

SELF-EVALUATION

OF THE FACULTY OF TRANSPORT AND TRAFFIC SCIENCES





SELF-EVALUATION OF THE FACULTY OF TRANSPORT AND TRAFFIC SCIENCES

University of Zagreb
FACULTY OF TRANSPORT AND TRAFFIC SCIENCES
Zagreb, Vukelićeva 4

Klasa: 041-01/18-01/01
Ur. broj: 251-76-01-18-1

Zagreb, 31 August 2018

Name of the higher education institution evaluated: Faculty of Transport and Traffic Sciences

Name of the university of which the higher education institution forms a part: University of Zagreb

Year of founding: 1984

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Bank name and account number of the higher education institution: Zagrebačka banka,
IBAN: HR6823600001101425998

Sveučilište u Zagrebu
Fakultet prometnih znanosti
Zagreb Vukelićeva 4

Klasa: 035-01/18-01/78

Urbroj: 251-76-01-18-1

Zagreb, 25. rujna 2018.

Na temelju članka 27. i 40. Statuta Fakulteta prometnih znanosti, Fakultetsko vijeće na 55. sjednici održanoj 25. rujna 2018. donijelo je

ODLUKU

Usvaja se Samoanaliza Fakulteta prometnih znanosti.


Prof. dr. sc. Hrvoje Gold

FOREWORD

The Self-Evaluation of the Faculty of Transport and Traffic Sciences was carried out within the framework of the Higher Education Re-accreditation Plan of 2018, which was adopted at the 86th meeting of the Accreditation Advisory Group of the Agency for Science and Higher Education on 20 June 2017 (KLASA: 602-04/17-04/0059, URBROJ: 355-02-04-17-0001, 03 July 2017).

The following documents were used to prepare the Faculty Self-Evaluation:

- [Standards for the evaluation of quality of university and university constituents during re-accreditation of higher education institutions](#)
- [The process of re-accreditation of higher education institutions](#)
- [MOZVAG tables - appendix to the Self-Evaluation](#)

Analysis from the MOZVAG information system is an Appendix to this Self-Evaluation. The MOZVAG analysis and Self-Evaluation were prepared on the basis of data through academic year 2017/2018, or calendar year 2017.

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INTRODUCTION

HISTORY, ORGANISATION, MISSION AND VISION OF THE FACULTY OF TRANSPORT AND TRAFFIC SCIENCES

History of the Faculty

The Faculty of Transport and Traffic Sciences was founded within the University of Zagreb through a decision of the District Economic Court in Zagreb on 10 October 1984, which recognised the Faculty as an independent organisation for research, science and teaching of special interest for society.

The beginning and transport and traffic studies in Croatia is linked to the enrolment of the first generation of full-time students of the College of Post, Telegraphs and Telephones in Zagreb in October 1962. The College carried out its activities in a newly constructed building at Vukelićeva 4 in Zagreb, which today serves as the Faculty's headquarters. In 1968, Inter-Faculty Traffic Studies were founded at the University of Zagreb, involving seven faculties.

Between 1986 and 2005, the Faculty offered professional studies (level VI) and university studies (level VII) in the fields of road, rail, and river transport and traffic, as well as in the area of post, telegraphs and telephones. In 1992, an aeronautics study programme for the training of civil pilots and flight controllers (level VI) as well as training of military pilots (level VII) began with its first generation of students.

In 1997, the Faculty of Transport and Traffic Sciences launched a post-diploma studies programme and enrolled its first generation of students into scientific master's and professional master's studies. In 1999, the post-diploma doctoral programme was launched and the first generation of doctoral students was enrolled.

Since 2005, the Faculty has carried out its teaching according to the Bologna Process, in the following three study programmes at the pre-diploma undergraduate level (lasting three years) and diploma undergraduate level (lasting two years): Traffic, Intelligent Transport Systems and Logistics, and Aeronautics. In the same year, the Faculty initiated post-diploma doctoral studies in accordance with the Bologna Process.

A systematic solution has not yet been found to the problem of ensuring adequate space for Faculty work and development. In autumn 2007 and during 2008, part of the Faculty moved to specially adapted buildings on the former military scientific-teaching campus Borongaj. As a result, the Faculty carries out its activities at four locations: Vukelićeva 4, Kušlanova 2, the scientific-teaching campus Borongaj and Lučko airport. This airport also serves as the home of the Croatian Aviation Training Centre, an organisational unit of the Faculty that provides flight training to aeronautics students aiming to become civil pilots. On the Borongaj campus, the Faculty was originally housed in Buildings 70 and 71. In 2014, the Faculty renewed, remodeled and outfitted the abandoned Building 69, where an amphitheatre, classrooms and teacher offices were constructed. Part of Building 210 was also remodeled to house two laboratories

and classrooms. In 2018, three more sections of Building 210 were handed over to the Faculty for its use, and remodeling work has begun.

The fact that teaching and other activities of the Faculty take place at multiple locations creates substantial organisational problems for students and teachers. Therefore, it is envisaged that the entire Faculty will move to the scientific-teaching campus Borongaj, except for civil pilot aviation training, which will remain at Lučko airport. To achieve this goal, the Faculty has completed construction and legal planning for a new building on the university section of the Borongaj campus. To permit the expansion of teaching, scientific and research activities at the Faculty until the new building can be constructed, a feasibility study was carried out to assess the possibility of adapting attic space in Buildings 70 and 71 on the Borongaj campus, for which initial funding has been granted by the Ministry of Science and Education. To advance teaching at Lučko airport, a feasibility study was carried out about the possibility of creating a Lučko Centre for Aviation Training.

In academic year 2011, the process of re-accreditation of the Faculty of Transport and Traffic Sciences was carried out in accordance with the Plan for Re-accreditation of Higher Education Institutions in Croatia in Academic Year 2011/2012, which was adopted at the 16th meeting of the Accreditation Advisory Board of the Agency for Science and Higher Education on 6 July 2017 (Klasa: 003-08/11-02/0005, Ur.broj: 355-02-04-11-3). On 14 July 2015, the Ministry of Science, Education and Sport issued a Confirmation (Klasa: UP/I -602-04/12-13/00071, Ur.broj: 533-20-15-0006) that the Faculty satisfies the requirements for carrying out its higher education and science activities in accordance with the Law on Quality Assurance in Science and Higher Education. This Confirmation was issued on the basis of Article 159 of the Law on General Administrative Procedures (NN [Public Gazette] 47/09) and Clause 4 in Article 22 of the Law on Quality Assurance in Science and Higher Education (NN 45/09), as well as on the recommendation of the Agency for Science and Higher Education of 19 June 2015 (Klasa: 602-04/12-04/0026, Urbroj: 355-02-04-15-0009) following a positive opinion of the Agency's Accreditation Advisory Board.

Organisation of the Faculty of Transport and Traffic Sciences

Organisation of the Faculty of Transport and Traffic Sciences is based on the Faculty Statute, which was last modified in 2017, and on the Regulations on Faculty Organisation and Staff Positions from 2007. These documents have been revised according to goals outlined in the Faculty Development Strategy for 2018-2023. The Faculty has created organisational units to structure, align and perform its teaching and scientific work. These units include scientific-teaching units (divisions, departments, chairs, laboratories), the Croatian Aviation Training Centre (HZNS), the Croatian Air Traffic Control Training Centre (HUSK) and administrative-technical units.

The administrative-technical units include the Dean's Office, Faculty Secretary's Office, Library, IT Service, Project and Technology Transfer Office, International Collaboration and Mobility Office, and Quality Assurance Office. The Faculty Secretary's Office comprises the Legal Service,

Human Resources Service, Financial and Accounting Service, Student Affairs, Publishing Service, Maintenance Service, and Public Relations Office.

Study programmes are carried out through Divisions on Traffic, Intelligent Transport Systems and Logistics, and Aeronautics. Teaching, professional, scientific and research activities and their linking with the economy are carried out through departments. Chairs have been established as basic scientific and teaching units for multiple related subjects. Chairs can be independent organisational units or units within a department. Independent chairs perform the range of activities of chairs and departments. Laboratories, which can also function independently or within departments, perform scientific, research, teaching and professional tasks.

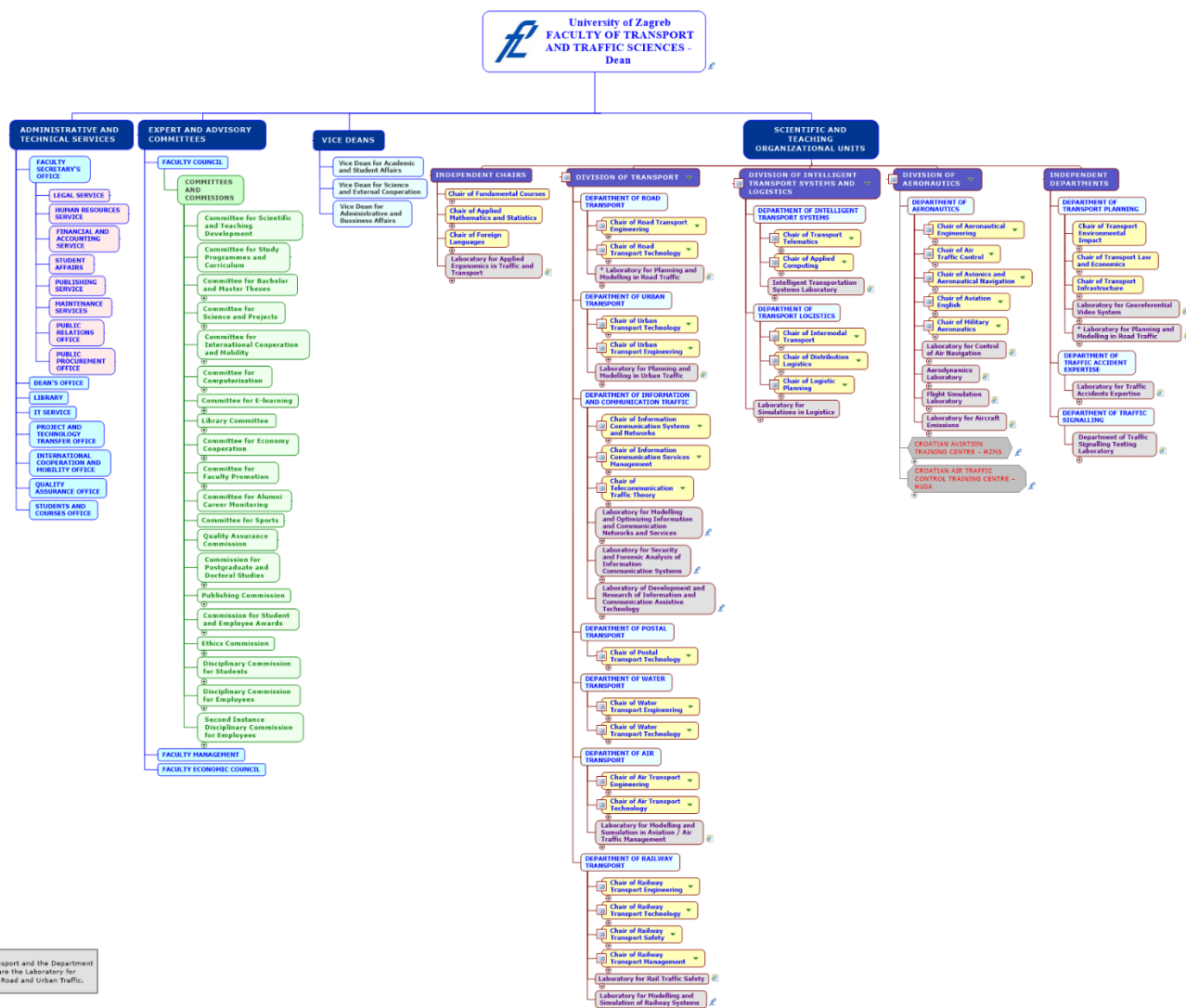
The Dean's Office is a unit that performs administrative-technical, organisational, archival and other tasks to satisfy the needs of the Dean and Vice-Deans. The Faculty Secretary's Office is an internal unit that performs administrative-management, financial, material, technical, general and other tasks.

The Croatian Aviation Training Centre and Croatian Air Traffic Control Training Centre are internal units that provide theoretical and practical training for, respectively, civil pilots and flight controllers. In addition to acting as organisational units of the Faculty, both organisations are accredited for pilot and controller training by the corresponding aviation bodies within the framework of European aviation regulations.

The administrative bodies of the Faculty are: Dean, Vice-Deans, Dean's Council, Faculty Council, Faculty Economic Council and other bodies established by the Statute and other Faculty Resolutions. The Dean's Council is an advisory body that assists the Dean in his or her work and comprises the Dean, Vice-Deans, Secretary, division heads and a union representative. The Faculty Council is an expert body made up entirely of teachers with a scientific-teaching rank, representatives of teachers and associates with a teaching or associate rank, and representatives of students and employees. Another advisory body is the Economic Council, whose members are representatives of reputable institutions and firms operating in economic areas of interest to the Faculty. The Faculty Council is made up of permanent and ad hoc committees. Permanent committees include the Committee for Scientific and Teaching Development, Quality Assurance Commission, Committee for Study Programmes and Curriculum, Committee for Bachelor and Master Theses, Committee for Science and Projects, Committee for Economy Cooperation, Committee for International Collaboration and Mobility, Committee for Faculty Promotion, Committee for Computerisation, Committee for E-Learning, Committee for Alumni Career Monitoring, Committee for Sports, Library Committee, Publishing Commission, Commission for Postgraduate and Doctoral Studies, Committee for Student and Employee Awards, Ethics Commission, Disciplinary Commission for Students, Disciplinary Commission for Employees, and Second-Instance Disciplinary Commission for Employees.

Figure 1 shows the organisational structure of the Faculty.

Figure 1. Organisational structure of the Faculty of Transport and Traffic Sciences.



Mission and Vision

The primary programme and goals for achieving the mission and vision of the Faculty are described in the following documents:

- [Development strategy of the Faculty of Transport and Traffic Sciences for 2018-2023](#), which is a continuation of the [Development strategy of the Faculty of Transport and Traffic Sciences for 2012-2017](#)
- [Foundation for the strategic programme of scientific research at the Faculty of Transport and Traffic Sciences for 2012-2017](#)
- [Strategic programme of scientific research at the Faculty of Transport and Traffic Sciences for 2015-2020](#)

Mission

The mission of the Faculty of Transport and Traffic Sciences is to offer high-quality pre-diploma, diploma and post-diploma education as well as enable individuals to conduct scientific, research and professional work for successful engagement in the effective development of traffic, transport, logistics and aeronautics. The Faculty carries out scientific, developmental and professional research in line with the strategic interests of Croatia. The Faculty performs all its tasks with the goal of sustainable development of traffic and transport, the economy and social groups. The Faculty systematically carries out education and research activities in the fields of traffic and transport technology.

Vision

The vision of the Faculty of Transport and Traffic Sciences is to be a recognised institution of higher education in the fields of traffic and transport technology that is integrated into the European Higher Education Area and European Research Area as a support for development of the economy and social groups. The Faculty achieves this vision by constantly advancing its teaching plans and programmes, scientific research and professional activities as well as by developing human potential.

[Listing in the Registry of Higher Education Institutions and Registry of Scientific Organisations](#)

The Faculty is listed in the [Registry of Higher Education Institutions](#) as a constituent of the University of Zagreb, and in the [Registry of Scientific Organisations](#) in the field of technical sciences, specifically in the area of traffic and transport technology.

STUDY PROGRAMMES

The Faculty of Transport and Traffic Sciences at the University of Zagreb provides university-level pre-diploma and diploma study programmes, as well as post-diploma doctoral and specialisation programmes, as permitted by the [authorisation](#) issued by the Ministry of Science and Education. Authorisation to provide pre-diploma studies was granted in 2005; diploma studies, 2008; specialisation studies, 2009; and doctoral studies, 2007.

All programmes are university-level and cover the technical science fields of transport and traffic technology, except in the case of the aeronautics programme, which covers the fields of aviation and rocket and space technology. At the pre-diploma and diploma levels, the study programme Transport includes concentrations in road, rail, water, air, postal, information-communication, and urban transport. The study programme Intelligent Transport Systems and Logistics contains a concentration in intelligent transport systems, and a concentration in logistics. The programme Aeronautics contains concentrations for civil pilot, military pilot and air traffic control.

At the post-diploma level, the Faculty offers specialisation studies in Urban Traffic, Intermodal Transport and Transport Logistics and Management, as well as doctoral studies in Technological Systems in Traffic and Transport. Starting in academic year 2018/2019, the Faculty will offer doctoral studies on the basis of a University of Zagreb [resolution](#) on the founding and implementation of a post-diploma university doctoral programme in Transport.

