointment of examiners and observers (ch. 16).
- (2) The announcement of failed examinations shall be made at the latest one week upon the decision of the examination committee, in the personalized domain of the student portal of Ulm University of Applied Sciences. Any information on decisions of the examination committee that cannot be given via the student portal shall be sent by mail in writing. Objection periods shall begin upon the date of the announcement.

II. Master's Examination

Chapter 18 Purpose and conduction of the Master's examination

The Master's examination represents the conclusion of the Master program. The Master's examination shall ascertain whether the examinee has an overview of the relations within the subject, whether he/she is able to apply scientific methods and knowledge, and whether he/she has acquired the necessary thorough expert knowledge for the transition to professional practice.

Chapter 19 Type and extent of the Master's examination

- (1) In the Special Part, it is determined for the Master's examination which module examinations in the obligatory and elective areas shall be completed.
- (2) The module examinations shall comprise the subject matters of the modules, in accordance with the courses assigned in the Special Part.

Chapter 20 Assignment and working period of the Master's thesis

- (1) The Master's thesis is an examination. It is intended to give evidence that the student is able to discuss a problem belonging to the subject autonomously and with scientific methods, within a given period. The topic of the Master's thesis shall be assigned at the latest three months upon the conclusion of all the module examinations.
- (2) The topics (problems) of the Master's thesis shall usually be assigned by professors of Ulm University of Applied Sciences; in this case, these professors shall also be the primary reviewers and supervisors of the Master's thesis. Besides, the students may propose their desired topics, especially concerning topics assigned by companies (external Master's theses). In such a case, the student shall propose a professor of Ulm University of Applied Sciences as primary reviewer and supervisor of the university. The topic proposal and the supervisor for external theses shall be approved by the chairman/woman of the examination committee.

- (3) The Master's thesis shall be assigned by the chairman/woman of the examination committee. The topic, the beginning of the working period, and the intended deadline are to be filed for the record. Upon request, the examination committee shall make sure the assignment of the Master's thesis in due time.
- (4) The Master's thesis may also be written in the form of a group project, if the contributions of the individual persons to be evaluated as examination are clearly distinguishable and rateable due to the indication of sections, page numbers, or other objective criteria enabling a clear distinction, and if it fulfils the requirements pursuant to sec. 1.
- (5) The working period for the Master's thesis is 6 months.
As far as such shall be necessary in order to guarantee equivalent examination conditions or for reasons for which the examinee is not responsible, the working period may be extended; the respective decision shall be taken by the examination committee on the grounds of a statement of the supervisor. The topic, the task, and the extent of the Master's thesis shall be limited by the supervisor in such a way that the deadline of the Master's thesis can be met.

Chapter 21 Submission and evaluation of the Master's thesis

- (1) The Master's thesis shall be submitted in two copies to the primary reviewer or to the secretary of the Graduate School; the date of submission shall be filed for the record. At the time of submission, the examinee shall certify in writing that he/she has written the thesis - in the case of a group project the respectively indicated part of the thesis - autonomously and has not used any other sources and tools than those indicated.
- (2) The Master's thesis shall be evaluated by at least two examiners (reviewers) who are professors or visiting lecturers of Ulm University of Applied Sciences or of a partner university. They shall be appointed by the examination committee. One of the examiners shall be from the circle of professors of the Master program in which the student has been enrolled. Besides, the primary reviewer shall be a professor of Ulm University of Applied Sciences, and one of the examiners shall be the supervisor of the Master's thesis. The evaluation process shall not take longer than four weeks.
- (3) The contents of the Master's thesis shall be presented and defended (colloquium) during a seminar. The evaluation of the presentation and of the defence shall be included in the evaluation of the Master's thesis.
- (4) The mark of the evaluation of the Master's thesis and of the respective seminar shall comprise the following weighting factors:

evaluation of the primary reviewer:	50 %
evaluation of the second reviewer:	30 %
evaluation of the colloquium:	20 %
- (5) The Master's thesis may be repeated once if it is evaluated by a mark worse than "sufficient" (4.0); a second repetition is excluded. The assignment of a new topic shall be applied for in writing before the chairman/woman of the examination committee within a period of two months upon announcement of the failure. If the deadline for such application has been omitted, the right to examination shall expire unless the examinee is not responsible for the omission.

