

Curriculum for the University Programme

Traffic Accident Research

of Graz University of Technology

The curriculum of the university programme “Traffic Accident Research” was decided by the Curricular Committee for Doctoral Programmes and University Certificate Programmes and approved by the Senate of Graz University of Technology during its meeting on June 24, 2024, in accordance with § 56 Universities Act 2002, Federal Law Gazette I No. 120/2002 as amended.

The legal basis for this university programme is the Universities Act (UG 2002) as well as the Legal Regulations for Academic Affairs of the Statutes of Graz University of Technology in the currently applicable version, as amended.

Please note: the English version of this document is a courtesy translation. Only the German version is legally binding.

Change history

Version	In effect as of	Brief description of the change
01	01/08/2024	First submission

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Traffic Accident Research

Curriculum 2024

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I General Provisions

§ 1 Object of the university programme and qualification profile

The university programme Traffic Accident Research is offered as a part-time continuing education programme that lasts four semesters. The total scope of the university programme is 120 ECTS credit points. Graduates of this programme are awarded the university degree of “Master of Science (Continuing Education)”, abbreviated as “MSc (CE)”.

(1) Subject of the university programme

Between 2010 and 2020, the number of road deaths in Europe fell by 36 percent. The European Road Safety Charter aims to achieve zero road deaths and serious injuries by 2050. However, as the figures for road deaths in the EU over the last few years show, the number of road deaths has been rising again since 2021. Not at least this fact shows that a comprehensive and interdisciplinary understanding of the factors that lead to a road accident is essential for a further reduction. The occurrence of a road accident often also requires it to be analysed in order to clarify the question of fault. For the accident analyst, this results in a further, responsible field of activity. In order to fulfil this responsibility, well-founded and comprehensive training is essential.

The overarching aim of the Traffic Accident Research university programme is to offer well-founded additional training in the field of vehicle technology. In addition to accident documentation and accident mechanics, the university programme includes the areas of vehicle safety, road technology and biomechanics as well as courses on legal, traffic policy and psychological principles. Graduates are thus optimally prepared for the increasingly demanding requirements of a global labour market.

(2) Qualification profile and competences

Upon graduation, students of this university programme will have obtained subject-specific knowledge in a wide variety of related disciplines of vehicle safety, in particular: accident documentation, accident mechanics, vehicle engineering, traffic engineering, biomechanics, legal principles, traffic policy principles and psychological principles.

Graduates of the programme are able to

- mathematically describe the mechanical processes involved in traffic accidents. Furthermore, they can describe the movement of vehicles in traffic accidents in kinematic and kinetic terms and explain the basic principles of collision mechanics.
- are able to analyse traffic accidents professionally and are familiar with all modern reconstruction methods. They can analyse and investigate an accident according to the state-of-the-art, from professional accident documentation and reconstruction to the preparation of an expert report and its representation.
- have knowledge of the principles of operation of modern safety systems as well as detailed knowledge of the biomechanics of the persons involved in accidents and of the mode of operation of safety equipment and can explain the effects of mechanical impacts on the human body. They can derive measures to prevent or mitigate injuries. They know

the different load limits for different people as well as the different injury parameters and injury mechanisms.

- are familiar with the functionality and possible errors of modern safety systems and algorithms as well as their effects on vehicle safety. This concerns both active vehicle safety systems through electronic driver assistance and the effects of autonomous driving. take on technical management of projects, analyse and evaluate team performance and issues that may affect project success and, if necessary, implement a remedial strategy.
- can provide an overview of the data available and stored in a vehicle or in other tools used by the occupants such as mobile phones, GPS watches, etc. in the event of an accident and explain methods of reading and analysing this data. They can assess the reliability of this data and its limits.
- can correctly explain and apply models and methods of human factors analysis. They can develop suitable and verifiable prevention proposals and correctly explain and apply models of human performance.

(3) Need and relevance of the university programme for science and the labour market

The university programme Traffic Accident Research is a well-founded and internationally recognised additional programme that qualifies students as experts in the fields of accident reconstruction, accident investigation, accident research and vehicle safety and also prepares them for the challenges of the global labour market.