Pre-diploma studies last three years and upon completion of the programme in Transport and Intelligent Transport Systems, students receive 180 ECTS credits and the academic title *sveučilišni/a prvostupnik/prvostupnica* (baccalaureus / baccalaurea) traffic engineer. Upon completion of the Aeronautics study programme, students receive 180 ECTS credits and the academic title *prvostupnik / prvostupnica* (baccalaureus / baccalaurea) aeronautical engineer with a (civil/military) pilot concentration or air traffic control concentration.

Diploma studies last two years and upon completion of the programme in Traffic and Intelligent Transport Systems and Logistics, students receive 120 ECTS credits and the academic title of *magistar / magistra* (master's) traffic engineer. Upon completion of the Aeronautics study programme, students receive 120 ECTS credits and the academic title of *magistar / magistra* aeronautical engineer.

Post-diploma specialisation studies last one year. Upon their completion, students receive 60 ECTS credits and the academic title of university specialist in urban traffic, intermodal transport or transport logistics and management. Doctoral studies last three years. Upon their completion, students receive 180 ECTS credits and the academic title of doctor of science in the technical sciences of traffic and transport technology.

Table 1 shows all study programmes provided by the Faculty of Transport and Traffic Sciences.

Table 1. Study programmes at the Faculty of Transport and Traffic Sciences at the pre-diploma, diploma and post-diploma levels

a) Pre-diploma studies	First year	Second year	Third year / concentration	180 ECTS credits Academic title / abbreviation
Transport	Common core curriculum in Transport	Common core curriculum in Transport	Road	university <i>prvostupnik</i> / <i>prvostupnica</i> (baccalaureus / baccalaurea) transport engineer (univ. bacc. ing. traff.)
			Urban	
			Information-communication	
			Postal	
			Water	
			Air	
			Railway	
Intelligent transport systems (ITS) and logistics	Common core curriculum in ITS and logistics	Common core curriculum in ITS and logistics	Intelligent transport systems	university <i>prvostupnik</i> / <i>prvostupnica</i> (baccalaureus / baccalaurea) transport engineer (univ. bacc. ing. traff.)
			Logistics	
Aeronautics	Concentration: Pilot	Civil pilot		university <i>prvostupnik</i> / <i>prvostupnica</i> (baccalaureus / baccalaurea) aeronautical engineer (univ. bacc. ing. aeronaut.)
		Military pilot		
	Concentration: Air Traffic Control			

b) Diploma studies	First and second years / Concentration	120 ECTS credits Academic title/abbreviation
Transport	Road	<i>magistar</i> / <i>magistra</i> transport engineer mag. ing. traff.
	Urban	
	Information-communication	
	Postal	
	Water	
	Air	

	Railway	
Intelligent Transport Systems and Logistics	Concentration: Intelligent Transport Systems	<i>magistar / magistra</i> transport engineer
	Concentration: Logistics	mag. ing. traff.
Aeronautics	Aeronautics	<i>magistar / magistra</i> aeronautical engineer mag. ing. aeronaut.

c) Post-diploma studies	Length of study / ECTS credits	Academic title / abbreviation
Doctoral studies in Technological Systems in Traffic and Transport	three years / 180 ECTS credits (the most recent cohort of students was enrolled in 2017/2018)	doctor of science in the technical sciences of traffic and transport technology dr. sc.
Doctoral studies in Transport	three years / 180 ECTS credits (the first cohort will be enrolled in 2018/2019)	doctor of science in the technical sciences of traffic and transport technology dr. sc.
Specialisation studies in Urban Transport	one year / 60 ECTS credits	university specialist in urban transport univ. spec. traff.
Specialisation studies in Intermodal Transport	one year / 60 ECTS credits	university specialist in intermodal transport univ. spec. transp.
Specialisation studies in Transport Logistics and Management	one year / 60 ECTS credits	university specialist in transport logistics and management univ. spec. logist.

PROCESS OF WRITING THE FACULTY SELF-EVALUATION

Following the approval of the Plan for Re-accreditation of Higher Education Institutions 2018 by the Agency for Science and Higher Education on 20 June 2017, and following the Agency's memorandum to the Dean of the Faculty on 3 July 2017, the Faculty Management suggested members of the Commission for Preparation of a Self-Evaluation, which the Dean named on

31 August 2017 (Klasa: 035-01/17-01/24, Ur.broj: 251-76-01-17-1). Work began immediately to prepare data for the Self-Evaluation. The final composition of the Commission (Figure 2) was established through the Dean's decision of 16 January 2018 (Klasa: 035-01/17-01/24, Ur.broj: 251-76-01-18-2). The Dean, prof. dr. sc. Hrvoje Gold, served as the primary coordinator for preparing the Self-Evaluation and completing the re-accreditation process.

On 2 January 2018, the Dean received a letter from the Agency for Science and Higher Education that an Expert Commission for Re-accreditation was scheduled to visit the Faculty from 12 to 16 November 2018, and that 12 October 2018 was the deadline for entering data into MOZVAG and handing in the Self-Evaluation and MOZVAG analysis.

During preparations for re-accreditation and the writing of the Self-Evaluation, members of the Commission for Preparation of a Self-Evaluation and members of the professional service units at the Faculty attended several workshops and held meetings, as follows:

- A preparatory meeting on the re-accreditation process was held on 5 September 2017 (Faculty Management, department heads and presidents of Faculty committees and commissions)
- Workshop on 24 October 2017 to prepare a Self-Evaluation, which was designed for representatives of higher education institutions undergoing the re-accreditation process according to the Plan for Re-accreditation of Higher Education Institutions 2018 (Tomislav Mlinarić, Marko Matulin, and Anita Domitrović)
- MOZVAG - Workshop for Coordinators at Higher Education Institutions on 14 December 2017 (Zvonko Kavran and Katarina Mostarac)
- Meetings of the Commission for Preparation of a Self-Evaluation and department heads related to learning outcomes at the study programme level
 - 24 January 2018
 - 29 January 2018
 - 05 February 2018
 - 26 February 2018
 - 05 March 2018
- Workshop on 22 January 2018 for the Management, department heads and members of the Commission for Preparation of a Self-Evaluation on the definition of learning outcomes in study programmes. The workshops were moderated by Profs. Željka Kamenov and Vesna Vlahović-Štetić of the Faculty of Philosophy of the University of Zagreb
- Training for all teachers at the Faculty on 15 February 2018 on how to achieve desired outcomes in study programmes. The training was provided by Profs. Željka Kamenov and Vesna Vlahović-Štetić of the Faculty of Philosophy of the University of Zagreb.
- Presentation of content needed for preparation of the Self-Evaluation and the MOZVAG analysis at a meeting of the extended Faculty Council on 16 January 2018 (Zvonko Kavran, Ivan Grgurević, and Anita Domitrović)

- Coordination meetings of the Management, topic leaders and MOZVAG coordinators were held usually twice monthly from 01 February until 25 July 2018
- Meetings of topic leaders and commission members as needed
- Meeting on 17 July 2018 to inform members of the Faculty Council about Gantt chart activities related to Faculty re-accreditation
- Presentation of the contents of the Self-Evaluation and MOZVAG analysis to representatives of administrative and technical units at a meeting open to the public is planned for 05 September 2018. Public discussion and collection of comments are expected to be closed on 20 September.

Adoption of the Self-Evaluation and MOZVAG analysis is planned for the Faculty Council meeting of 25 September 2018.

Workers from administrative-technical units will prepare data for the Self-Evaluation and enter it into the MOZVAG information system. These data will come from various databases (ISVU, CROSB, Project Database).

The Self-Evaluation and MOZVAG analysis were prepared based on guidelines published by the Agency for Science and Higher Education. Faculty documents such as the Statute, Regulations and Strategies were also consulted for guidance, as were documents from previous Faculty evaluations that are mentioned in the Self-Evaluation.

Figure 2. Decision to name members to the Commission for Preparation of a Self-Evaluation

Sveučilište u Zagrebu
FAKULTET PROMETNIH ZNANOSTI
Zagreb, Vukelićeva 4

Klasa: 035-01/17-01/24
Ur.broj: 251-76-01-18-2

Zagreb, 16.01.2018.

Temeljem članka 27. Statuta Fakulteta prometnih znanosti Sveučilišta u Zagrebu donosim sljedeću

O D L U K U
o izmjeni i dopuni Odluke
o imenovanju Povjerenstva za izradu Samoanalize

I.

Ovom Odlukom mijenja se i dopunjuje Odluka o imenovanju Povjerenstva za izradu Samoanalize (Klasa: 035-01/17-01/24 Ur.broj: 251-76-01-17-1) od 31. kolovoza 2017. u članku II. kako slijedi:

I. Interno osiguravanje kvalitete i društvena uloga visokoga učilišta

1. Doc. dr. sc. Anita Domitrović, predsjednica Povjerenstva za upravljanje kvalitetom, koordinator
2. Izv. prof. dr. sc. Ljupko Šimunović, predsjednik Etičkog povjerenstva
3. Izv. prof. Grgo Luburić, član Odbora za promociju Fakulteta

II. Studijski programi

1. Prof. dr. sc. Tomislav Josip Mlinarić, prodekan za znanost i vanjsku suradnju, koordinator
2. Doc. dr. sc. Ivan Grgurević, o.d. prodekana za nastavu i studente
3. Dr. sc. Marko Matulin, ISVU koordinator
4. Prof. dr.sc. Mario Šafran, predsjednik Odbora za završne i diplomske radove
5. Prof. dr. sc. Zvonko Kavran, MOZVAG koordinator
6. Dr. sc. Katarina Mostarac, MOZVAG administratorica
7. Student preddiplomskog studija
8. Student diplomskog studija

III. Nastavni proces i podrška studentima

1. Doc. dr. sc. Ivan Grgurević, o.d. prodekana za nastavu i studente, koordinator
2. Doc. dr. sc. Anita Domitrović, predsjednica Povjerenstva za upravljanje kvalitetom
3. Doc. dr. sc. Diana Božić, predsjednica Povjerenstva za praćenje napredovanja završenih studenata
4. Doc. dr. sc. Pero Škorput, predsjednik Odbora za e-učenje
5. Prof. dr. sc. Kristijan Rogić, predsjednik Povjerenstva za izdavačku djelatnost
6. Doc. dr. sc. Borna Abramović, predsjednik Odbora za međunarodnu suradnju i mobilnost
7. Prof. dr. sc. Zvonko Kavran, MOZVAG koordinator
8. Dr. sc. Katarina Mostarac, MOZVAG administratorica
9. Maja Ferina, dipl. učiteljica, voditeljica Studentske službe
10. Student preddiplomskog studija
11. Student diplomskog studija

IV. Nastavnički i institucijski kapaciteti

1. Prof. dr. sc. Ernest Bazijanac, prodekan za poslovanje, koordinator
2. Doc. dr. sc. Ivan Grgurević, o.d. prodekana za nastavu i studente
3. Prof. dr. sc. Zvonko Kavran, MOZVAG koordinator
4. Prof. dr. sc. Sadko Mandžuka, predsjednik Odbora za suradnju s gospodarstvom
5. Doc. dr. sc. Mario Muštra, predsjednik Odbora za informatizaciju
6. Lahorka Crnković, prof., v. pred., voditeljica knjižnice
7. Mr. sc. Sanja Živko, dipl. oec., voditeljica financijsko-računovodstvene službe
8. Ivanka Nikolić, bacc. oec., članica Odbora za praćenje i unaprjeđenje znanstvenog i nastavnog razvoja
9. Romina Jovančević, mag. iur., voditeljica pravne i kadrovske službe

V. Znanstvena i stručna djelatnost

1. Prof. dr. sc. Tomislav Josip Mlinarić, prodekan za znanost i vanjsku suradnju, koordinator
2. Izv. prof. dr. sc. Doris Novak, predsjednik Odbora za znanost i projekte
3. Doc. dr. sc. Borna Abramović, predsjednik Odbora za međunarodnu suradnju i mobilnost
4. Prof. dr. sc. Sadko Mandžuka, predsjednik Odbora za suradnju s gospodarstvom
5. Dr. sc. Marko Šoštarčić, voditelj Ureda za projekte i transfer tehnologije
6. Dr. sc. Mario Anžek, glavni urednik časopisa Promet - Traffic & Transportation
7. Mojca Brenko Puzak, mag. bibl., CROSB administratorica
8. Nikola Bakarić, prof., voditelj Ureda za međunarodnu suradnju i mobilnost
9. Bruno Antulov Fantulin, mag. ing. aeronaut., doktorand

II.

Za grafičko uređenje i oblikovanje Samoanalize imenuju se:

1. dr. sc. Marko Matulin, koordinator
2. Jasenka Badanjak, ing. arh., voditeljica izdavačke službe
3. Ante Kulušić, dipl. ing. prom., v. teh. u izdavačkoj službi

III.

Ova Odluka stupa na snagu danom donošenja.

Dekan

Prof. dr. sc. Hrvoje Gold

Dostaviti:

1. Imenovani
2. Tajnik
3. Arhiva

OUTCOMES OF PREVIOUS FACULTY ASSESSMENTS

The Faculty of Transport and Traffic Sciences has, since 2012, undergone a series of assessments, described below in chronological order:

- Certification of fulfillment of ISO quality standards in 2012 and 2015 by an authorised firm
- Re-accreditation by the Agency for Science and Higher Education in 2012
- Internal quality assurance assessment by the University of Zagreb in 2016
- Re-accreditation of post-diploma doctoral studies by the Agency for Science and Higher Education in 2016

The Faculty Development Strategy for 2012-2017 stipulated the goal of aligning with ISO 9001 standards, even though this is not obligatory for higher education institutions, as a complement to alignment with Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG). Certification of alignment with ISO 9001:2008 quality assurance standards covers higher education services, business and professional education, organisation of seminars and workshops, and publishing activities. The certificate was received for the first time in May 2012 and again in May 2015. A complete certification process for the integrated quality assurance system at the Faculty is planned for the beginning of academic year 2018/2019 in order to ensure alignment with the 2015 revision of ISO 9001 standards and with

the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG).

In 2012, the Faculty of Transport and Traffic Sciences underwent a re-accreditation procedure performed by the Agency for Science and Higher Education. This procedure assessed to what extent the Faculty fulfilled the conditions laid out in the following sources:

- Law on Quality Assurance in Science and Higher Education (NN 45/09)
- Regulations on Granting Authorisation to Perform Higher Education Activities, Operate Study Programmes and on Re-accreditation of Higher Education Institutions (NN 24/10)
- Criteria for Quality Assessment of Higher Education Institutions within the University (Klasa:003-08/11-02/0005; Urbroj:355-02-04-11-8, 29 June 2011)

The Expert Commission for Re-accreditation visited the Faculty on 25-26 April 2012.

After the re-accreditation process, the Agency for Science and Higher Education sent an accreditation recommendation and letter of expectations to the Faculty on 24 October 2012, laying out deficiencies that needed to be resolved within three years. The Faculty did not file any objections to this recommendation. Based on this recommendation, the Ministry of Science, Education and Sport sent a letter of expectations to the Faculty on 2 November 2012, laying out the deficiencies to be resolved within three years. During the following three years, the Faculty analysed the deficiencies and carried out reforms to address them.

After the various activities undertaken to address the deficiencies, the Faculty sent a final report on these activities to the Agency for Science and Higher Education. On the basis of Ministry and Agency procedures, the Ministry of Science, Education and Sport issued the Faculty with a confirmation to operate on 14 July 2015. Section 1.2 of the Self-Evaluation describes the activities undertaken to address deficiencies.

In March and April 2016, the Quality Assurance Commission of the University of Zagreb carried out internal assessment of the quality assurance system at the Faculty. This self-evaluation examined the level of development of the quality assurance system according to the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) and the University's internal processes and procedures.

The Quality Assurance Commission at the Faculty completed the self-evaluation in collaboration with the Faculty Management, teachers and service units, and then submitted it to the University. The Quality Management Committee of the University visited the Faculty on 5 April 2016 and carried out the internal review. Members of this Committee as well as other university members were named by the University Quality Committee to serve as members of the Expert Commission for Internal Review. This process established that the quality assurance system at the Faculty was in accordance with the Standards and Guidelines (ESG) as well as internal processes and procedures of the University of Zagreb. The results of this process were ratified by the Senate of the University of Zagreb. Section 1.2 of the Self-Evaluation provides a

more detailed description of the internal evaluation process and hyperlinks to publicly accessible documents.