Chapter 22 Additional modules

Students may take examinations in more than the prescribed modules (additional modules); however, there shall not be any respective claim. The result from examinations in these modules shall not be included in the calculation of the overall mark.

Chapter 23 Calculation of the overall mark and certificate

- (1) The overall mark shall be calculated according to ch. 10 sec. 2-4 on the basis of the marks of the examinations assigned to the modules, and of the mark of the Master's thesis. In the Special Part, a special weighting may be determined for individual module marks and the mark of the Master's thesis.
- (2) In the case of extraordinary results (overall mark at least 1.2), the overall evaluation shall be "with honours".
- (3) A certificate for the passed Master's examination shall be issued immediately, if possible within four weeks upon the evaluation of the last completed examination. The certificate shall include:
 - the modules and their results,
 - the topic of the Master's thesis and its mark,
 - the overall mark,
 - the study program and, if applicable, the major fields of studies,
 - the duration of studies until the conclusion of the Master's examination,
 - if applicable, the result of examinations in additional modules - upon request (ch. 22).The marks shall be indicated including the decimal value determined pursuant to ch. 10 sec. 5 in brackets.
- (5) The certificate shall bear the date of the last examination ascertained by the examination committee.

Chapter 24 Academic degree and Master Certificate

- (1) When the student has passed the Master's examination, Ulm University of Applied Sciences shall grant the following academic degrees:

in the Master program *Information Systems*
the degree "Master of Science" (abbreviation: "M.Sc.")

in the Master program *Electrical Energy Systems and Electromobility*
the degree "Master of Engineering" (abbreviation: "M.Eng.")

in the Master program *Medical Engineering*
the degree "Master of Engineering" (abbreviation: "M.Eng.")

in the Master program *Systems Engineering and Management*
the degree "Master of Engineering" (abbreviation: "M.Eng.").

- (2) Simultaneously with the examination certificate, the student shall receive the Master certificate bearing the date of the examination certificate. Therein, graduation shall be certified. The Master certificate shall be signed by the President and provided with the seal of Ulm University of Applied Sciences.

Chapter 25 Diploma supplement (Master program explanation)

- (1) Ulm University of Applied Sciences shall issue a diploma supplement corresponding to the "Diploma Supplement Model" of the European Union, the Council of Europe, and the UNESCO. The national education system shall be described by the text agreed upon by the KMK (Conference of the Federal Ministers of Education) and the HRK (Federal Conference of University Presidents), as amended from time to time.
- (2) The diploma supplement shall be signed by the competent dean; in the case of the Master program "Systems Engineering and Management", it shall be signed by the dean responsible for the respective major fields of studies.
- (3) In order to improve the transparency of the final mark, the diploma supplement shall indicate the information on the ECTS Grading Table pursuant to § 14 of the ECTS Users' Guide.

Chapter 26 Invalid Master's examination

- (1) If the examinee has deceived during an examination and if such fact becomes known only after the receipt of the certificate, the mark of the examination may be corrected pursuant to ch. 10. If applicable, the module examination may be declared as "insufficient" (5.0), and the Master's examination may be declared as failed. The same shall apply to the Master's thesis. If applicable, the statutes pursuant to ch. 11 (6) shall be applied.
- (2) If the requirements for the conduction of a module examination have not been fulfilled without the examinee's intention to deceive, and if such fact becomes known only after the receipt of the certificate, such defect shall be remedied by the examinee's passing of the module examination. If the examinee has deliberately and unjustly obtained admission to the module examination, the module examination may be declared as "insufficient" (5.0), and the Master's examination may be declared as failed.
- (3) Prior to any decision, the student shall be given the opportunity to make a statement.
- (4) The incorrect certificate shall be revoked, and a new certificate shall be issued, if applicable. Together with the incorrect examination certificate, the Master certificate shall also be revoked, if the Master's examination has been declared to have been failed on the grounds of deception. Any decision pursuant to sec. 1 and sec. 2 phrase 2 shall be excluded after a period of five years upon the date of the certificate.