The university programme gives graduates improved access to a wide range of areas of work, in particular to:

- Accident reconstruction (e.g. as an expert or for courts and insurance companies)
- Accident research
- Vehicle engineering
- Vehicle safety
- Road planning
- Legislation

§ 2 University programme organiser

(1) The organiser of this university programme is Graz University of Technology.

(2) Within the university, the programme is managed by TU Graz *Life Long Learning*.

§ 3 Duration and scope of the university programme

(1) Commensurate with the European Credit Transfer and Accumulation System, the various study achievements and courses are assigned ECTS credit points that reflect the students' workload. One ECTS credit point corresponds to 25 full hours of workload, including both the share of self-study and the semester course hours.

- (2) The university programme lasts four semesters with a total scope of 120 ECTS credit points. The structure of the programme is explained in detail in § 9.

§ 4 Course language

- (1) The courses are held in German or English as well as in a mixed form (e.g. German lecture with English technical literature).
- (2) The academic direction of the university programme is responsible for determining whether the participants have the necessary knowledge of the language of instruction (see § 7 (4)).

§ 5 Teaching and learning concept

The university programme Traffic Accident Research is offered as a part-time continuing education programme: by offering block-based courses and additional distance teaching units, it is possible to cater specifically to the needs of working students. In addition, a virtual teaching and learning environment provides opportunities for networking with lecturers and other students as well as teamwork outside of in-person units.

II Admission

§ 6 Admission requirements

- (1) The requirement for admission to the university programme Traffic Accident Research is proof of the following qualifications:
 - Completed degree in a technical or scientific discipline amounting to at least 180 ECTS credit points from a domestic or foreign post-secondary educational institution and at least two years of relevant professional experience.
 - Completed degree in an economic or legal discipline amounting to at least 180 ECTS credit points from a domestic or foreign post-secondary educational institution, at least two years of relevant professional experience and completion of the pre-module in mathematics.
- (2) The aim of the pre-module in mathematics is to ensure that students who do not have a technical degree as an entry requirement have sufficient knowledge of the fundamentals of mathematics. The pre-module is worth 1.5 ECTS credits. Further information on the Mathematics pre-module can be found at: www.TrafficAccidentResearch.tugraz.at
- (3) In addition to the previously mentioned qualifications, proof of sufficient English language skills is a prerequisite for admission to the programme. The type of proof required is specified in § 7 (4).

§ 7 Application and admission procedure

- (1) The maximum number of places available for the programme is set at 20 by the academic direction of the university programme based on didactic and organisational considerations. If the number of applicants meeting the admission requirements is greater than the number of available places, places will be assigned in chronological order upon receipt of the stipulated programme fee in accordance with § 16.
- (2) Applications for a place in the programme must be made in writing to the academic direction of the programme and must include a fully completed and signed application form, proof of identity and proof of fulfilment of the required admission requirements (degree certificate for a degree programme, employment testimonials). An application for a place in the programme does not in itself constitute any right to actual participation. The academic direction of the programme and the Vice Rector for Academic Affairs are entitled to reject applicants.
- (3) The procedure for awarding a place consists of preliminary screening of application documents by the *Life Long Learning* organisational unit, review by the academic direction of the programme and, where necessary, an application interview. An entrance examination may be scheduled.

- (4) Applicants have adequate knowledge of the language (cf. § 6 (3)), either thanks to internationally recognised language certificates or school-leaving certificates (e.g., matriculation certificate, completion of a study programme in the pertinent language of instruction) or in the course of verification by the academic direction of the programme. No proof must be furnished if the language of instruction is the applicant's first language.
- (5) The decision regarding fulfilment of the admission requirements is taken for applicants pursuant to § 6 (1) on the basis of a two-person rule involving the academic director of the programme and the Vice Rector for Academic Affairs.
- (6) Places are awarded in writing by the academic direction of the programme upon receipt of the stipulated programme fee. Admission to the programme as a postgraduate master's student (see § 51 (2) 22 Universities Act) is performed by the Rectorate and administered by the *Registrar's Office*.

III Programme Contents and Examination Regulations

§ 8 Types of courses

The types of course offered at Graz University of Technology are governed by § 4 of the Excerpt of Statutes: Legal Regulations for Academic Affairs of Graz University of Technology, as amended.