In accord with the [Plan for re-accreditation of post-diploma doctoral study programmes in 2016](#), carried out by the Agency for Science and Higher Education, the doctoral programme in Technological Systems in Traffic and Transport was re-accredited. Based on the report of the Expert Commission for Re-accreditation and on the recommendation of the Agency, the Ministry of Science, Education and Sport issued the Faculty with a [letter of expectations](#) in 2016. This letter contained recommendations for addressing deficiencies within three years (2019). Taking into account these recommendations and the Report of the Expert Committee, the Faculty developed an Action plan for removing deficiencies. Taking into account the recommendations of the Expert Committee, the Faculty developed a new teaching plan and doctoral study programme in [Transport](#), which the University of Zagreb [approved](#) and which will accept its first cohort of doctoral students in academic year 2018/2019. The Ministry of Science and Education, on the basis of an official decision, [confirmed that this programme is listed in the Registry of Study Programmes](#). The organisation of this new doctoral programme resolves most of the deficiencies noted in the 2016 re-accreditation process. Section 1.2 of the Self-Evaluation contains a more detailed description of the re-accreditation of the doctoral study programme in 2016, as well as hyperlinks to publicly accessible documents.

The Faculty of Transport and Traffic Sciences established an internal quality assurance system that is constantly being developed and improved in light of previous assessments.

1. INTERNAL QUALITY ASSURANCE AND THE SOCIAL ROLE OF THE HIGHER EDUCATION INSTITUTION

1.1. The higher education institution has established a functional internal quality assurance system

Internal quality assurance system includes and evaluates all activities of the higher education institution (study programmes, teaching process, student support, support to students from under-represented and vulnerable groups, learning resources, scientific/artistic activity, professional activity, etc.) and provides underlying documentation.

Internal quality assurance system seeks to involve all stakeholders of the higher education institution (students and external stakeholders - employers, alumni, representatives of professional organisations, civil society organisations and internal stakeholders).

The higher education institution adopted a quality assurance policy, which is a part of its strategic management and is achieved through the implementation of the strategy, including the strategic research agenda, involving a period of at least five years.

The implementation of the strategy includes SWOT or similar analysis, strategic goals, programme contract goals (where applicable), operational plan, defined responsibilities for implementation, monitoring mechanisms and the report on its implementation. The stakeholders recognize the strategy as an effective tool for improvement.

The higher education institution systematically collects and analyses data on its processes, resources and results, and uses them to effectively manage and improve its activities, as well as for further development.

The higher education institution uses various methods for collecting data on quality (student satisfaction surveys, peer review, feedback from employers and/or associates, graduates etc.).

The higher education institution is committed to the development and implementation of human resource management policies (managerial, scientific-teaching, artistic-teaching, administrative, professional and support resources), in accordance with professional principles and standards.

The Faculty of Transport and Traffic Sciences is a constituent of the University of Zagreb, and its internal quality assurance system is aligned with that of the University and is based on [documents and guidelines for quality assurance at the University of Zagreb](#).

The goals, aims and assessment areas of the Faculty's quality assurance system are set according to the [Regulations on the quality assurance system of the Faculty of Transport and Traffic Sciences](#), approved at the Faculty Council meeting of 17 May 2011, and on the Amendments to these Regulations scheduled to be implemented at the beginning of academic year 2018/2019. The Faculty has a Quality Assurance Commission, which performs its duties according to the Regulations. The Commission presents a Report and Work Plan to the Faculty Council once a year. Members of the Commission are employees at scientific-teaching, teaching and associate ranks; a representative of administrative staff (most often an employee from Student Affairs); a representative of Faculty Management (Dean or a Vice-Dean); at least one student representative; and one alumni representative. The new Statute of the Faculty stipulates an Office for Quality that would perform administrative tasks in quality management. Until this Office is created, these administrative tasks are carried out by members of the Commission.

The Quality Assurance Commission actively participates in meetings, roundtables and workshops organised by the University, and it has entered into a collaboration with the Quality

Management Office at the University of Zagreb. The Commission also takes part in the activities of the Agency for Science and Higher Education aimed at promoting and advancing quality. Internal quality assurance at the Faculty takes the form of a collection of measures and activities through which the quality of the scientific, teaching and professional activities at the Faculty are planned, monitored, organised, assessed and improved. These measures and activities promote professional and ethical standards with an emphasis on excellence, and they are applied in the following areas:

- rules and procedures for development and application of quality assurance at the Faculty,
- approval, monitoring and periodic evaluation of study programmes at the Faculty,
- student assessment and evaluation of learning outcomes and study programme goals,
- support to students in their teaching activities (e.g. advising, mentoring, demonstrations) and non-teaching activities (e.g. student practice, career advising),
- support to teachers: e.g. monitoring of promotion procedures, availability of necessary skills and experience for high-quality teaching, continuing education to advance teaching and learning, assessment and self-assessment of teaching,
- students' survey-based assessment of teachers and Faculty activities,
- scientific and professional activities,
- mobility and international collaboration,
- resources for teaching, scientific-research and professional activities,
- public outreach.

To carry out its activities, the Quality Assurance Commission follows guidelines in the [Quality Assurance Handbook of the University of Zagreb](#) and the Quality Handbook of the Faculty of Transport and Traffic Sciences.

In accordance with the Quality Assurance Handbook of the University and in collaboration with the [Quality Management Office of the University of Zagreb](#), the Faculty carries out two types of assessments: students' assessment of teachers, and students' assessment of study programmes.

All teachers are required to be assessed every three years using a "pen-and-paper" approach in accordance with the [Plan for conducting surveys in university constituents](#) and the recommendations of the Office for Periodic Teacher Assessment Surveys in University Constituents. Teachers may be assessed more often if necessary, by request of the teacher or in the opinion of the Quality Assurance Commission at the Faculty. In accord with the periodic plan, the most recent teacher assessment by students at the Faculty was carried out in academic year 2015/2016, and the next assessment will be performed in academic year 2018/2019. After the survey is administered, filled-out surveys are delivered for processing to the Quality Management Office at the University. This Office communicates the survey results to the Dean of the Faculty, who analyses them together with the Vice-Dean for Academic and Student Affairs and with the Faculty's Quality Assurance Commission. The results are then delivered to

teachers, in accord with the [Recommendations for handling the results of university surveys](#). In the event that a teacher receives a poor evaluation, the Dean, in collaboration with the Vice-Dean for Academic and Student Affairs as well as the Quality Assurance Commission, recommends further action.

Study programmes at the Faculty must be evaluated once a year by students finishing their pre-diploma and diploma studies. The Student Affairs Office sends completed surveys to the Quality Management Office of the University, which delivers the results to the Dean, who together with the Vice-Dean for Academic and Student Affairs and the Quality Assurance Commission, analyses the survey results, presents them to the Faculty Council and publishes them on the Faculty website.

In accordance with the [Quality Assurance Handbook of the University of Zagreb](#), teacher assessment by colleagues is planned to begin in academic year 2018/2019.

The Quality Assurance Commission of the Faculty regularly holds meetings (usually once a month) where it discusses and formulates proposals that it sends to the Dean and Faculty Council for further action.

The Faculty received a confirmation of the implementation of a quality assurance system when it was [certified to be in compliance with ISO standard 9001:2008](#) for its services related to higher education, business and professional education, organisation of seminars and workshops as well as publishing activities. This certificate was granted for the first time in May 2012 and then re-issued in May 2015. The implementation of an integrated quality assurance system is envisaged for the beginning of academic year 2018/2019 in order to bring the Faculty into compliance with the 2015 revision of ISO standard 9001 and with the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG).

The system of quality assurance is described in the Quality Handbook of the Faculty and in the Procedure Manual. The Quality Handbook describes how the quality assurance system fulfills the requirements of the ISO standard through its alignment with the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG). The Quality Handbook is the basic document defining the measures and procedures for quality assurance, and it contains the policy, mission and vision of the Faculty. The Procedure Manual describes processes and procedures that fall within the purview of the ISO 9001:2015 certificate.

The Faculty is continuously developing and improving its quality assurance system on the basis of previous evaluations, which are described in greater detail in Section 1.2 of the Self-Evaluation.

The [Faculty Statute](#) defines the Faculty's organisation, activities, and composition, as well as the powers and decision-making procedures of Faculty bodies. It specifies the organisation and implementation of study programmes, as well as the status of students, teachers, associates, researchers and other employees.

The rules defining how the Faculty conducts its various activities are laid out in the [Regulations](#), which are approved at meetings of the Faculty Council and are publicly available.

The Faculty is divided into divisions, departments and chairs. Committees and commissions are also formed and serve as working and advisory bodies in the service of the Faculty Management, the Dean's Council and the Faculty Council.

Guidelines for the development of the Faculty are laid out in the [Strategic programme of scientific research for 2015-2020](#) and the [Development strategy of the Faculty of Transport and Traffic Sciences for 2018-2023](#).

This strategy and strategic goals at the Faculty were formulated based on analysis of strengths, weaknesses, opportunities and threats (SWOT) presented in the [Development strategy of the Faculty of Transport and Traffic Sciences for 2012-2017](#), then amended by the Dean's Council on 26 March 2018 and published as the [Development strategy for 2018-2023](#).

STRENGTHS

- part of a reputable research-oriented university
- recognised university studies in all areas of traffic and transport technology (except maritime transport) at the pre-diploma, diploma and post-diploma levels
- publication of the international scientific journal *PROMET - Traffic & Transportation*, indexed in recognised bibliographic databases
- one third of the scientific-teaching staff are young postdoctoral scientists
- experience working on international scientific projects
- links with the commercial sector in transport and logistics and experience working on innovative and professional projects
- significant number of collaborative agreements with similar higher education institutions in Europe, and substantial mobility of incoming and outgoing students
- Laboratory and IT infrastructure for teaching and research
- Implementation of an e-learning system

WEAKNESSES

- teaching conducted at four locations spread out from one another
- insufficient space for teaching and scientific-research work
- inadequate space for the Faculty library, independent student work, and the work of Student Council and student societies
- insufficient number of teachers for the large number of students in the general courses of study programmes
- small numbers of diploma graduates from among those studying at the pre-diploma level
- lack of student interest in pre-diploma and diploma teaching in part-time study programmes
- lack of expert associates to prepare laboratory exercises
- limited mobility of teachers and associates for research stays, and limited mobility for non-teaching staff
- weak interest in post-diploma specialisation studies

OPPORTUNITIES

- Faculty move into a new building on the scientific-teaching campus Borongaj, or remodeling of space in existing buildings at Borongaj
- demand from the labour market for lifelong learning
- applications to EU-financed projects
- scientific collaboration with similar faculties and other institutions within the EU
- internalisation of studies
- stronger economy with greater employment opportunities for graduates
- development of qualification standards by the Croatian Qualifications Framework (HKO)

THREATS

- insufficient higher education funding
- frequent changes in the higher education system
- uncertainty surrounding the scientific-teaching campus Borongaj
- formal legal procedures and limitations when hiring new employees
- departure of highly educated individuals abroad
- hiring difficulties at higher education institutions

Following this SWOT analysis and the setting of strategic goals, annual plans were developed for departments and chairs, and work plans were developed for committees and commissions.

The Faculty Management, with help from the Dean's Council and Faculty Council, collects and analyses data about business processes and uses them for management, improvement and further development. Meetings of departments, commissions, committees and Faculty Council are conducted according to monthly or annual work plans. The Dean's Council meets weekly. When necessary, meetings of the Management and department heads are organised, as well as meetings of Management with teachers of scientific-teaching rank and professional and administrative staff. Once a year, a meeting is organised with Management, department members and presidents of commissions and committees.

Since 2015, Microsoft SharePoint software has been used to simplify organisation and monitoring of the data collection and management system, as well as to facilitate communication and collaborative work. The software is applied to the work of the organisational units, services, and committees of the Faculty, Departments, Chairs and Faculty Council. All Faculty employees can access the software according to their authorisation level.

The Committee for Scientific and Teaching Development was founded at the beginning of academic year 2013/2014 in order to address concerns about the development of human potential. The Committee actively analyses the human resource needs of the Faculty and prepares and submits proposals for consideration at Faculty Council meetings. These proposals concern advancement of teachers at associate and scientific-teaching ranks and the hiring of new teachers and associates. The Committee develops detailed analyses about the needs and

possibilities for teacher development and promotion, as described in Section 4 of the Self-Evaluation. At the beginning of the academic year, the Committee proposes a Teacher Promotion Plan for acceptance by the Faculty Council.

The organisational and work-related rules of the Faculty are described in the [Regulations on faculty organisation and staff positions](#), and the rules and conditions for promoting teachers are laid down in the [Regulations on the conditions and processes for promotion to scientific, scientific-teaching, teaching or associate ranks in the technical sciences of traffic and transport technology](#). These regulations are expected to change in the near future, based on the current legal framework.

In addition to the Student Council, the Faculty is home to several [student societies](#), which organise various activities for students in their free time, resolve student issues, and monitor student rights. The Student Council and student societies organise student sport competitions, visits by experts, roundtables, humanitarian actions, publication of magazines and related activities. The Faculty provides a certain amount of financial support to the Council and societies, in accordance with annual work plans. Students actively collaborate in the work of Faculty bodies, such as the Faculty Council and various committees and commissions.

Another student organisation active at the Faculty is the alumni society, known as the Croatian Association of Diploma Engineers and Engineers of the Faculty of Transport and Traffic Sciences [Croatian Association of Diploma Engineers and Engineers of the Faculty of Transport and Traffic Sciences \(AMAC- FSC\)](#). The goal of the association is to maintain and preserve gratitude and loyalty to the University of Zagreb and other Croatian universities, protect the Croatian university tradition, promote the Faculty's reputation, care for the Faculty's development and advancement, protect and develop engineering ethics, resolve status questions, develop transport and traffic sciences, and address other community challenges. Collaboration between the Faculty and alumni improves teaching quality and shapes the teaching process, ensuring that it corresponds to the actual needs of the transport sector.

1.2. The higher education institution implements recommendations for quality improvement from previous evaluations

The higher education institution analysed the recommendations for improvement and undertakes activities on the basis of previous internal and external evaluations.

The higher education institution analyses improvements and plans further development accordingly.

The Faculty continuously develops and improves its quality assurance system on the basis of previous evaluations, which since 2012 have taken place as follows:

- Certification of fulfillment of ISO quality standards in 2012 and 2015, with planned re-certification in 2018
- Re-accreditation by the Agency for Science and Higher Education in 2012
- Internal assessment of the quality assurance system by the University of Zagreb in 2016

- Re-accreditation of post-diploma doctoral studies by the Agency for Science and Higher Education in 2016

The Faculty obtained a Certificate of Compliance with ISO standard 9001:2008 for the first time in May 2012 with respect to its range of activities in higher education, business and professional education, organisation of seminars and workshops and publishing. Continuous work on the system led to its [ISO re-certification](#) in 2015. A complete certification process for the integrated quality assurance system at the Faculty is planned for the beginning of academic year 2018/2019 in order to ensure alignment with the 2015 revision of ISO 9001 standards and with the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG).

Since 2012, an authorised [certification firm](#) has certified and re-certified the quality assurance system according to ISO standards. These audits are conducted once a year and must take into account the entire range of processes covered by the certificate. Based on the reports from these audits, the Faculty defines corrective measures for addressing areas of non-compliance and plans further development.

In 2012, the Faculty participated in re-accreditation by the Agency for Science and Higher Education. The re-accreditation procedure aimed to determine how well the Faculty fulfills the conditions for performing higher education activities as established in the Law on Quality Assurance in Science and Higher Education (NN 45/09), Regulations on Granting Authorisation to Perform Higher Education Activities and Operate Study Programmes and on Re-accreditation of Higher Education Institutions (NN 24/10) and the Criteria for Quality Assessment of Higher Education Institutions within the University (Klasa:003-08/11-02/0005; Urbroj: 355-02-04-11-8, 29 June 2011). After the re-accreditation process, the Agency for Science and Higher Education sent an accreditation recommendation and letter of expectations to the Faculty, laying out deficiencies that needed to be resolved within three years. Based on the [accreditation recommendation](#), the Ministry of Science, Education and Sport sent a [letter of expectations](#) to the Faculty on 2 November 2012, laying out the deficiencies to be resolved within three years. The Faculty received a letter of expectations because the Expert Commission had judged the scientific and professional work, mobility and international collaborations of the Faculty to be "in an early phase of implementation".