Chapter 27 Insight into the examination files

Within one year upon conclusion of the examination process, the examinee shall be granted insight into his/her written examinations, the respective reviews, and the examination minutes, upon request in adequate form; § 29 of the State Administrative Procedure Act of Baden-Württemberg shall remain unaffected.

Part B: Special Part

Chapter 28 Courses, study achievements, examinations, regulation for elective modules

(1) The following abbreviations are used for the courses:

- V = lecture,
- Ü = tutorial,
- L = laboratory,
- S = seminar,
- P = project work.

(2) The semester hours per week are abbreviated by SWS.

(3) Study achievements are documented by:

- LN = general evidence of performance,
- BE = report,
- E = constructive design,
- HA = term paper,
- K = written examination of 90 min., unless determined differently,
- LA = laboratory work,
- PA = practical work,
- PK = minutes,
- PP = practical work / design and presentation,
- RE = oral presentation of 15 min., unless determined differently,
- ST = study paper (other written paper).

(4) Examinations are completed by:

- LN = general evidence of performance,
- E = constructive design,
- K = written examination of 90 min., unless determined differently,
- K,K = two written examinations = two examinations,
- LA = laboratory work,
- M = oral examination,
- ST = study paper (other written paper),
- PA = practical work,
- PP = practical work / design and presentation,
- RE = oral presentation of 15 min., unless determined differently,
- BE = report.

- (5) Elective modules are modules for which the student shall give evidence of examinations in appropriate courses (elective subjects), which he/she may select from a catalogue of currently offered courses determined by the competent faculty. The number of elective subjects shall result from the respective study effort of the student in credits, determined for the elective modules.
- (6) There are the following types of elective modules:
- | | |
|------------------------------------|---|
| interdisciplinary elective module: | interdisciplinary subjects of economic and social science; competent faculty: Mathematics, Natural Sciences and Economics, |
| specific elective module: | specific subjects of the respective study program; the competent faculty of the respective study program determines which subjects shall be appropriate, unless these are determined in the Special Part, chapter 29 and following. |
- (7) The current elective subjects shall be announced in due time before the beginning of lectures; the type of course, the study effort in credits, the teaching effort in semester hours per week, and the required study achievements and examinations shall be indicated.
- (8) The assignment of the credits to be substantiated for the elective modules to the curriculum semesters, as reflected in the tables of the study programs in the Special Part, shall be considered as a recommendation and shall not be binding. The student shall register for the courses and the examinations in the elective modules by prior registration, if applicable, and by attending. In due time before the issuance of the Master's examination certificate, the student shall give evidence that he/she has delivered sufficient performance in the prescribed elective modules.
- (9) Insofar as elective modules are required in order to pass the Master's examination, all the selected elective subjects and the achieved marks shall be indicated in the respective certificates. These marks shall be weighted according to the respective number of credits during the calculation of the overall mark.

Chapter 29 Master program Information Systems (IS)

- (1) Required for the enrollment is a professionally qualifying academic degree (overall mark at least 2.5) of a study program where at least 180 ECTS (European Credit Transfer System) have been achieved, and where the proportion of the acquired competence from the category of Computer Science is at least 33 %.
- (2) The courses may also be conducted in English language in all the modules; in this case, the examinations shall also be required in English.
- (3) The study effort corresponds to 90 credits. The attendance time of all the courses required for the successful conclusion of the Master program shall amount to 39 semester hours per week.

- (4) Students shall only be admitted to the required examinations if they have successfully completed the respective study achievements.
- (5) The weighting of a module mark during the calculation of the overall mark corresponds to the number of credits assigned to this module.
- (6) The curriculum semesters 1 and 2 are not consecutive and can be attended in reverse order. They shall only be offered once per year.
- (7) The courses to be attended for the successful conclusion of the Master program, the study achievements assigned to the courses, and the examinations assigned to the modules shall result from the following table. In the case of modules consisting of several courses, the names of the courses, the assigned semester hours per week, and the type of course shall additionally be indicated.