§ 9 Modules, courses und semester allocation

- (1) The modules of the programme as well as their associated courses are listed below. All courses have to be completed. The allocation of courses to semesters constitutes the standardised curriculum:

Module name / Course	Course type	ECTS	Sem.
Mechanics		14	
Mechanics 1	VU	4	1
Mechanics 2	VU	4	2
Mechanics 3	VU	3	3
Mechanics 4	VU	3	4
Vehicle Safety		10	
EuroNCAP	VO	2	2
Vehicle Safety 1	VO	3	2
Vehicle Safety 2	VO	3	3
Primary and Secondary Safety of Trucks	VO	2	3
Biomechanics		12	
Forensic Medicine	VO	2	1
Biomechanics	VO	3	2
Pedestrian/Child Safety	VO	2	3
The Mechanics of Car Accidents	VU	5	3
Automotive Engineering		11	
Automotive Engineering	VO	3	1
E-Mobility	VO	3	1
Passive Safety and Regulations in Vehicle Development	VU	2	2
Vehicle Electronics	VO	3	2
Traffic Engineering		11	
Traffic Psychology	VO	2	1
Traffic Safety Concepts for the Infrastructure	VO	3	1
Introduction to Transport Policy Basics	VO	2	1
Basics of Criminal Law and Civil Law	VO	2	1
Perception and Visualisation	VU	2	2
Accident Analysis		23	
Measurement Technology and Electronics in Vehicles	VU	4	1
Laboratory Course Vehicle Safety	LU	4	2
Motorcycle Accident	VU	4	3
Reconstruction Methods 1	VU	4	3
Reconstruction Methods 2	VU	2	4
Testing Methods in Traffic Accident Analysis	VO	2	4
Accident Investigation	VU	3	4
Insurance and Damage Analysis		8	
Insurance Fraud	VO	2	1
Methodologies in Expert Opinions	VO	2	2
Diagnostics and Repair	VO	4	2
Master's thesis		30	3+4
Master's examination		1	4

(2) The content and learning outcomes of the modules are described in more detail in Appendix I Module Descriptions.

§ 10 Examination regulations

- (1) A course certificate is issued in accordance with § 74 (1) Universities Act (UG 2002) for completion of each course within a module. The lecturer must determine whether a student has successfully completed a course. The lecturer must announce the examination mode before the course begins. In addition, an overall assessment is given for each module.
- (2) Examinations for courses held in the form of lectures (VO) must cover the entire contents of the course. Examinations may be oral only, written only, a combination of written and oral, or computer-assisted.
- (3) Courses held in the form of lectures with integrated practical (VU) and laboratory practical (LU) shall be assessed continuously on the basis of contributions made by students and/or by means of periodical achievement reviews. In any case, the assessment must consist of at least two examinations.
- (4) The positive result of course examinations is to be assessed as “excellent” (1), “good” (2), “satisfactory” (3) or “sufficient” (4) and the negative result as “unsatisfactory” (5).
- (5) Students may resit examinations in accordance with § 28 of the Excerpt of Statutes: Legal Regulations for Academic Affairs of Graz University of Technology, as amended.
- (6) Module grades are to be determined by
 - a. multiplying the grade of each examination result in connection with the module with the ECTS credit points of the corresponding course,
 - b. adding the values calculated according to lit. a.,
 - c. dividing the result of the addition by the sum of the ECTS credit points of the courses, and
 - d. rounding the result of the division to a whole-numbered grade if required. The grade is rounded up if the decimal place exceeds 0.5. Otherwise, the grade is rounded down.
 - e. A positive module grade may only be awarded if each individual course has been assessed as positive.
- (7) In addition to the assessments of the individual courses, an overall assessment is given. It is “passed” if each module, the master’s thesis and the master’s examination have been assessed positively, otherwise it is “failed”. The overall assessment is “passed with distinction” if none of the abovementioned study achievements (modules, master’s thesis, master’s examination) were awarded a grade lower than “good” and at least half of the study achievements were awarded the grade “excellent”.

§ 11 Recognition of courses and achievements

According to § 78 Universities Act (UG 2002), the recognition of examinations can be carried out by the academic direction of the programme at the request of the student. Depending on the decision by the academic direction of the programme, this may be accompanied by an additional check of the applicant's level of knowledge. Any recognition of study credits shall not decrease the programme fee to be paid.