During the following three years, the Faculty analysed the deficiencies mentioned in the recommendation and addressed them through several reforms. The Faculty drafted an [Activity plan to address deficiencies identified during re-accreditation](#). In particular, the Faculty worked intensively on the expert committee's comments regarding its scientific research and international collaboration, since these areas were rated the weakest in the accreditation recommendation.

In line with the activity plan, Faculty employees worked under the leadership of Faculty Management to carry out a range of activities in order to address deficiencies. Particularly developed were activities of the Committee for Science and Projects and the Committee for

International Collaboration and Mobility. The latter organised various meetings and workshops aimed at informing and motivating students about mobility, and these efforts rapidly began to show results in the form of an increase in the number of mobility applications from students. The Committee for Science and Projects launched, during academic year 2014/2015, an internal programme to support research at the Faculty from the Faculty's own budget (PROM-PRO, PROM-PRIMA, PROM-PRODUKT), which the Faculty Management approved, leading to the release of 250,000 HRK that year to support research at the Faculty. The programme was originally conceived to last two years. A presentation on the success of the funded projects was made, together with the announcement of the second part of the programme in academic year 2015/2016. Since then, the programme has continued with the aim of increasing scientific productivity. This is expected to bring improvements in the citation impact of Faculty research and in the Faculty's success rate when applying to international projects.

The Quality Assurance Committee monitored the dynamics of addressing deficiencies and presented a report to the Faculty Council entitled [Report on the dynamics of addressing deficiencies for the period from December 2013 to the end of March 2014](#), followed by the [Final report on addressing deficiencies](#) in April 2015. It was concluded that the Faculty had resolved most of the deficiencies in accord with the recommendations of the Expert Commission, and the final report was sent to the Agency for Science and Higher Education as evidence of their response to the letter of expectations. Following the delivery of this report, the Agency for Science and Higher Education recommended to the Ministry of Science, Education and Sport to re-accredit the Faculty. In July 2015, the Faculty received a [confirmation that it fulfilled the conditions for performing scientific and higher education activities](#). The Faculty continued with activities aimed at improving the internal quality system according to rules and regulations for science and higher education in Croatia and the EU.

From March to April 2016, the state of development of the quality assurance system was evaluated internally as part of the internal review conducted by the Quality Management Committee at the University of Zagreb. The Quality Assurance Committee filled out the self-evaluation form in collaboration with the Faculty Management, teachers and service units, and then submitted the form to the University. Then the Quality Management Committee of the University visited the Faculty on 05 April 2016 and carried out its internal review. During this visit, the University's Expert Commission and the Faculty's Quality Assurance Committee worked together to verify that the quality assurance system was aligned with Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), as well as with internal processes and university procedures. The [results of the Self-Evaluation](#) were ratified at the University Senate in Zagreb and published on the Faculty's website.

In accordance with the Plan for Re-accreditation of Post-Diploma Doctoral Study Programmes in 2016 from the Agency for Science and Higher Education, the doctoral programme Technological Systems in Traffic and Transport went through the re-accreditation procedure. Based on the [Report of the Expert Commission on Re-accreditation](#) and the recommendation

of the Agency for Science and Higher Education, the Ministry of Science, Education and Sport sent to the Faculty a letter of expectations in June 2016. This letter contained recommendations for addressing deficiencies within three years. Based on these recommendations and the report of the Expert Commission, the Faculty created an Action plan for removing deficiencies. The Faculty's Committee for Science and Projects follows the developments in this process.

Based on the recommendations of the Expert Commission for Re-accreditation, the Faculty created a new [post-diploma doctoral programme Transport](#). The creation and design of this new study programme eliminates most of the deficiencies identified during re-accreditation. The [decision to create and implement](#) this doctoral programme was made in May 2018, and the first cohort of doctoral students was enrolled in academic year 2018/2019.

1.3. The higher education institution supports academic integrity and freedom, prevents all types of unethical behaviour, intolerance and discrimination

The higher education institution supports academic integrity and freedom, upholds the ethical standards and preserves academic integrity and freedom.

The higher education institution effectively uses mechanisms for preventing unethical behaviour, intolerance and discrimination.

The higher education institution carries out activities related to the sanctioning of unethical behaviour, intolerance and discrimination.

The system for managing conflicts and resolving irregularities is functional at all levels of the higher education institution.

The work of employees of the higher education institution, its students and external stakeholders, is based on ethical standards in higher education.

The higher education institution systematically addresses issues of academic dishonesty (plagiarism, cheating etc.).

The Faculty of Transport and Traffic Sciences adheres in its work to the principles of morals and professional ethics as defined in the [Ethical Code of the Faculty of Transport and Traffic Sciences](#), which was prepared in alignment with the [Ethical Code of the University of Zagreb](#). When they join the academic community, Faculty members (teachers, associates, students) are obliged to hold themselves to the highest standards of moral integrity, ethics as well as scientific and professional honesty.

The following are mechanisms used by the Faculty to ensure ethical behaviour among all its employees:

- implementation in academic year 2017/2018 of a new [Ethical Code of the Faculty of Transport and Traffic Sciences](#), which made advances over the previous Code
- formation of an Ethics Commission at the Faculty
- naming of an [ombudsman for students at the Faculty](#)
- positioning of mailboxes at various locations around the Faculty, in which anyone can anonymously leave written messages regarding suspicions of unethical behaviour by Faculty employees

- implementation of [Regulations on disciplinary responsibilities of employees](#) and [Regulations on disciplinary responsibilities of students](#). These regulations establish disciplinary procedures and measures for those who violate the Ethical Code (e.g. failing to respect the dignity of the Faculty, failing to satisfy professional obligations, plagiarism, consumption of addictive substances on Faculty property, corruption, conflicts of interest).

The Ethical Code is the foundation that determines the principles of scientific ethics at the Faculty and at the University. The regulations in the Code are not legally binding statements enforced through pressure and threat of sanctions; rather, they are institutional norms that reflect international values and principles of behaviour in the academic community. The Code provides rules for behaviour that every employee adopts, alongside his or her own beliefs and values, in order to ensure a minimal ethical standard of behaviour.

The Code contains fundamental morals and principles of professional ethics that should guide the actions of all teachers, scientists, other employees, and students of the Faculty. The Code specifies general ethical principles, ethical principles in science and higher education, the organisation and activities of the Ethics Commission and the procedures for bringing matters before this Commission.

The Faculty promotes the following fundamental ethical principles and values: protection of human rights and freedoms; prohibition of discrimination, abuse and prejudice; prohibition of the consumption of addictive substances; respect for law and legal procedures; academic freedom; the principle of professionalism; the right and obligation to receive professional training, show professional transparency and respect professional confidentiality; freedom of public expression; scientific honesty; prohibition of the invention, falsification or plagiarism of data or ideas; prohibition of the abuse of authorship; collegiality; adherence to ethical principles related to the home institution and students; adherence to the rights and obligations of students; prohibition of accepting gifts or other goods; prohibition of conflicts of interest and nepotism; and protection of examinees.

The goal of the Code is to promote values specific to Faculty activities in the broadest sense. All members of the Faculty community are required to promote the ethical behaviour and values stipulated in the Code. To advance the achievement of this goal, the Ethics Commission provides opinions on ethical principles and standards at the Faculty, as well as on general ethical questions and specific issues. The Commission engages in additional activities as specified in the Code.

The Ethics Commission is responsible for promoting ethical principles at the Faculty, so it monitors the implementation of these principles, determines whether accusations of unethical behaviour should be processed further, and expresses opinions on complaints from employees and students. The Ethics Commission acts in accordance with the Code, which stipulates the structure and activities of the Commission and the procedures to follow.

The Ethics Commission renders an opinion on accusations of potential violations of the Ethical Code that are presented in written form, which can come from Faculty employees and students. The Commission must provide its opinion within 60 days from receipt of the accusation, and the accuser as well as the Dean must be informed. If the Ethics Commission considers that a Code violation has occurred, the Dean should inform the relevant bodies within 15 days. The Ethics Commission prepares an annual report on its activities in the preceding academic year, which it delivers to the Ethics Council of the University of Zagreb.

During academic year 2016/2017, the Ethics Commission processed and delivered opinions on three matters. Two matters concerned unethical behaviour in research, and the other concerned unethical behaviour in teaching. In the academic year 2017/2018, no potential violations were brought before the Ethics Commission. Instead, the Commission approved scientific research proposals.

The student ombudsman is a student of the Faculty whose job is to resolve issues involving academic relationships and academic rights and freedoms of students. This position was created in 2007 with the implementation of the Law on the Student Council and Other Student Organisations.

The Faculty understands the importance of the principles of ethical behaviour, tolerance and academic honesty, and therefore promotes them among students during their studies. The goal is to encourage ethical behaviour during studies and later in the career. The Faculty promotes the same values among its employees. In this way, employees see unethical activities as futile, dishonourable acts that can tarnish their reputation and credibility and lead to their exclusion from the academic community.

The Faculty strives to maintain positive interpersonal relationships. Smaller problems are resolved internally at the teacher-student level, within the affected department(s) and through third-party mediation by the Faculty Management.

Certain types of unethical behaviour by students are subject to disciplinary measures as specified in the [Regulations on disciplinary responsibilities of students](#). Examples of such behaviour include disturbing peace and order at the Faculty; behaving disrespectfully toward teachers, associates, students and other individuals on Faculty grounds; inappropriate behaviour during classes, examinations, or bachelor or master thesis defences (fights, screaming, impolite expressions, use of mobile devices); copying or attempted copying; and use of unauthorised written materials or technical aids on exams. Teachers can issue written and oral warnings, and they can block access to exams for up to 6 months without the need to initiate a disciplinary process. In the case of more serious disciplinary violations, a disciplinary process is launched in accordance with the Regulations. This can lead to disciplinary measures, a pre-exclusion warning, forfeit of the right to sit exams for up to 6 months, exclusion from studies for up to 2 years, and permanent exclusion from studies. The Faculty Council hears appeals to decisions made by the Disciplinary Commission for Students and renders a final

decision within 40 days from the date of appeal. The disciplinary process applies Croatian criminal law, except aspects of the law related to coercive measures.

Two disciplinary measures were taken during academic year 2014/2015, four in 2015/2016 and six in 2016/2017. These measures included prohibition from sitting exams for 3-4 months, pre-exclusion warnings, exclusion from studies for 1 year as well as permanent exclusion from study.

Certain types of unethical behaviour by teachers are subject to disciplinary measures as specified in the [Regulations on disciplinary responsibilities of employees](#). Examples of such behaviours include failure to perform professional duties, negligent or late performance of duties, illegal activities or failure to uphold measures designed to prevent illegal activities, abuse of position and exceeding official authorisation. As specified in the Regulations, written warnings are issued for less serious disciplinary violations, while a public warning or termination of employment occur for more serious violations.

The Ethics Council of the University of Zagreb is responsible for providing a unified interpretation of the Ethical Code, facilitating coordination among the various ethics bodies, and guiding University activities toward the advancement of ethical standards.

The Faculty ensures that all employees can enjoy their human rights, it respects their integrity and dignity, it excludes all forms of discrimination and abuse, it guarantees academic freedom, and it maintains conditions for creating equality and justice.

Members of the academic community are expected to be responsible, conscientious, professional and ethical in fulfilling their obligations towards students, colleagues and other workers at the University. They should exercise the principles of objectivity, impartiality, discretion, propriety, dialogue and tolerance. Teachers should contribute to the intellectual development of their students and transmit to them a high level of scientific knowledge.

To impress upon students the importance of avoiding plagiarism, all first-year students complete seminar reports in certain subjects. These reports are written according to strict guidelines that teach them to cite relevant authors and literature correctly and thereby avoid plagiarism of other works. In subsequent years, students prepare bachelor or master theses, or even doctoral theses. When they submit these documents, they must attach a [Statement of academic honesty and consent](#). The consent refers to the student's agreement to allow his or her work to be archived in the [Dabar Digital Academic Archives and Repositories](#). This helps make students aware that their work is a permanent contribution open to public review.

When teachers apply for scientific projects, they sign a declaration about the originality of their research.

The Faculty publishes the journal *Promet - Traffic & Transportation*, which is the most reputable journal in the transport field in Croatia and the region. For years, the journal has worked to maintain scientific and research honesty by avoiding the publication of articles suspected of

violating these norms. In this way, teachers are made aware of the kinds of honesty checks that occur and of the consequences of plagiarism and data theft.

The Faculty uses [Crossref/iThenticate](#) software to detect plagiarism or similarity with other words. Such checks are performed on scientific articles, doctoral thesis proposals and doctoral theses. The journal *Promet* also often uses this software to check submitted manuscripts before they are accepted for publication.

The Faculty actively participates in discussions about centralised purchase of software tools to detect plagiarism, which are being coordinated by the University Computing Centre (SRCE) at the national level. Such software would be used systematically to check submitted bachelor and master theses for plagiarism.

1.4. The higher education institution ensures the availability of information on important aspects of its activities (teaching, scientific/artistic and social)

Information on study programmes and other activities of the higher education institution is publicly available in Croatian and at least one world language.

The higher education institution informs stakeholders on the admission criteria, enrolment quotas, study programmes, learning outcomes and qualifications, forms of support available to students.

Information on the social role of the higher education institution is made available to stakeholders.

The higher education institution informs stakeholders about other indicators (e.g. pass rate analyses, graduate employment, drop-out rates, outcomes of previous evaluations, etc.)

Information about study programmes and other activities is publicly available in Croatian on the Faculty's website, on the appropriate pull-down menu below "ENROLMENT" ("UPISI"). A new website with information in Croatian and English is planned for launch during academic year 2018/2019.

The website contains [class schedules](#) of all study programmes at the pre-diploma and diploma levels. Criteria for enrolment in later years of pre-diploma and diploma programmes are also published on the website in a timely fashion.

[Post-diploma studies](#) have their own menu leading to all information relevant to enrolled post-diploma and potential future doctoral students.

The study programmes and activities of the Faculty are also made publicly visible through a range of activities, including:

- [University of Zagreb Fair](#), in which the Faculty has regularly participated and repeatedly won awards for the quality of its presentations
- [Visits to high schools in Zagreb and surrounding areas](#)
- [Open House Day](#), when the Faculty presents its work to high school students through panel lectures and visits to laboratories and other spaces where students work at the Faculty

- Programs such as "[Today I study, tomorrow I work](#)", which promotes companies that employ Faculty graduates
- Other similar activities

These activities involve members of the Committee for Faculty Promotion as well as other teachers and students from the [Student Council and student societies](#). During these activities, various promotional videos are shown ([video 1](#), [video 2](#), [video 3](#), [video 4](#), [video 5](#)), together with brochures and flyers designed to inform the public about enrolment criteria, study programmes and other activities of the Faculty.

Through its organisational units, the Faculty organises expert meetings and workshops about traffic and transport challenges and potential solutions. It also organises project presentations aimed at target groups, such as the broader public, students in their final year of pre-diploma studies, and students in diploma studies.

Interested stakeholders can inform themselves about Faculty activities not only through the [Faculty website](#) but also through social media such as [Linkedin](#), [Twitter](#) and [Facebook](#).

1.5. The higher education institution understands and encourages the development of its social role

The higher education institution contributes to the development of economy (economic and technological mission of the university).

The higher education institution contributes to the development of the local community.

The higher education institution contributes to the foundations of the academic profession and the accountability of teachers for the development of the university and the local community.

The development of its social role is a part of higher education institution's mission (e.g. development of civil society, democracy, etc.)

The Faculty, through its professional and economic projects as well as through its other activities, plays a truly important role in the development of the domestic economy and the broader community. Developmental and professional projects are aimed at investors in the domestic economy, public administration, and a range of government bodies. The results of these projects are quite visible in the form of traffic and transport infrastructure in Croatia, particularly road, urban, air, rail and other types of transport. The founding of the Economic Council in 2015 was a significant step forward in the Faculty's collaboration with the economy, and the Council focuses its work on areas in which the Faculty can advance and maintain its position as the leading Croatian institution in the area of transport and traffic. The Committee for Faculty Promotion supports the work of the Economic Council and coordinates media coverage of its work. Members of the Economic Council are regularly invited to participate in the Faculty's promotional activities, as well as in scientific and expert activities organised by the Faculty, such as open houses, roundtables, and panel discussions. The creation of new study

programmes must involve Council members, whose opinion is taken into account. The Council usually meets twice a year.

The Faculty is involved in decision-making in the public interest through the activities of its teachers, who, acting independently or in the name of the faculty, serve as members of city, county and national government bodies and other agencies working to address traffic problems; work in the economy to resolve specific transport problems; organise conferences, congresses, meetings, roundtables and other types of group interactions in Croatia and abroad; and serve as members of councils and boards at companies, agencies and associations related to transport and traffic.