Master program Information Systems								
module group	module	type	SWS	credits in the curriculum semester			study achievement	examination
				1 SS	2 WS	3 SS/WS		
Software Design and Implementation	Model-driven Development of Complex Systems	V+L	4	9				M
	Software Quality Assurance	V+Ü	2					
Intelligent Information Systems	Intelligent and Cognitive Systems	V+Ü	4	9				M
	Autonomous Systems	V+L	2					
Selected Topics of Information Systems		S	4	6				ST + RE 30 min.
Project Information Systems	Project phase 1	P	2	6	6		RE 15 min.	LA+ST+RE 15 min.
	Project phase 2	P	2					
Information Security		V+L	4		6			K
Business management		S	4		5			K
Distributed and Interacting Systems		V+L	5		7			K
Subject-specific elective module 1		ch. 28			3			ch. 28
Subject-specific elective module 2		ch. 28			3			ch. 28
Master's Thesis		P+S	2			30		BE+RE+M
total			35	30	30	30		

Chapter 30 Master program Medical Devices - Research and Development (MMD)

- (1) Required for the enrollment is a more than average professionally qualifying academic degree of an engineering study program.
- (2) Students with an academic degree in engineering without any relations to medical engineering may be required to successfully complete examinations within modules of the Bachelor program "Medical Engineering", in order to catch up on missing knowledge regarding the basics of medical engineering. These requirements shall be determined individually.

- (3) The entire number of courses required for the successful conclusion of the Master program with respect to compulsory and elective modules amounts to 42 semester hours per week, resulting in the acquisition of 90 ECTS credits in three semesters.
- (4) Courses may also be held in English language in all the modules. The completion of study achievements and examinations may be required in English language.
- (5) Students shall only be admitted to the required examinations if they have successfully completed the respective study achievements.
- (6) The weighting of marks during the calculation of the overall marks for the Master's examination shall comply with the number of credits.
- (7) The modules required for the successful conclusion of the Master program, their assignment to module groups, and the respective study achievements and examinations shall result from the following table:

Master program Medical Devices – Research and Development								
module group	module	type	SWS	credits in the curriculum semester			study achievement	examination
				1 SS	2 WS	3 SS/WS		
Development of Medical Devices	Regulatory Affairs	V+Ü	4	6			PA, RE	K
	Software for Medical Devices	V+L	4		6		LA	BE, M
Scientific Work	Scientific Work	V+Ü	8	6				BE
					6			BE
Simulation and Modeling	Scientific Computing for Medical Devices	V+L	4	6			LA	K
	Multiphysics / Virtual Lab	V+L	4		6		LA	LN
Compulsory elective modules	Technical elective modules ¹⁾	ch. 28	8	5	5			ch. 28
Management	Management and Innovation	V+S	4	3			RE	
					3			BE
Project	Research project	LA	4	4			LA	BE, RE
					4			
Thesis	Master's Thesis	P	2			30		ch. 21 (3)-(4)
total			42	30	30	30		
<p>1) From the following courses, at least two courses shall be selected to the extent of at least 10 credits:</p> <ul style="list-style-type: none"> - Optical Systems in Medicine (5) - Ultrasound in Theragnostics (5) - Applied Biomechanics (5) - Biomechanics of Spine and Knee (5) - In-vitro Diagnostic Techniques (5) - Navigation for Medical Interventions (5) - Image Analysis and Machine Learning (5) 								

Note: The modules of the 2nd curriculum semester are based on the modules of the 1st curriculum semester within one module group.