§ 12 Master's thesis

- (1) Purpose of the master's thesis is to demonstrate the student's ability to work on scientific topics on their own, both with regard to content and methodology. The task of the master's thesis must be chosen so that it is possible and reasonable for the student to complete the work within six months.
- (2) The content of the master's thesis is based on current studies, analyses and developments in the specialist field of the programme and may be carried out can be realised in cooperation with a company.
- (3) The master's thesis must be registered in writing with the academic direction of the programme before the start of processing. The subject, the field to which the subject is assigned, and the supervisor must be stated.
- (4) After completing the master's thesis, it must be submitted for assessment in electronic form as a PDF.

§ 13 Final examination before a committee

- (1) Prerequisites for registering for the final examination are proof of the positive assessment of all modules (see § 9) and proof of the positively assessed master's thesis (see § 12).
- (2) The master's examination is an oral examination before a committee and consists of
 - the presentation of the master's thesis,
 - the defence of the master's thesis, and
 - an examination on the subject area of the master's thesis and associated subject areas.
- (3) The total duration of the master's examination is usually 60 minutes and must not exceed 75 minutes.
- (4) The examination committee for the master's examination includes the supervisor of the master's thesis and two other members appointed by the academic direction of the programme in accordance with § 23 (8) to (10) of the Excerpt of Statutes: Legal Regulations for Academic Affairs.

- (5) The grade of the master's examination is determined by the examination committee in accordance with § 24 (4) of the Excerpt of Statutes: Legal Regulations for Academic Affairs of Graz University of Technology, as amended.

§ 14 Completion of studies and graduation certificate

- (1) Upon positive assessment of all modules, the master's thesis and the master's examination, the master's programme is completed.
- (2) A graduation certificate is issued for successful completion of the programme. The degree certificate contains
1. a list of all the modules as set out in § 9 (along with their ECTS credit points) and their assessment results,
 2. the title and assessment of the master's thesis,
 3. the assessment of the master's examination, and
 4. the overall grade in accordance with § 11 of the Excerpt of Statutes: Legal Regulations for Academic Affairs of TU Graz.
- (3) In accordance with § 87 (2) Universities Act (UG 2002), graduates of this programme are awarded the academic degree "Master of Science (Continuing Education)", abbreviated as "MSc (CE)", by written administrative decision.

IV Organisation

§ 15 Academic course management

- (1) The Vice Rector for Academic Affairs must appoint a member of the Vehicle Safety Institute of Graz University of Technology with a teaching qualification in a pertinent subject as academic director of the programme.
- (2) The Vice Rector for Academic Affairs appoints further staff members to executive academic and administrative functions at the suggestion of the academic director of the programme and based on organisational requirements.

§ 16 Tuition fee and maximum duration of study

- (1) In order to conduct the programme cost-effectively, the Rectorate will determine a programme fee, adjusting it as required to budgetary needs, at the suggestion of the academic direction of the programme in coordination with the *Life Long Learning* organisational unit.

- (2) The maximum study duration is eight semesters (corresponds to the regular study duration plus four semesters). Admission to the programme expires after the end of the maximum study duration.
- (3) If the regular study duration is exceeded, an additional programme fee may be levied for each further semester required in order to cover the costs of continued supervision and tuition of the student. The fee is specified in the current terms and conditions of payment and cancellation.

§ 17 Quality assurance

- (1) Courses are evaluated in accordance with the directives of Graz University of Technology. The results of the course evaluations must be taken into account on an ongoing basis when teachers are assigned to courses.
- (2) Additionally, an intermediate and final evaluation must be performed of the entire programme by means of a standardised questionnaire. The academic direction of the programme decides whether any corrective action is required based on the findings.
- (3) The results of the evaluations must be documented in the form of a report and sent to the *Life Long Learning* organisational unit. Moreover, a financial report must be compiled on the performance of the programme.
- (4) An academic advisory board can be established for evaluating individual courses and the further development of the programme as a whole.

V Final Provisions

§ 18 Legal validity

This curriculum comes into effect four weeks after publication in the “Mitteilungsblatt” of Graz University of Technology.

Version of the curriculum:

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2024	01	03/07/2024, 19th issue