All tasks and activities at the Faculty aim to support the sustainable development of transport and traffic and of the economy and society in which the Faculty operates. The Faculty continuously works to develop its nationally and internationally recognised excellence in education and research in all areas of transport and traffic. It works to harness the synergistic benefits of education and research with the aim of creating a system in which knowledge is transferred and applied in society's interest and for society's prosperity.

The Faculty organises professional and scientific activities for the broader community. Since 2001, the Faculty has organised an annual scientific-professional consultative meeting called Science and Traffic Development (ZIRP), covering crucial topics from the fields of traffic, transport and logistics. Since 2002, this consultative meeting has been organised in collaboration with the Croatian Association of Diploma Engineers and Engineers of the Faculty of Transport and Traffic Sciences. For example, the title of the [ZIRP meeting in 2012](#) was "Development of logistics business and the traffic system with EU financing", and the roundtable topic was "New traffic development strategy in Croatia". The theme of the [ZIRP meeting in 2018](#) was "Transport and logistics industry in the Digital Age"; this meeting was organised in collaboration with [four European universities](#) (Wroclaw University of Science and Technology, University of Bremen, University of Maribor and University of Pardubice). The Faculty organises other consultative meetings in addition to ZIRP, and [proceedings from these meetings](#) are published on the Faculty website.

The Faculty plays a social role in promoting engineering solutions towards safe, efficient, quiet and inclusive transport through the participation of its teachers in meetings, roundtables, forums as well as TV and radio broadcasts. The Faculty also plays an important social role in promoting sustainable transportation solutions that are healthier and environmentally friendlier (walking, cycling and taking public transport). The Faculty is taking part in the planning of sustainable mobility and energy efficiency solutions for Croatian cities, and it participates in the implementation of measures to increase the safety of the most vulnerable members of road and railway traffic at rail crossings. The Faculty worked with primary and secondary school students to produce a [video spot](#) for broadcast on TV and in schools during workshops on safety at rail crossings.

In addition to contributing to the national economy, the Faculty contributes to local community development by carrying out professional projects to increase traffic safety and improve traffic infrastructure.

In order to promote traffic-related topics to the broader community, Faculty employees and students take part in various events and learning programmes for diverse social groups. One example is the participation of members of the [Department of Traffic Accident Expertise](#) in expert assessments of traffic accidents. In addition, workshops for experts who perform traffic accident assessments are organised every year on the Borongaj campus, with the goal of improving the quality of such work in Croatia.

Since 2012, the Faculty regularly participates in the Festival of Science, and details can be found on the webpages corresponding to each year ([2018](#), [2017](#), [2016](#), [2015](#), [2014](#), [2013](#)). The Department of Railway Transport participates in the popularisation of science and collaborates with the Nikola Tesla Technical Museum and the Croatian Railway Museum.

In addition, the Faculty has recently participated in the following events:

- [Workshop in 2012](#) on participation of disabled individuals in traffic
- [ARCA International Innovation Expo](#)
- [Šibenik Children's Festival](#)
- [Zagreb Energy Week](#)
- [European Mobility Week](#)
- [SWIIF Festival of Innovation](#)

News about these events is regularly posted on the Faculty's website under the links [Events](#) and [News](#), as well as on the University website.

Teachers in the study concentration Information and Communications Traffic within the study programme Transport are particularly involved in social-impact work. These teachers, through a collaboration with the Faculty of Education and Rehabilitation Sciences at the University of Zagreb, apply their teaching and scientific expertise for the benefit of disabled and visually impaired individuals. Students in the Laboratory of Development and Research of Information and Communication Assistive Technology are collaborating with the Department of Visual Impairments of the Faculty of Education and Rehabilitation Sciences at the University of Zagreb and the non-profit association Up2Date to develop innovative services in the field of assistive technologies for individuals with disabilities. This research also involves education, in which students become familiar with users' day-to-day needs as they navigate the transport network and with the possibilities for applying novel ICT solutions and services.

The Faculty works to develop sustainable partnerships between higher education institutions and civil society organisations to implement programmes of socially useful learning. Since 2015, the Faculty has offered support to associations that promote such goals, such as an Inclusive Beekeeping School for individuals with disabilities, to whom the Faculty has provided classroom space with wheelchair access. This school involves beekeeping associations and

teachers from the Faculty of Education and Rehabilitation Sciences of the University of Zagreb. In part because of the success of the Inclusive Beekeeping School, the Croatian Employment Office introduced in 2016 the practice of beekeeping as an acceptable basis for cofinancing and prequalification of individuals with disabilities.

For more than five years, the Faculty has given modest financial support to the association SOS Children's Village Lekenik in the form of Christmas and New Years' cards for associates and business partners. In this way, the Faculty promotes social awareness of the need to offer assistance to children without parents or social support.

The Faculty collaborates closely with numerous international federations and associations, including International Road Federation (IRF), European Union Road Federation (ERF), European Road Assessment Programme (EuroRAP), International Road Assessment Programme (iRAP), Road Safety Foundation (RSF), Bloomberg Initiative for Global Road Safety (BIGRS), International Union of Railways (UIC), RailNetEurope (RNE), Allianz pro Schiene e.V. (The Pro-Rail Alliance, Njemačka), Audio Engineering Society (AES), Institute of Electrical and Electronics Engineers (IEEE, Region 8, IEEE Croatian Section), International Telecommunications Society (ITS), and The Royal Institute of Navigation ([RIN, Croatian Branch](#)).

The Faculty also collaborates closely with numerous domestic federations and associations, including Croatian Auto Club (HAK), Auto Club Siget, Croatian Ergonomics Society (HED), Odras (CIVINET network), ITS Croatia, Adriatic Aerospace Association (A3), Intermodal Transport Cluster - Short Sea Shipping Promotion Centre, Pro-Rail Alliance, Safety in Traffic, Cyclists' Union, Croatian Federation of Associations for Youth and Students with Disabilities, Imagine, and Green and Blue Sesvete.

With the goal of bringing together all stakeholders in the Faculty and broader community, Faculty teachers have founded the [Hiking Club of the Faculty of Transport and Traffic Sciences](#) and the [Collectors Club of the Faculty of Transport and Traffic Sciences](#).

The students and teachers of the Faculty show strong social awareness and are quick to engage in volunteer work and philanthropic campaigns, such as blood donation, donation campaigns for needy individuals following natural disasters, and gift collection for children's homes.

2. STUDY PROGRAMMES

2.1. The general objectives of all study programmes are in line with the mission and strategic goals of the higher education institution and the needs of the society

There is evidence that general goals of all study programmes are in line with the mission and strategic goals of the higher education institution.

The justification for delivering study programmes is provided and includes an analysis of resources of the higher education institution required for delivering study programmes.

If the higher education institution delivers study programmes leading to degrees in regulated professions, it accepts the recommendations of professional organisations that govern their licencing.

The higher education institution produces competitive professionals for national and international labour markets.

The overall goals of study programmes respond to social needs (e.g. there is justification for studies provided by the university and its constituents).

The strategic goals of the Faculty are defined in two foundational documents: [Development strategy of the Faculty of Transport and Traffic Sciences for 2018-2023](#) and the [Strategic programme of science research for 2015-2020](#). The basis for the Strategy for 2018-2023 was the [Development strategy of the Faculty of Transport and Traffic Sciences for 2012-2017](#). The overall goals of all study programmes at the Faculty are aligned with its mission, vision and strategic goals. In accord with the mission and vision defined in the Faculty's Strategy, all tasks and activities at the Faculty address the sustainable development needs of transport and traffic as well as the economy and society in which the Faculty operates.

Justification for the Faculty's study programmes is the need for university-educated experts who can respond creatively to the development demands of the transport sector and who can improve transport systems and processes on the basis of recent scientific and technological achievements. Economic globalisation and international exchange create a growing need for mobility of people, goods and information. As a result, there is a need for dynamic development of systems based on safe, clean, sustainable and intelligent transport, and that are aligned with strategic priorities and demands, as well as with R&D projects of the European Union and strategic documents of the Croatian government, such as [White paper on the roadmap to a Single European Transport Area](#), [Smart, green and integrated transport in the framework of the Horizon 2020 EU programme](#) and the [Strategy for transport development in Croatia from 2014 to 2030](#).

In this way, in alignment with social and economic needs, the Faculty offers three study programmes at the pre-diploma and diploma levels: Traffic, Intelligent Transport Systems and Logistics, and Aeronautics. At the post-diploma level, the Faculty offers specialisation and doctoral studies.

Since receiving its [authorisation](#) to offer pre-diploma and diploma studies according to the Bologna process, the Faculty has amended and expanded study programmes by 20% in 2010 and 2013. These changes were based on the results of the most recent scientific research and methodological concepts in the field of traffic and transport technology, and they were aligned with economic needs.

In 2018, the post-diploma doctoral programme [Transport](#) was approved, and it enrolled its first cohort in academic year 2018/2019. The programme was conceived such that it would be comprehensively integrated with economic needs.

The Faculty guarantees the availability of teaching, administrative and technical staff needed to meet the goals and requirements of its study programmes. The Faculty has developed a system for planning and monitoring teaching load based on a [Document Management System](#), and teaching plans are created through collaborative software ([Microsoft SharePoint](#)). Courses and teaching load are normally defined in May for the following academic year, and these plans are made available to all teachers as a spreadsheet.

The Faculty's teaching, research and professional spaces, although distributed over multiple locations, fulfill the requirements of its study programmes and its scientific and professional activities. The Faculty has been working for several years to unify its space resources. Section 4 of the Self-Evaluation provides a detailed description of teaching and institutional capacities.

In line with the [Database of regulated professions in Croatia](#), the Faculty provides pre-diploma education in Aeronautics as preparation for the regulated professions of airplane pilot and air traffic controller. The pre-diploma programme is designed so that its graduates satisfy the conditions for completing the licensing process to become a civil pilot or to receive a certificate in basic training as an air traffic controller. These two study programmes are aligned with European regulations for the training of civil pilots and air traffic controllers, and they have been approved by the Croatian Agency for Civil Aviation. Two organisations have been organised and certified for training purposes: the [Croatian Aviation Training Centre \(HZNS\)](#), which trains civil pilots according to PART FCL; and the [Croatian Air Traffic Control Training Centre \(HUSK\)](#), which provides basic controller training according to EU Commission Regulation 2015/340. The Faculty offers a pre-diploma programme in Aeronautics with a Military Pilot concentration for training towards the regulated profession of military pilot of airplanes and helicopters. This training is carried out in collaboration with the Croatian Ministry of Defence: the Ministry is involved in selecting students for the programme and in providing practical training. The Ministry also provides financial support to students during their studies and employs them after they graduate.

The justifiability of study programmes is analysed every year when admission quotas are proposed for pre-diploma and diploma studies. In addition, data on employment of bachelor and master graduates of the Faculty are obtained from the Croatian Employment Office and analysed. Employment data also come from the Agency for Science and Higher Education as well as the Committee for Alumni Career Monitoring. Examples of the results of research on employment of graduates are described in Section 3.10 of the Self-Evaluation.

The Faculty actively works to promote employment in traffic and transport in collaboration with the [Croatian Chamber of Traffic and Transport Engineers](#) and the Economic Council of the Faculty, which involves 23 firms in the transport and logistics sector. Significant investments are expected in the transport and logistics sector in Croatia and Europe, and this will increase

demand for the competencies and qualifications gained through studies at the Faculty, which will be needed for completing various projects as well as implementing and maintaining them after their completion.

The Faculty follows market trends and, in direct communication with economic stakeholders, strives to adapt to these trends by organising activities involving its Economic Council, roundtable discussions with economic actors, [presentation of companies to students](#), corporate funding of studentships, and other activities.

2.2. The intended learning outcomes at the level of study programmes delivered by the higher education institution are aligned with the level and profile of qualifications gained

The higher education institution has clearly defined the learning outcomes of the study programmes, and they are aligned with the mission and goals of the higher education institution.

The higher education institution checks and ensures that the learning outcomes at the level of courses are aligned with the learning outcomes at the programme level, are well aligned among one another and do not show unnecessary overlap or repetition.

Learning outcomes achieved in the study programme are aligned with the CroQF and EQF level descriptors.

In defining learning outcomes, the higher education institution acts in line with professional requirements and internationally recognized professional standards, ensuring that the programme is up to date.

The intended learning outcomes clearly reflect the competencies required for employment, continuing education or other individual/society needs.

Study programmes at the Faculty have clearly defined learning outcomes that are aligned with the mission and goals of higher education as specified in the Dublin Descriptors of knowledge and understanding, application of knowledge and understanding, inference and judgment, communication and learning skills for students at the pre-diploma and diploma levels. Outcomes are examined at two levels:

- learning outcomes at the level of pre-diploma and diploma study programmes
- learning outcomes at the level of a specific course

[Learning outcomes at the level of study programme](#) clearly reflect the competencies necessary for inclusion in the labour market or continuation to a higher level of study. Learning outcomes at the level of specific courses are aligned with outcomes at the programme level without unnecessary overlap. Departments and Independent Chairs check the alignment of learning outcomes and lack of overlap or repetition for all concentrations in all study programmes, and the results are confirmed at the level of Divisions.

Learning outcomes for all study programmes are available on the Merlin e-learning system and are linked to the outcomes of specific courses. Learning outcomes for courses are announced to students every year as part of the curriculum and study programme, as laid out in the document "Teaching curriculum, responsibilities of teachers and students, and examination procedures".

On the basis of the learning outcomes of each course, the contribution of each course to the overall learning outcomes of the study programmes is determined. Table 2.1 of the MOZVAG Appendix shows the learning outcomes for the study programme and the contribution of each course to those outcomes.

The learning outcomes at the level of specific courses are aligned with those at the level of the study programme for all concentrations within each programme. This alignment is usually checked annually during the adoption of the curriculum for the next academic year. During this check, learning outcomes are aligned based on the Croatian and European Qualifications Framework, the Dublin Descriptors of knowledge and understanding and Bloom's taxonomy. Immediately before assessing alignment of learning outcomes in courses, teachers refresh their knowledge about outcomes interrelationships and alignment. All teachers at the Faculty received training on learning outcomes between 2012 and 2014, and a workshop on this topic was provided during academic year 2017/2018.

2.3. The higher education institution provides evidence of the achievement of intended learning outcomes of the study programmes it delivers

The higher education institution ensures the achievement of intended learning outcomes of the study programmes it delivers.

The higher education institution continually revises and improves the teaching process on the basis of evidence on the achievement of the intended learning outcomes (for example, tests, seminar papers, presentations, etc.).

Learning outcomes that students achieve are aligned with the needs of their profession.

Learning outcomes that students achieve upon completing study programmes are aligned with the needs of the labour market and society.

Learning outcomes at the course level and at the level of entire study programmes are defined based on monitoring of the development of the transport and traffic professions.

To ensure fulfillment of learning outcomes in a given course, the document "Teaching curriculum, responsibilities of teachers and students, and examination procedures" is prepared for each course. This document defines the goal of the course, its learning outcomes and the contribution of these learning outcomes to the desired outcomes for the study programme as a whole. The document also lays out the teaching plan for the semester in terms of type of instruction, name of instructor, student responsibilities and examination procedures. At the beginning of the semester, these documents are made available for all courses in a study programme through the Merlin e-learning system, and the information in the documents is explained at the first meeting of the course.

The teaching process is revised in alignment with the development of the relevant professions so that student competencies correspond to labour market demands. These changes can be large or small and include changes to the teaching format (e.g. lectures, auditory practicals,

laboratory practicals, seminars), changes or additions to course content and introduction of new courses.

All changes are made through a controlled procedure that depends on the extent of the change. Smaller course changes (5-10%) are initiated by the teacher him- or herself, in response to calls from the Vice-Dean for Academic and Student Affairs. These changes are made in May for the following academic year. Larger changes are made in collaboration with the Committee for Study Programmes of the University. All changes must be approved, first at a meeting of the Committee for Study Programmes and Curriculum of the Faculty, then at a meeting of the Faculty Council. More extensive changes must be approved at a meeting of the Committee on Study Programmes of the University.

Since receiving its [authorisation](#) in 2005 for pre-diploma studies and in 2008 for diploma studies, the Faculty has submitted to the University two revisions to its study programmes and curricula, and it is now preparing a project to alter the study programmes and curricula according to the guidelines of the Croatian Qualifications Framework (HKO).

Learning outcomes within a given course are assessed based on student achievements, e.g. tests, seminars, seminar papers, presentations and final exams. At the beginning of the semester, learning outcomes and methods to evaluate student achievement are described.