Chapter 31 Master program Systems Engineering and Management (SY)

- (1) Required for the enrollment is a more than average professionally qualifying academic degree of a technical study program, corresponding to at least 180 credits.
- (2) The courses may be conducted in English language; in this case, the completion of study achievements and examinations shall also be required in English.
- (3) The Master program offers a selection of four different major fields of studies. The study effort according to the European Credit Transfer System (ECTS) for each of these is 90 credits. The entire number of courses required for the successful conclusion of the Master program amounts to
 - 42 semester hours per week in the major field "Electrical Engineering",
 - 43 semester hours per week in the major field "Mechanical Engineering",
 - 44 semester hours per week in the major field "Industrial Management",
 - 44 semester hours per week in the major field "Logistics".
- (4) Students shall only be admitted to the required examinations if they have successfully completed the respective study achievements.
- (5) The weighting of the marks of the individual modules for the calculation of the overall mark shall correspond to the number of credits.
- (6) The courses required for the successful conclusion of the Master program and the respective study achievements and examinations shall result from the following table:

Master program Systems Engineering and Management								
Major field Electrical Engineering								
discipline group	module	type	SWS	credits in the curriculum semester			study achievement	examination
				1 SS	2 WS	3 SS/WS		
Math.-sc. Principles	Numerical Optimization	V	4	6				K
	Physical Methods	V	4	6				K
Systems Engineering	Modeling of Technical Systems	V+L	4	6			LA	K
	Model-based Systems Development	V+L	4	6			LA	K
	Embedded Systems	V+L	4	6			LA	K
	Micro- and Nanoelectronic Systems	V+L	4		6		LA	M
	alt. module Systems Engineering ¹⁾²⁾	ch. 28 (7)	4		6		ch. 28 (7)	ch. 28(6,7)
Management	alternative module Management ²⁾³⁾	V	8		10		ch. 28 (7)	ch. 28(6,7)
Scientific Work	project ⁴⁾	P	4		8		ST	BE, RE
	Master's Thesis with seminar	P+S	2			30		BE, RE, M
total			42	30	30	30		
¹⁾ One of the following courses shall be selected to the extent of 6 credits: <ul style="list-style-type: none"> - Web Technologies and Data Management - Advanced Software Engineering 								
²⁾ In coordination with the management of the Master program, additional courses may be offered; besides, individual modules may be cancelled temporarily for organizational reasons.								
³⁾ Two of the following courses shall be selected to the extent of 5 credits each: <ul style="list-style-type: none"> - Company Management - International Business - Technology and Innovation Management - Business Model Innovation - Personnel Management and Controlling 								
⁴⁾ The mark of the project module shall be determined by the following weighting: <ul style="list-style-type: none"> report 6/8 presentation: 2/8 								

Master program Systems Engineering and Management Major field Mechanical Engineering								
discipline group	module	type	SWS	credits in the curriculum semester			study achievement	examination
				1 SS	2 WS	3 SS/WS		
Math.-sc. Principles	Numerical Optimization	V	4	6				K
Systems Engineering	New Materials	V+L	4		6			K
	Industrial Design Engineering and Design Methods	V+S	5+2	9			HA, RE	K
	alt. module Systems Engineering 1 ¹⁾²⁾	ch.28(7)	4	6			ch.28(7)	ch.28(6,7)
	alt. module Systems Engineering 2 ²⁾³⁾	ch.28(7)	4		6		ch.28(7)	ch.28(6,7)
Management	Digital Product Development	V+L	4	6				K
	Technology and Innovation Management	V	4		5			K
Scientific Work	alternative module Management ²⁾⁴⁾							
	project ⁵⁾	P	2	3	3		ST	BE, RE
	Master's thesis with seminar	P+S	2			30		BE, RE, M
total			43	30	30	30		
<p>¹⁾ One of the following courses shall be selected to the extent of 6 credits:</p> <ul style="list-style-type: none"> - Finite Element Method, SS - Fatigue, WS - Physical Methods, SS 								
<p>²⁾ In coordination with the management of the Master program, additional courses may be offered; besides, individual modules may be cancelled temporarily for organizational reasons.</p>								
<p>³⁾ One of the following courses shall be selected to the extent of 6 credits:</p> <ul style="list-style-type: none"> - Artificial intelligence and Soft Computing for Engineers - Sensor and Actuator Technology 								
<p>⁴⁾ Two of the following courses shall be selected to the extent of 5 credits each:</p> <ul style="list-style-type: none"> - Business Management - International Business - Business Model Innovation - Personnel Management and Controlling 								
<p>⁵⁾ The mark of the project module shall be determined by the following weighting:</p> <p>report 4/6 presentation: 2/6</p>								