To ensure that students are prepared for the labour market when they complete their studies, they have numerous opportunities to familiarise themselves with professional practice through internships (student practice), seminar papers, as well as bachelor and master theses. Through these activities and their mentors, students consult with experts in the field.

Bachelor and master theses give teachers the opportunity to assess whether students have synthesised learning outcomes at the pre-diploma and diploma levels. The Committee for Bachelor and Master Theses reviews and approves thesis topics, after they have been analysed and approved by the relevant department. [Regulations on bachelor and master theses](#) have been defined to help ensure their quality through a formalised procedure from topic submission until defence. Students prepare their theses on the basis of the [Instructions for proposal, preparation and defence of bachelor and master theses](#).

A [List of approved topics for bachelor and master theses and deadlines for thesis submission and defence](#) is published on the Faculty website. After a public defence, bachelor and master theses are submitted to the Faculty Library, which makes them available digitally through the [Dabar Repository](#).

2.4. The HEI uses feedback from students, employers, professional organisations and alumni in the procedures of planning, proposing and approving new programmes, and revising or closing the existing programmes

Development activities related to study programmes are carried out systematically and regularly, involving various stakeholders.

Planning and proposing new study programmes includes an analysis of justification for delivering a study programme, resources and alignment with the strategic goals at the local and regional level, and other needs of society.

The higher education institution provides evidence on the justification for delivering same or similar study programmes within the same university, or it eliminates the programme overlap.

The higher education institution publishes up-to-date versions of study programmes.

The higher education institution records the changes to study programmes and analyses their fitness for purpose.

Activities related to study programmes involve teachers, students and economic stakeholders through the Economic Council of the Faculty and through collaborations with departments. The Council comprises representatives of institutions and corporations directly related to the scientific and teaching activities of the Faculty. Together the Council and Faculty plan all levels of study programmes, and they collaborate on lifelong learning programmes. The [new doctoral studies programme](#) approved in 2018 is a good example of collaboration with representatives from the economy, analysis of social needs and alignment with strategic goals of society as a whole. During definition of goals and concepts for research seminars, outcomes are also defined that strongly link doctoral students to the business sector and give them competencies sought by employers in various traffic and transport areas.

A redevelopment of all study programmes at the pre-diploma and diploma levels is planned in accord with the strategic goals of the Faculty and the needs of the labour market. At the same time, teaching quality is constantly improved and student competencies are aligned with the Croatian Qualifications Framework at the higher education level.

In 2017, the Faculty created the Commission for Development of Qualification Standards and Registration in HKO, based on guidelines from the Croatian Qualifications Framework (HKO). The main task of the Commission is to prepare documentation about the new teaching and study programmes at the Faculty in accord with professional and qualification standards. A secondary goal is to register the new teaching programme and curriculum in the HKO Registry. The working group held several meetings and began surveying employers in order to develop professional standards. In June 2018, the Faculty submitted a proposal to the European Social Fund call "Implementation of the Croatian Qualifications Framework at the level of higher education". In this proposal, the Faculty planned an expansion of the existing diploma-level study programme Transport and development of new pre-diploma and diploma studies in Logistics.

It is not realistic to expect that new study programmes aligned with professional and qualification standards within the Croatian Qualifications Framework can be developed within one year. Therefore a Working Group for Development of Guidelines for the Teaching Programme and Curriculum was organised. This group is planning changes to the teaching programme and curriculum even before implementation of the Croatian Qualifications Framework. The new programme and curriculum will be based on the results of employer surveys about required competencies for bachelor and master graduates and would represent a "transitional phase" prior to introduction of a new study programme completely aligned with

the Croatian Qualifications Framework. The Working Group has so far analysed more than 30 study programmes at related faculties in Europe and, based on this analysis, they will suggest possible guidelines for the new teaching programme and curriculum to Faculty leadership and department heads.

The Faculty submitted an application to the European Social Fund call "Internationalisation of higher education for development of teaching programmes and curricula in English" with the project „LoMI - Leaping over limits through internationalisation", and this application has been awarded funding. The project is a collaboration of several faculties at the University of Zagreb: the Faculty of Transport and Traffic Sciences, the Faculty of Mechanical Engineering and Naval Architecture and the Faculty of Organisation and Informatics, with the support of the Faculty of Political Science (September 2018).

Pre-diploma and diploma study programmes are evaluated through surveys filled out by students who have completed the programmes. The surveys evaluate various aspects of the programmes, including content and quality of required and elective courses, the range of elective courses available, the possibility of taking courses outside the programme, the appropriateness of course demands and difficulty in light of students' prior knowledge, and the interconnectedness and sequence of contents in various courses through the years of study. The results of the survey for each academic year are presented at meetings of the Faculty Council.

Mentors are defined for all study levels and concentrations, and they are selected from among teachers. The goal of the [mentoring system during studies](#) is to create conditions for improving the effectiveness of studying. Meetings with students generally take place once per semester, and the reports from these meetings are delivered to the Quality Assurance Commission, which [analyses](#) them. The teaching process is then improved on the basis of this analysis.

Every academic year, throughout the process of making small changes to the teaching programme and curriculum for the next academic year, suggestions from teachers that have been approved by department heads are collected and discussed at a Faculty Council meeting. Details of study programmes are regularly updated on the Faculty web pages ([example of a teaching programme and curriculum for academic year 2018/2019](#)).

The website of the Committee for International Cooperation and Mobility contains a [list of courses in English](#).

In 2016, a [Self-assessment of the state of development of a quality assurance system](#) was completed as an outcome from an internal evaluation conducted by the the Quality Management Committee of the University of Zagreb. Programmes are developed, approved, continuously monitored and periodically reviewed with a high degree of consistency.

The Faculty does not offer technical studies or similar pre-diploma or diploma studies in the field of traffic and transport technology at the University of Zagreb or at other universities in Croatia.

2.5. The higher education institution ensures that ECTS allocation is adequate

The higher education institution allocates ECTS credits in accordance with the actual student workload, based on the analyses of feedback from stakeholders in the teaching process, or other procedures.

Students are provided with feedback on the results of the analysis of gathered information and the implemented changes.

The teaching programme and curriculum include allocations of ECTS credits to courses in accordance with the Bologna Process. Since the Faculty received authorisation for teaching activities, two analyses of the teaching programme and curriculum have been carried out, in collaboration with teachers and associates. As a result of these analyses, changes were made in 2010 to all pre-diploma study programmes and to the diploma programme in Aeronautics, and in 2013 to the diploma programmes Transport and Intelligent Transport and Logistics. In addition to innovations in the teaching programme and curriculum, these changes included reassignment of ECTS credits to accurately reflect student workload.

In 2010, the changes in ECTS credits in pre-diploma studies were as follows: Transport, ECTS credits were adjusted for 8 courses, and 10 courses were introduced; Intelligent Transport Systems and Logistics, 3 courses were introduced; Aeronautics, ECTS credits were adjusted for 10 courses, and 3 courses were introduced. In the diploma programme Aeronautics, the course selection was expanded, with corresponding ECTS credits, to cover the field of civil aviation.

In 2013, the changes in ECTS credits in the diploma study programme Transport were as follows: ECTS credits were adjusted for 8 courses, and 22 new courses were introduced. Overall, ECTS credits were distributed among the study concentrations as follows: road transport, 24 credits; urban transport, 13; information and communications traffic, 24; postal transport, 23; water transport, 20; air transport, 21; and railway transport, 24. Changes in ECTS credits in the diploma study programme Intelligent Transport Systems and Logistics involved adjustment of ECTS credits for 8 courses and introduction of one course. The distribution of credits was 20 for intelligent transport systems and 22 for logistics.

Every year during the summer semester, the Faculty updates the curriculum for the next academic year, including small adjustments and additions to study programmes. This also provides an opportunity for redistributing ECTS credits based on actual student workload. Changes for the academic year 2017/2018 are available to students at <http://www.fpz.unizg.hr/isvu/2017/>.

During the academic year, when students hand in their bachelor or master theses, they are asked to fill out surveys to evaluate pre-diploma, independent diploma, integrated prediploma-diploma or specialisation studies. The questions on the survey include an evaluation of how well ECTS credit allocations correspond to actual student workload. Results from these surveys suggest a satisfactory allocation of credits.

In academic years 2014/2015 and 2017/2018, the Quality Assurance Commission surveyed students about ECTS credit allocation. The results of these surveys will be taken into account when ECTS credits are assigned to courses in the new study programmes.

2.6. Student practice is an integral part of study programmes

The higher education institution allows for learning and obtaining new skills through student practice, where applicable.

Where applicable, student practice is an integral part of study programmes and is organised outside the higher education institution, in cooperation with the labour market.

Student practice is carried out in a systematic and responsible manner, ensuring the achievement of intended learning outcome regarding student practice.

The Faculty enables pre-diploma students to learn and gain skills through practical activities. All students, regardless of whether they are studying full- or part-time, are required to complete 25 days of practical work in accordance with the work schedule at the host organisation. Student practice must be completed before the end of pre-diploma studies. Students are advised to complete 105 ECTS credits and to select a study concentration in the third year of pre-diploma studies or enrol in the third year of pre-diploma studies.

Students in the pre-diploma programme in Aeronautics complete their practical work through elective courses at the Faculty, which depend on the study concentration: for the concentration in Flight Control, practical courses are Aerodrome Simulator, Area Simulator, and Approach Simulator; concentration in Civil Pilot, Flight Theory and Practice; and concentration in Military Pilot, Flight Theory and Practice 1. Students of Aeronautics who complete the appropriate course(s) are considered to have completed their professional practice.

Students in other study programmes who fulfill the conditions for practical activities enrol in the course Professional Practice at the beginning of the academic year through the Merlin e-learning system. A student can request professional practice if he or she satisfies the conditions during an academic year. Part-time students who are employed are excused from performing professional practice so long as they provide a certification from their employer that they are working. This certification, with the signature and seal of the employer, must be delivered to the Student Affairs Office before completion of studies.

Student practice usually takes place during the summer, after the summer exam period and before the fall exam period. The practical work can be performed in public or private institutions, in Croatia or abroad, with the approval of the Student Practice Director. The host organisation must engage in activities that are appropriate for the student's study concentration. With the Director's approval, students can also perform their practical work at the Faculty by working on Faculty projects.

In the current programme and curriculum of pre-diploma studies, ECTS credits are not awarded for practical activities. During preparation of the new study programme, the possibility of awarding ECTS credits for student practice is being considered. The new programme may also involve a restructuring of student practice and introduction of practical activities in diploma studies.

Student Practice Directors in each study concentration are teachers who have been given the responsibility of assigning students to practical activities, and the work of these Directors is

coordinated by the Student Practice Coordinator. These Directors are listed in the Merlin system. To begin practical work, students receive from the Director a reference for student practice signed by the Director and the Vice-Dean for Academic and Student Affairs, and stamped with the Faculty seal. The reference includes the e-mail address of the Director so that the practice mentor in the host organisation can contact him or her directly. To organise practical work, the student and Student Practice Director discuss with each other, as do the student and the host organisation. All necessary forms are available to students, and they must be filled out electronically and signed or signed and stamped; these forms are Instructions for Completing Student Practice, Report of Completed Student Practice, Confirmation of Student Practice Completion, Confirmation of Employment and Confirmation of Student Practice Non-Completion. For students who complete practical work, the Student Practice Director records the work on their transcript. In the case of part-time students who bring a Confirmation of Employment, the Student Affairs Office records the practical work on the transcript.

The Faculty tracks for what practical activities students apply and what activities they complete, and these data are collected for each study concentration. Announcements are regularly released containing links to calls that offer professional practice and are open to students, such as [Erasmus+ traineeships and apprenticeships for students](#) or [IAESTE Croatia](#). Since 09 February 2018, the Faculty has been a partner institution in the [Private Sector Initiative for Youth](#), which the Croatian Employers' Association (HUP) launched in collaboration with the European Bank for Reconstruction and Development (EBRD). Before a student can access the Internet portal of the Initiative, he or she must give approval for his or her personal data to be passed to the Initiative; the approval form is filled out in electronic form in the Merlin system. This practical work can fulfill the student practice requirement for students in pre-diploma studies, which is decided by the Student Practice Director for the student's concentration.

Student practice is not performed during diploma or post-diploma studies. Students who perform practical work through the HUP/EBRD Private Sector Youth Initiative or Erasmus+ traineeships or apprenticeships receive recognition on a supplementary student record on the basis of a Confirmation of Student Practice Completion for students in pre-diploma and diploma studies. This confirmation is filled out electronically and can be downloaded by the student from the Merlin system (courses "Student Affairs" and "Student Affairs-PDS").

The Faculty has existing arrangements with organisations that can host students performing practical work. Any teacher can, in coordination with the Student Practice Director and Legal Office, initiate the signing of a contract with a host organisation, and these contracts are archived.

An upgrade is planned for the e-course Student Practice in the Merlin system as well as development of a dedicated e-practice application that would allow students to reserve a practice place online and allow Directors to monitor and analyse student practice. Also planned are the development of partnerships with host organizations where students can perform practice activities as an extracurricular activity, co-financing of student practice, and creation

of a student portfolio containing all the certificates that the student has earned during his or her studies. These can include certificates of student practice, awards and other achievements. This portfolio would increase the profile of the Faculty among future employers and give those employers a better view of the student's knowledge and skills.

The Faculty Development Strategy for 2018-2023 calls for establishing an Office for Student Practice and Career Development, which would plan and monitor student practice, student scholarships, and the suitability of the teaching programme and curriculum as well as competencies of graduates based on economic needs and the labour market. The Office would also assist the economy and employers in identifying young experts in the field of traffic and transport technology.

2.7. Lifelong learning programmes delivered by the higher education institution are aligned with the strategic goals and the mission of the higher education institution, and social needs

There is evidence that general goals of the lifelong learning programmes are in line with the mission and strategic goals of the higher education institution.

There is evidence that general goals of the lifelong learning programmes are in line with social needs.

Revision and development of lifelong learning programmes is carried out systematically and on a regular basis.

The section of the Faculty's Development Strategy related to study programmes and students calls for developing and implementing a lifelong learning programme. The Faculty provides for lifelong learning through various training events, workshops, conferences and summer schools.

The [Regulations on lifelong learning](#) describe the concept of education programmes and types of lifelong learning programmes and procedures for proposing, implementing and evaluating such programmes. These educational programmes are defined as programmes outside study programmes that are founded on the principles of lifelong learning. These programmes can be proposed and organised in collaboration with partners outside the Faculty and University, such as professional associations, institutions, national and local government agencies and others. It is anticipated that development of proposals for such programmes will involve the Faculty Council, the Croatian Chamber of Traffic and Transport Engineers and the Croatian Association of Diploma Engineers and Engineers of the Faculty of Transport and Traffic Sciences.

The Faculty provides continuous training in various topics of commercial interest that are linked to the latest advances in the field. At the end of training, participants are surveyed to understand their level of satisfaction.

Over the past five years, the Faculty has provided the following lifelong learning programmes for more than 100 participants:

- Logistics training for employees of INA, Inc. (2015)
- Inventory management in supply chains for employees of Pik Vrbovec, Inc. (2016)

- Logistics training for employees of IKEA Hrvatska (2017)
- Possibilities for optimising inventory warehousing and management, Shipping business, Models of goods distribution for employees of SportVision, Inc. (2017)
- Qualification of road safety inspectors (2017)
- Training in safety management systems for the Ministry of Defence (2018)
- Seminar on technical analysis of road accidents (annually since 2013)

The Faculty is continuously involved in developing lifelong learning programmes aimed at specific groups such as civilian pilots, air traffic controllers, flight instructors, and instructors of flight control simulators. These trainings have involved approximately 100 participants over the last five years. These programmes were designed to help participants obtain licences to work as a civilian pilot or flight controller, or to obtain additional authorisations beyond a basic licence. The programmes are completely aligned with European aviation regulations on the training of civilian pilots and flight controllers, and they have been approved by the relevant aviation authorities (Croatian Civilian Aviation Agency). They contain theoretical content (50-650 hours, depending on the programme) delivered primarily by teachers in the Department of Aeronautics, as well as by external associates of the Faculty working in the economy. The programmes also contain practical training in aircraft, flight simulators and flight control simulators. This practical training (30-200 hours, depending on the programme) is taught by Faculty instructors from the Croatian Aviation Training Centre (HZNS) and Croatian Air Traffic Control Training Centre (HUSK), as well as by external associates from the economy.

The training programme for road safety inspectors qualifies individuals to obtain the licence of Certified Road Safety Inspector. The programme is carried out within Directive 2008/96/EC of the European Parliament and Council on the safety of roadway infrastructure. The Directive requires that all member states train authorised inspectors to check the safety of roadway infrastructure. The programme comprises 36 teaching hours, of which 30 are spent in the classroom and 6 in the field. The programme is open to traffic and construction experts with at least 10 years of field experience and previous work on at least 10 projects in roadway traffic safety. At the end of the training, participants must pass oral and written exams covering theoretical and practical knowledge. After passing these exams, participants receive from the relevant Ministry a licence to work as authorised road safety inspectors. The programme involves 12 instructors who are teachers or external associates at the Faculty.

With mobility funding from the Central European Initiative, the Faculty organised a summer school in collaboration with the Faculty of Technical Sciences at the University of Novi Sad and seven other universities in the Danube region. The Logistic and Intermodal Summer School for the Danube region (LIDARES) was run with 21 participants.

3. TEACHING PROCESS AND STUDENT SUPPORT

3.1. Admission criteria or criteria for the continuation of studies are in line with the requirements of the study programme, clearly defined, published and consistently applied

The criteria for admission or continuation of studies are published.

The criteria for admission or continuation of studies are consistently applied.

The criteria for admission or continuation of studies ensure the selection of candidates with appropriate prior knowledge, which is aligned with the requirements of the study programme.

The higher education institution has effective mechanisms for recognising prior learning.

Informing future students about enrolment in study programmes at the Faculty of Transport and Traffic Sciences begins with the [University of Zagreb Fair](#), which is organised in November and provides potential students with information about studies and enrolment requirements for the following academic year. Faculty teachers, students and members of the Student Affairs Office participate in the Fair. For the last few years, the Faculty has received [awards](#) for its activities at the Fair.

The Faculty also promotes itself at high schools through [events](#) and [Open Door Days](#). The Committee for Faculty Promotion, made up of teachers, students and members of the Student Affairs Office, is responsible for promoting the Faculty.

Enrolment criteria and quotas are determined in response to a call from the University for proposals about criteria and quotas, and they are based on analysis of previous years, on conditions required for the teaching process, and on labour market needs. Criteria and quotas are proposed, accepted at a meeting of the Faculty Council, and delivered to the University for consideration. After acceptance by the University, the [quotas are posted on the University website](#), and then the [enrolment criteria](#) are published by the Faculty on its website for the following academic year.

Application and enrolment to the Faculty occur via the portal [become a student](#), just as for all university faculties in Croatia. The Faculty is responsible for evaluating candidates based on additional criteria, but these criteria must be approved by the University and published on the Faculty website.

In the pre-diploma study programme Aeronautics, a student chooses a concentration of pilot (civilian or military) or flight controller during enrolment in the first year. In the study programmes Transport or Intelligent Transport Systems and Logistics, the pre-diploma concentration is selected at the end of the second year. During choice of study concentration, internal quotas are defined based on available capacity in the relevant department and on students' levels of interest on the most recent survey, which is administered through the Merlin e-learning system.

Enrolment criteria for the first year of study are clearly defined and include evaluation of success in high school, performance on the mandatory national high school final exams (*državne mature*), points earned for additional high school accomplishments, and, if necessary,

additional criteria. Criteria are the same for the pre-diploma study programmes Transport and Intelligent Transport Systems and Logistics. In this case, the criteria include performance on the Level A *državna matura* in mathematics and, optionally, in the Level A *državna matura* in physics. Criteria for the pre-diploma study programme Aeronautics include evaluation of medical condition and an oral English exam, as well as performance on the Level A *državne mature* in mathematics, English and optionally physics. Students wishing to enrol in the programme Aeronautics to become a military pilot apply through the project Kadet, organised by the Croatian Ministry of Defence. Alternatively, such students can apply through [a public call to join the military cadet pilot service](#). Candidates for military pilot training are also evaluated in the selective flying task, which is run by the Croatian Military Aviation Section of the Ministry of Defence.

The [Criteria for promotion within study programmes](#) at the Faculty are clearly defined and comparable with those at other technical faculties at the University of Zagreb. Students enrol in higher years of study through the ISVU Studomat or the Student Affairs Office.

Students may experience difficulties in progressing through the study programme for justifiable reasons, such as health issues, transfer to part-time status because of employment, or a pause in studies. In these cases, students can submit a petition to the Student Affairs Office in which they describe the reason for the petition and provide evidence of previous achievements and of the justified reason why they experienced promotion difficulties. The Committee for Study Programmes and Curriculum, which comprises teachers, members of the Student Affairs Office, and the Vice-Dean for Academic and Student Affairs, considers these petitions according to procedures that the Committee decides. Then the Student Affairs Office informs students of the outcomes.

It is possible for students from related faculties and universities to enrol in the Faculty of Transport and Traffic Sciences. In such a transfer, the student's previous achievements and ECTS credits are taken into account. The Vice-Dean for Academic and Student Affairs, in collaboration with course leaders, decides on recognition depending on similarities between the study programmes at the two faculties and on the courses taken by the student at the other faculty. [Criteria for transfers](#) are published on the Faculty website.

[Quotas and criteria for enrolment in diploma studies](#) are clearly defined and publicly available. The procedures for determining criteria and quotas are identical to those for pre-diploma studies. The ranking of students within each study concentration is carried out by the Commission on Student Enrolment in consultation with the director of the concentration and based on enrolment criteria and applications received.

Enrolment into diploma studies at the Faculty is open to students who completed pre-diploma studies at the Faculty or other technical faculties at the University of Zagreb or elsewhere. The enrolment criteria are the same in all cases. If necessary, the student may need to take qualifying courses to cover perceived gaps between what they learned in their pre-diploma studies and what is required for diploma studies at the Faculty. Students who completed a

diploma at another technical or professional school enrol in a [qualifying year](#) before they can enrol in the first year of diploma studies at the Faculty. During this year, the student is considered a part-time student and must complete all courses in that year. No ECTS credits are awarded for this year. Only by completing this qualifying year can a student earn the right to enrol in diploma studies at the Faculty.

Tables 3.2 and 3.3 of the Appendix show data on the high school success of students enrolled in the first year of pre-diploma studies at the Faculty. Analysis of the data in Table 3.2 shows a decrease in the percentage of students who passed the obligatory section of the *državna matura* in the last three enrolment years (2015-2017), while the average grade in high school has remained nearly the same. The most successful students in high school enrol in the study programme Aeronautics, followed by students in the programmes Transport and Intelligent Transport Systems and Logistics.

To attract students who are more academically successful, the Committee for Faculty Promotion organises [promotional activities](#) to present the Faculty to high schools in Croatia and the region, as well as to present the Faculty through Open Door days and the University Fair. It also provides scholarships to select students.

Student societies help promote the Faculty and attract interested students through their various activities designed to improve student work and quality of life. These activities have proven effective in Croatia and abroad. The best recommendations of the Faculty come from its successful, engaged students.

The [website of the student society TRANS](#) describes workshops for secondary school students and university students, including an Arduino workshop and workshops entitled "Managing urban traffic networks – MATLAB i VISSIM", "Introduction to Public Relations – from the practical perspective of project implementation", "Creating a CV, preparing for the business interview and career planning".

In May 2018, an Expert Meeting of Faculty students discussed the topic "We have a solution: the new generation's visions for a green, sustainable development" on the Borongaj campus as the opening activity of the 8th Zagreb Energy Week, organised by the City Office for Energetics, Environmental Protection and Sustainable Development.

Table 3.3 shows a high level of success among students who enrol in diploma studies, reflecting the fact that pre-diploma students who enrol tend to perform better in high school. Most diploma students completed their pre-diploma studies at the Faculty, while a smaller number come from pre-diploma programs at other faculties at the University of Zagreb or elsewhere.

Analysis of data from the last three years shows an increase in interest in the study programme Intelligent Transport Systems and Logistics. This is assumed to indicate positive outcomes on the labour market, since graduates from this programme find employment in their field relatively quickly.

Data in the tables indicate a fall in the number of students enrolled in part-time studies, raising the question of whether such studies are needed. In accordance with the goal defined in the Faculty Strategy, a proposal was made to change the concept of part-time study into lifelong learning, which led to the [Regulations on lifelong learning](#) in May 2018. These regulations specify the concept and types of lifelong learning programmes and the procedures for proposing, implementing and evaluating them. Lifelong learning programmes are not considered study programmes, but are founded on the principles of lifelong learning. As mentioned in Section 2.7 of the Self-Evaluation, the Faculty provides lifelong learning through the Division of Aeronautics [Department of Aeronautics, Croatian Aviation Training Centre (HZNS) and Croatian Air Traffic Control Training Centre (HUSK)] as well as through the Department of Transport Logistics and Department of Transport Planning.

3.2. The higher education institution gathers and analyses information on student progress and uses it to ensure the continuity and completion of study

Procedures for monitoring student progress are clearly defined and available.

The information on student progress in the study programme is regularly collected and analysed.

The higher education institution ensures adequate mechanisms for analysing student performance and pass rates, and initiates necessary actions accordingly.

At the end of the academic year, completion rates for each year of study are analysed using data from the ISVU system. Progression from the first to second year of study can be seen in Table 3.4 of the MOZVAG Appendix. Based on enrolment quotas for the pre-diploma study programme Transport, an average of 13% of students earned 60 ECTS credits and progressed from the first to second year of the programme during the last five academic years. An average of 30% of students earned 30-54 ECTS credits over the same period. The corresponding percentages for the pre-diploma course Intelligent Transport Systems and Logistics were 20% and 25%; and for the pre-diploma programme Aeronautics, 25% and 50%.

Table 3.5 in the Appendix shows completion rates for students in pre-diploma study programmes over the last five academic years. The table shows that an average of 30-40% of students enrolled in the pre-diploma programme Transport completed the programme; completion rates were approximately 30% for the pre-diploma programme Intelligent Transport Systems and Logistics, and an average of 50-60% for the pre-diploma programme Aeronautics. Over the last five years, completion rates have fallen in the programme Transport and remained fairly constant in the programmes Intelligent Transport Systems and Logistics and Aeronautics.

Completion rates in diploma study programmes at the Faculty have been better over the last five years than in the pre-diploma programmes (Table 3.5 of the Appendix). For example, completion rates were an average of 80-90% for the diploma programme Transport, 60-70% for the diploma programme in Intelligent Transport Systems and Logistics, and 70-90% for the diploma programme Aeronautics. Better completion rates for diploma studies are logical

because those studies attract stronger students, who have homogeneous knowledge from their pre-diploma studies. The idea that diploma studies extend knowledge gained during pre-diploma studies may contribute to students' motivation.

The available data indicate that completion rates for diploma studies are satisfactory, while the rates for pre-diploma studies are low and should be increased through appropriate activities and measures. To help students achieve better results, the Faculty has been hiring demonstrators for entry-level courses, and their work has been financed through programme contracts. Demonstrators work throughout the academic year to help students solve assignments from practical exercises and exam materials. In academic year 2017/2018, 25 demonstrators were engaged in 8 entry-level courses in pre-diploma studies; altogether, 68 demonstrators assisted students in 40 courses in all pre-diploma and diploma study programmes at the Faculty.

After analysis of courses with low completion rates (e.g. Mechanics I and Flight Theory II), the Faculty organised additional teaching to improve students' knowledge and their pass rate on exams. Teachers, in collaboration with the Library, arranged the ordering of multiple copies of additional materials to ensure access to all students. To improve students' understanding of course material, the Faculty organises various types of teaching, such as teaching in the field, expert visits, and laboratory exercises in the 19 laboratories at the Faculty. Students can also master the material through e-learning.

To improve the organisation of teaching, first-year students are divided into 3 groups for lectures, with each group comprising an average of 120 students; and 8 groups for laboratory exercises, with each group comprising approximately 40 students. During the laboratory exercises themselves, students are divided into even smaller groups of 10-20 on average.

A "teaching organisation" service exists at the Faculty, and its responsibility is to monitor the teaching schedule for students by groups. The Faculty's Strategy stipulates the creation of an Office for Students and Courses, which would plan elements of the teaching process at all levels of study according to the existing teaching plan and curriculum, create an academic calendar, alter the curriculum, and analyse progression and completion rates.

The Merlin system facilitates tracking and controlling programmes and mentoring students. (Section 3.4 of the Self-Evaluation describes more about ways in which the Faculty offers support to students and mentors throughout the course of study.)

To improve progression rates, the Vice-Dean for Academic and Student Affairs has created a table of knowledge from natural and technical sciences that is necessary for entry-level courses. The knowledge gained in these courses, which are attended by all students at the Faculty, directly affects students' ability to progress through courses in their study concentration.

With the goal of increasing student progression, the Faculty analysed pass rates for all courses in all study programmes for academic years 2016/2017 and 2017/2018, and they identified courses within the 10% showing the lowest pass rates. An action plan was developed for these

courses that includes additional teaching and other elements to support the teaching process (e.g. availability of literature, assessment of teaching methods, and size of teaching groups).

3.3. The higher education institution ensures student-centred learning

The higher education institution encourages various modes of programme delivery, in accordance with the intended learning outcomes.

Various teaching methods are used that encourage interactive and research-based learning, problem solving and creative and critical thinking (for example, individual and group projects, cooperative learning, problem-based learning, field work and other interactive methods).

The HEI continually evaluates and adapts teaching methods and different modes of programme delivery.

Teaching methods are adapted to a diverse student population (non-traditional student population, part-time students, senior students, under-represented and vulnerable groups** etc.).*

The higher education institution ensures the use of state-of-the-art technologies to modernise teaching.

Available and committed teachers contribute to the motivation of students and their engagement.

The higher education institution encourages autonomy and responsibility in students.

In each academic year, a document entitled "Teaching curriculum, responsibilities of teachers and students, and examination procedures" is created for all courses in the study programmes. This document contains the names of the course leader and instructors, the number of student groups, learning outcomes (at course level), teaching methods, optional and required literature, curriculum (description of course topics and content) for each week of the semester, and assessment methods. All this information is available to students through the Merlin e-learning system as part of each course description. Teachers are required to familiarise students with this information at the first meeting of the course.

Teaching is performed through various methods, which, depending on the course, can be lectures, seminars, practical exercises (auditory and laboratory), discussions, debate, e-learning, teaching in the field, independent assignments and a mentored project. In May of each academic year, teachers propose changes to course structure and teaching formats for the next academic year, while taking into account ECTS credits and learning outcomes for the course. These smaller changes, if judged to be justified, are accepted at a meeting of the Faculty Council and are implemented in the new academic year. Field work, in Croatia or abroad, is organised within specific courses, study programmes or study concentrations.

In order to encourage the use of diverse teaching methods in alignment with desired learning outcomes, the Faculty organised workshops on "Learning Outcomes" and "Teaching Methods" between 2012 and 2015, which were attended by all teachers. In February 2018, all teachers attended training on learning outcomes. A workshop is planned for academic year 2018/2019 on "Learning Outcomes and Constructive Alignment", which will also cover how to adapt teaching methods to learning outcomes and how to assess student knowledge.

All teachers hold consultations with students twice a week. The teaching schedule for part-time students is adapted to their needs, so classes are held Thursdays and Fridays in the afternoon,

and Saturdays in the morning. Consultations are held in the afternoon specifically for part-time students. The Student Affairs Office works in the afternoon one day per week.

Sessions in computer classrooms are arranged for courses involving software and other computer tools.

[Teachers in collaboration with student societies](#) organise various activities such as informal education, workshops, and sports competitions in order to motivate students for professional or scientific work, and to improve their studying and overall experience at the Faculty.

3.4. The higher education institution ensures adequate student support

The higher education institution provides guidance on studying and career opportunities to students (for example, tutors, supervisors and other advisers as a support in student learning and progress).

The higher education institution has established functional procedures for student career guidance, psychological and legal counselling, support to students with disabilities, support in outgoing and incoming mobility, and library and student administration services, at university of faculty level and students are informed about them.

Students are familiar with the support services available.

Student support is tailored to a diverse student population (part-time students, mature students, students from abroad, students from under-represented and vulnerable groups, students with learning difficulties and disabilities, etc.).

The higher education institution employs an adequate number of qualified and committed professional, administrative and technical staff.

Advising on studies and career possibilities begins for first-year students on the first day of courses, when they receive basic information about studies, information systems and quality assurance systems at the Faculty. Students are informed about the [mentoring system during studies](#), which helps students achieve their academic goals as well as develop skills and competencies necessary for realising their professional and personal potential. The system offers support to students throughout their studies at the Faculty. It is designed to create the conditions for students to improve the efficiency of their studying and thereby reduce the number of students who abandon their studies. Students at all levels of study (pre-diploma, diploma, post-diploma) receive a mentor throughout their studies. The mentoring system during studies is aimed primarily at pre-diploma and diploma students.