Master program Systems Engineering and Management Major field Industrial Management								
discipline group	module	type	SWS	credits in the curriculum semester			study achievement	examination
				1 SS	2 WS	3 SS/WS		
Math.-sc. Principles	Stochastic Models and Methods of Operations Research	V	4	6				K
Systems Engineering	Processes of Systems Engineering	V	4		5		HA	K
	Flexible Automation	V+L	4		6		LA	K
	Digital Plant Simulation	V+L	4		6		LA	M
	alt. module Systems Engineering ¹⁾²⁾	ch. 28 (7)	4	6			ch. 28 (7)	ch. 28(6,7)
Management	Planning of New Technologies	V	4		5			K
	Lean Process Management	V	4	5				K
	International Business	S	4	5				RE
	Technology and Innovation Management	V	4		5			K
	alternative module Management ²⁾³⁾	ch.28(7)	4	5			ch. 28 (7)	ch. 28(6,7)
Scientific Work	project ⁴⁾	P+S		3	3			BE, RE
	Master's Thesis with seminar	P+S	2			30		BE, RE, M
total			42	30	30	30		
¹⁾ One of the following courses shall be selected to the extent of 6 credits: <ul style="list-style-type: none"> - Energy Usage and Energy Efficiency in Production and Logistics, WS - Planning of Automated Logistics Plants - Artificial Intelligence and Soft Computing for Engineers, WS - Numerical Optimization 								
²⁾ In coordination with the management of the Master program, additional courses may be offered; besides, individual modules may be cancelled temporarily for organizational reasons.								
³⁾ Two of the following courses shall be selected to the extent of 5 credits each: <ul style="list-style-type: none"> - Quantitative Planning Methods - Business Management - Business Model Innovation 								
⁴⁾ The mark of the project module shall be determined by the following weighting: <ul style="list-style-type: none"> report 4/6 presentation: 2/6 								

Master program Systems Engineering and Management								
Major field Logistics								
discipline group	module	type	SWS	credits in the curriculum semester			study achievement	examination
				1 SS	2 WS	3 SS/WS		
Math.-sc. Principles	Stochastic Models and Methods of Operations Research	V	4	6				K
Systems Engineering	Processes of Systems Engineering	V	4		5		HA	K
	Flexible Automation	V+L	4		6		LA	K
	Energy Usage and Energy Efficiency in Products and Logistics	V	4		6			K
	alt. module Systems Engineering 2 ^{1) 2)}	ch.28(7)	4	6			ch.28(7)	ch.28(6,7)
	Digital Product Development	V+L	4	6				K
Management	Quantitative Planning Methods	V+L	4	5			LA	K
	Digital Plant Planning	V+L	4	5			LA	M
	Supply Network Performance Management ³⁾	V	4		5			RE, K
	Contract Logistics and Logistics Law alternative moduleManagement ^{2) 4)}	V	4		5		RE	K
	ch.28(7)	4	5			ch.28(7)	ch.28(6,7)	
Scientific Work	project ⁵⁾	P+S		3	3			BE, RE
	Master's Thesis with seminar	P+S	2			30		BE, RE, M
total			42	30	30	30		
<p>¹⁾ One of the following courses shall be selected to the extent of 6 credits:</p> <ul style="list-style-type: none"> - Digital Plant Planning, WS - Planning of Automized Logistics Plants - Artificial Intelligence and Soft Computing for Engineers, WS - Numerical Optimization 								
<p>²⁾ In coordination with the management of the Master program, additional courses may be offered; besides, individual modules may be cancelled temporarily for organizational reasons.</p>								
<p>³⁾ The course shall be held in English language.</p>								
<p>⁴⁾ One of the following courses shall be selected to the extent of 5 credits:</p> <ul style="list-style-type: none"> - Lean Process Management - Business Management - Business Model Innovation - International Business 								
<p>⁵⁾ The mark of the project module shall be determined by the following weighting:</p> <p>report 4/6 presentation: 2/6</p>								

Chapter 32 Electrical Energy Systems and Electromobility (EE)

- (1) Required for the enrollment is a more than average professionally qualifying academic degree of a technical study program, corresponding to at least 180 ECTS credits.
- (2) The courses may be conducted in English language; in this case, the completion of study achievements and examinations shall also be required in English.
- (3) The study effort according to the European Credit Transfer System (ECTS) amounts to 90 credits. The entire number of courses required for the successful conclusion of the Master program amounts to 43 semester hours per week.

- (4) Students shall only be admitted to the required examinations if they have successfully completed the respective study achievements.
- (5) The weighting of the marks of the individual modules for the calculation of the overall mark shall correspond to the number of credits.
- (6) The courses required for the successful conclusion of the Master program and the respective study achievements and examinations shall result from the following table:

Master program Electrical Energy Systems and Electromobility								
discipline group	module	type	SWS	credits in the curriculum semester			study achievement	examination
				1 SS	2 WS	3 SS/WS		
Subject-specific Principles	Power Electronics	V+L	4	6			LA	K
	alternative module Principles ¹⁾	ch.28(7)	4	5				ch.28(6,7)
Technology (of Energy Conversion and Storage)	Photovoltaics	V+L	4		6		LA	M
	Electrochemical Power Sources 1	V	3	4			HA	K
	Electrochemical Power Sources 2	V+L	6		9		LA	K
	alt. module 1 ²⁾	ch.28(7)	4	5			ch.28(7)	ch.28(6,7)
Applications	Electrical Energy Networks	V+L	4	6			LA	K
	Electromobility	V+L	4		6		LA	M
	alternative module 2 ²⁾	ch.28(7)	4		5		ch.28(7)	ch.28(6,7)
Scientific Work	project ³⁾	P	4	4	4		ST	BE, RE, M
	Master's Thesis with seminar	P+S	2			30		BE, RE, M
total			43	30	30	30		
<p>¹⁾The selection shall depend on the prior knowledge and shall be approved a priori by the examination committee. At least one of the following courses shall be selected to the extent of 5 credits:</p> <ul style="list-style-type: none"> - Applied Thermodynamics - Systems Theory 								
<p>²⁾ From the following courses, one course to the extent of at least 5 credits shall be selected:</p> <ul style="list-style-type: none"> - Web Technology and Data Management (6), SS - Energy Management (6), SS or WS - Seminar on current technologies in the area of renewable energies (5), SS - EMC of Systems (5), WS - Sensor Technology and Energy Harvesting (6), SS - Physical Methods (6), SS 								
<p>³⁾ The project module includes a lecture component of 2 SWS Project Management (examination of the subject matter by oral examination). The overall mark of the project module shall be determined by the following weightings of the examinations:</p> <p>report: 5/8 presentation: 2/8 oral examination: 1/8</p>								

Part C: Final and Temporary Provisions

Chapter 33 Final and Temporary Provisions

- (1) This 1st amendment of the study and examination regulations for Master programs of Ulm University of Applied Sciences shall become effective on 1 March 2017.
- (2) The provisions of chapters 29 - 32 of this amendment shall usually be valid for all students of the respective Master programs; the respective provisions of the study and examination regulations for Master programs, in effect from 1 March 2012, shall hereby be annulled. Exempt there from shall be students who have been enrolled on the grounds of an earlier version of the study and examination regulations at the time of the coming into effect of these study and examination regulations, which was not in use any longer for beginners in the respective study program.

Ulm, 27 July 2018 *signed*

Prof. Dr. Volker Reuter (President)

Announcement:

Public announcement by the university as from 10 August 2018

Ulm, 27 July 2018 *signed*

Iris Teicher (Chancellor)

It is hereby certified that the foregoing is a full, true, and correct translation of the German original document, which was submitted in electronic form.

Trier, 24 October 2019

Dipl.-Übers. Petra Schulz, Sworn Translator for the English language