Mentors who accompany students throughout their studies are chosen from among the teachers at the beginning of each academic year. The system involves organised meetings between the mentor and the group assigned to him or her, as well as direct communication between mentor and student through consultations and e-mail. Reports from meetings between mentors and students are delivered to the [Quality Assurance Commission](#), which analyses the reports and sends feedback to students via the mentors and through a "question and answer" page on the Faculty website.

To obtain literature for their studies, students can draw on the Faculty Library and the Merlin e-learning system, which disseminates literature and learning materials and allows continuous

information transfer to students. Teachers and students gain access to Merlin by using a unique AAI username and password.

Information about teachers and their consultation hours are posted on the Faculty website. The working hours of the Library and consultations are planned with part-time students in mind.

The [Committee and Office for International Cooperation](#) was created to help students interested in mobility. The Committee organises workshops aimed at promoting international collaborations, disseminating information about mobility programmes, and providing support for filling out documentation required for mobility. The Faculty has concluded numerous agreements with foreign universities within the framework of [Erasmus+](#) and [CEEPUS](#) programmes in order to ensure mobility and international exchange opportunities for its students, teaching and non-teaching staff.

The Faculty website allows most of students' administrative tasks to be completed electronically, including registration for exams, requests for various types of certificates, and preparation of enrolment documents. For tasks that cannot be resolved electronically, the Student Affairs Office operates on a schedule adapted to full- and part-time students.

Students are familiar with the services of the Library, which contains a reading room for independent work. Librarians continually receive training in database searching and in library materials, allowing them to offer support to students and teachers when searching for and obtaining literature. Through programme contracts, students can obtain small equipment for their projects.

3.5. The higher education institution ensures support to students from vulnerable and under-represented groups

The higher education institution monitors various needs of students from vulnerable and under-represented groups.

The higher education institution encourages study by vulnerable and under-represented groups.

Teaching process is adjusted to the individual needs of students from vulnerable and under-represented groups.

The higher education institution invests resources in the support to students from vulnerable and under-represented groups.

At the beginning of every academic year, an "Introductory class for first-years" is organised, when students are informed, among other things, about the work of the [Centre for Student Advising and Support](#), which is organised at the University of Zagreb to help students with their individual needs. The [Office for Students with Disabilities](#) operates within this Centre. Centre experts can also help vulnerable and under-represented student groups find other sources of support for their needs and potential difficulties.

In the case of students with disabilities, access to teaching materials and the organisation and adaptation of exams must comply with specific rules, which depend on the type of disability.

The same academic criteria are applied to these students as to all other students, but the teaching and examination methods are adapted to them if necessary. For example, students with learning difficulties (e.g. dyslexia, dysgraphia, or dyscalculia) can receive adapted learning materials and take written exams. The Faculty adheres to the [Guidelines for equalising study opportunities for individuals with dyslexia](#), published by the University of Zagreb. All teachers at the Faculty have access to templates for learning materials aimed at individuals with dyslexia or dyscalculia, prepared as part of a programme agreement with the Ministry of Science and Education.

The Laboratory of Development and Research of Information and Communication Assistive Technology continuously analyses topics related to the adaptation of transport processes to diverse groups with mobility disabilities, as well as to blind and low-vision individuals. In the framework of the University Development Fund, the Laboratory has developed a mobile exam space for individuals with disabilities.

A [student ombudsman](#) is chosen from among the students to advise them about their rights during their studies and about methods to ensure their rights are respected. The ombudsman receives rights-related complaints from students and discusses them with the relevant Faculty bodies. The ombudsman can also participate in disciplinary procedures against students in order to protect their rights.

3.6. The higher education institution allows students to gain international experience ||

Students are informed about the opportunities for completing part of their study abroad.

The higher education institution provides support to students in applying for and carrying out exchange programmes.

The higher education institution ensures the recognition of ECTS credits gained at another higher education institution.

The higher education institution collects information on student satisfaction with the quality of HEI's support regarding practical matters of student mobility.

Students gain competencies required for the employment in an international environment.

The Faculty participates in the international exchange programmes ERASMUS+ and CEEPUS, as well as in bilateral collaborations. The programmes involving the largest numbers of students are the two sub-programmes of ERASMUS+, Student Mobility Studies (SMS) for study stays and Student Mobility Placements (SMP) for student work practice. When SMS calls are issued, a forum is organised at which SMS and partner institutions are presented, followed by a workshop that seeks to reduce administrative barriers for students. The forum and workshop are advertised in e-mail and posters, on the Faculty website and through the Merlin e-learning system. During the call, students can contact directly the ERASMUS+ coordinator and the ECTS coordinator. Similarly, when SMP calls are issued, a forum and workshop are organised to familiarise students with the sub-programme and help them apply. Students can contact the International Student Practice Coordinator, who is a member of the Committee for

International Cooperation and Mobility. The forum and workshop are advertised on posters and websites and through the Merlin e-learning system.

Students who have participated in the ERASMUS+ programme are invited to come to all forums, and when technically possible, a video link is set up with at least one student currently on a study stay or a work placement. The section "Mobility and cooperation" on the Faculty website describes the procedure for transferring course credits from foreign institutions, as well as examples of such transfers and of filled-out Study Contracts. This section also contains a list of all potential host institutions abroad, with teacher contact information and an Internet link.

After the forums, workshops and advising, students enter into a Study Contract with the agreement of the ECTS coordinator. The Student Affairs Office participates in the release of certain administrative documents.

Fundamentally important for international mobility are communication skills and knowledge of English or, for stays in Germany and Austria, knowledge of German. Students at the Faculty take English or German as obligatory courses for four semesters. Through the Faculty's local computer network, students can access globally recognised scientific databases (WoS, SCOPUS and TRID) and scholarly journals.

Teachers and experts who are hosted at the Faculty deliver lectures in English in their field, and they give presentations about their home institution.

Students can participate in programmes in which they assist foreign students ("buddy programs"). They can also participate in international scientific meetings (ZIRP, RCITD, MET i POWA) by presenting work performed in collaboration with teacher mentors.

3.7. The higher education institution ensures adequate study conditions for foreign students

Information on the opportunities for enrolment and study is available to foreign students in a foreign language.

The higher education institution provides support to foreign students in enrolment and study at the Croatian higher education institution.

The higher education institution collects feedback on satisfaction and needs of foreign students.

Foreign students have the opportunity to attend classes delivered in a foreign language (English).

Croatian language courses are delivered for foreign students at the level of the university or university constituent.

A part of the Faculty website is dedicated to incoming students and is presented in Croatian and English. At the level of the University of Zagreb, a centralised website is maintained by the Office for International Cooperation. Most incoming students communicate via e-mail directly with the International Cooperation and Mobility Office at the Faculty.

The standard practice at the Faculty is that Study Contracts for incoming students are agreed in detail prior to their arrival. The Faculty website contains a [list of courses taught in English](#), and curricula and programmes are linked to the ISVU system. Several coordinators provide support to incoming students: the ECTS Coordinator, ERASMUS+ Coordinator, CEEPUS Coordinator and Student Practice Coordinator. The Office organises support programmes to incoming students in collaboration with the Student Council, student societies and students at the Faculty who previously participated in mobility programs. These programmes help with administrative procedures and social integration.

With the help of the Office for International Cooperation at the University of Zagreb, the Faculty regularly conducts surveys to collect student exchange data. The University analyses the results of these surveys.

The number of courses conducted in English at the Faculty has grown over the last five years. In academic year 2012/2013, there were 16 courses in English. In 2017/2018, 43 courses in English were available across all three study programmes. Teaching occurs regularly or in consultations. Incoming students also have access to horizontal mobility with other constituents of the University of Zagreb.

Foreign partners are regularly contacted in order to increase incoming mobility. A [brochure in English](#) and [promotional video](#) have been prepared for this purpose.

Incoming students are encouraged to enrol in Croatian language courses at Croaticum – Centre for Croatian as a Foreign Language, at the Faculty of Philosophy of the University of Zagreb.

3.8. The higher education institution ensures an objective and consistent evaluation and assessment of student achievements

The criteria and methods for evaluation and grading are clear and published before the beginning of a course.

The higher education institution provides support to the assessors in the development of skills related to the testing and assessment methods.

The higher education institution ensures objectivity and reliability of grading.

If possible, the higher education institution carries out the evaluation of grading.

The evaluation procedures take into account special circumstances of certain groups of students (modifying examination procedures to suit e.g. students with disabilities), while at the same time ensuring the achievement of intended learning outcomes.

The students receive feedback on the evaluation results, and if necessary, guidelines for the learning process based on these evaluations.

Before each academic year, teachers prepare course curricula according to the [teaching programme](#) and course contents published on the Faculty website.

The document "Teaching curriculum, responsibilities of teachers and students, and examination procedures" contains clear descriptions of criteria for measuring student achievement in order to satisfy learning outcomes. It also contains information about the course, instructor, course contents and schedule of topics for the semester.

At the first meeting of the course, the teacher should familiarise students with learning outcomes, the curriculum and the plan for the course. He or she should also describe the teaching formats used and literature for learning course material. Students should become familiar with their responsibilities and with how their achievements will be evaluated during the semester, including exams. This includes learning about the grading system and conditions for auditing or enrolling in the course. All this information, in addition to being presented at the first class, is also published on the Merlin e-learning system.

The Vice-Dean for Academic and Student Affairs and the President of the Quality Assurance Commission have access to all curricula to ensure standardisation of the monitoring and assessment of students. Analysis of all courses indicates that teaching takes many forms, including lectures, auditory practical exercises, laboratory exercises and field work. In addition to written and oral exams, some courses assess student knowledge through seminars, discussions, and debates. Most teachers continuously monitor student knowledge through periodic checks in the form of tests and colloquia, in addition to final written and oral exams. [Regulations on examinations for full- and part-time students](#) specify the conditions and format of exams in the pre-diploma and diploma study programmes. First implemented in 2010, the Regulations are expected to be revised and expanded at the end of the academic year 2017/2018.

Students complete their studies by defending a bachelor or master thesis, in accordance with the [Regulations on bachelor and master examinations](#). Departments analyse and approve topics for bachelor and master theses, which are then confirmed by the Committee for Bachelor and Master Theses. The [minutes from Committee meetings](#) are available to students and teachers on the Faculty website.

In the name of unbiased, objective assessment, the results of written and oral exams are released to the public in compliance with regulation of the European Parliament and of the Council on the protection of natural persons with regard to the processing of personal data and on the free movement of such data. If a student is dissatisfied with his or her grade on an exam, he or she can request to repeat the exam in front of a commission. Such a request must be made within 24 hours from the release of the exam results, and it is made through the option "appeal examination result" in the ISVU system.

The Faculty applies the [Regulations on pre-diploma and diploma studies at the University of Zagreb](#), which specify the regulations for studying at these two levels at the Faculty. In the case of post-diploma studies, the Faculty applies [Regulations on doctoral study at the Faculty of Transport and Traffic Sciences](#) and the [Regulations on post-diploma specialisation studies at the Faculty of Transport and Traffic Sciences](#), which are aligned with regulations of the University of Zagreb.

3.9. The higher education institution issues diplomas and diploma supplements in accordance with the relevant regulations

Upon the completion of their studies, students are issued appropriate documents (diploma and diploma supplement).

Diplomas and Diploma Supplements are issued in accordance with relevant regulations.

At the end of their studies, students receive a diploma and diploma supplement, which indicate the qualification earned, the competencies gained, and the level, contents and status of the study programme that students completed.

The diploma contains information about the recipient (name and surname, place and date of birth), information about the qualification, the name of the study programme and concentration, and the academic title. The diploma bears a numeric identifier and the date of issue, and it is certified by the Dean's signature and dry seal of the Faculty.

A diploma supplement is issued in accordance with Article 84, Section 5 of the Law on Scientific Activities and Higher Education (NN 123/03, 105/04, 174/04, 02/07; Constitutional Court Decision USRH 46/07, 45/09 and 63/11), instructions from the Ministry of Science and Education, and guidelines of the University of Zagreb.

Diploma supplements contain the following information:

- Information about the diploma recipient (name and surname, date and place of birth, student ID number);
- information about the qualification gained (the name of the qualification in Croatian and the language in which the qualification was earned, the general study area, name and legal status of the higher education institution running the study programme, name and legal status of the higher education institution issuing the qualification, language in which studies were conducted);
- information about the level of the qualification (degree of qualification, duration of studies, necessary educational level for enrolment);
- information about the contents and results of the qualification received [nature of the study programme; the regulations under which the programme operates; basic information about the course of the study programme; explanation of the grading system, grades received, and average grade; title and grade for the bachelor or master thesis, and laudatory level (*cum laude*, *magna cum laude*, *summa cum laude*)];
- information about possibilities for employment or enrolment in further study;
- additional information (awards or similar);
- certification of the diploma supplement (signer's name and surname, date and place of issue, and seal);
- information on the higher education system in Croatia (structure of the entire education system and levels of higher education), together with sources of information on higher education.

An expanded version of the diploma supplement is being prepared that will document student practice and the competencies gained through it. This will increase the recognition of graduates on the labour market. This extended information is provided with the support of the Croatian Employers' Association and the Economic Council of the Faculty.

3.10. The higher education institution is committed to the employability of graduates

The higher education institution analyses the employability of its graduates.

Admission quotas are aligned with social and labour market needs and available resources.

The higher education institution informs prospective students about the opportunities to continue education or find employment after graduation.

The higher education institution provides students with support regarding future career planning.

The higher education institution maintains contacts with alumni.

When proposing enrolment quotas in May for the following academic year, the Faculty analyses the employment of its graduates using data from the [Croatian Employment Office](#) published in the [Monthly Statistical Bulletin](#) (e.g. for May 2018). This Bulletin publishes data on unemployment, open positions, and employment trends. The Faculty proposes enrolment quotas that reflect the number of teachers and available space, as described in Section 4 of the Self-Evaluation. Justification for the study programmes is analysed during the proposal of enrolment quotas for pre-diploma and diploma studies, as described in Section 3.1.

In addition to the publicly available data from the Croatian Employment Office, the Faculty collects and analyses its own data on labour market needs, and it informs students about this research. The Faculty collects and analyses data through the following activities:

- collecting data at meetings of the Faculty Advisory Board,
- organising workshops or roundtables in departments in order to identify labour market trends,
- organising student practice in partner institutions,
- collecting data at meetings of alumni associations,
- organising Career Day under the slogan "Today I study -- tomorrow I work", where institutions and firms in the fields of traffic, intelligent transport and logistics present themselves and where students can learn about employment opportunities,
- organising a Logistics Practicum in collaboration with the Croatian Chamber of Economy,
- surveying graduates.

Table 3.7 in the MOZVAG Appendix show employment of university graduates over the last three calendar years across Croatia, according to statistics from the Croatian Employment Office. The data indicate that the number of unemployed has not been increasing. Given the potential unreliability of data from the Employment Office, the Faculty as well as the Agency for Science and Higher Education perform their own research into the employment of graduates. The Faculty surveys all students at 6 months after they receive their diploma, then

it sends the filled-out surveys to the Agency. The Agency sends the results of the surveys to the Faculty. During surveying for academic year 2015/2016, 220 responded, and the results showed that 13.8% were unemployed, 89.9% found their first job after graduation in Croatia, while 10.7% found their first job abroad. With respect to the type of organisation where respondents found their first job, 64% were working in the private sector. Approximately 88% of respondents stated that their studies at the Faculty had prepared them for their first job.

Since January 2016, the Committee for Alumni Career Monitoring has been operating at the Faculty. Its main task is to develop a system to track and analyse employment and advancement in the field using a database, and to monitor the adequacy of study programmes, curricula and competencies of graduates against the national classification of professions and the needs of the economy and labour market.

To unify and update its database, the Commission conducted an on-line survey of Faculty alumni at the end of 2016 and beginning of 2017. Surveys were sent to students whose email addresses were in any of the information systems at the Faculty. The survey was administered in two ways:

- a) through an automated process in which a survey link was sent to potential respondents by email (followed by an electronic reminder). This survey was sent to 1,722 e-mail addresses. In this student group, 89.43% were aged 30 or below. The survey arrived at 1,472 addresses. The response rate on the survey was 43.6%.

In response to the question of whether they were currently employed, 78.18% answered "yes" while 8% gave no response.

- b) The link to the survey was posted on the Faculty webpage and its social media pages (Facebook, LinkedIn, Twitter). To ensure the reliability of the survey, respondents were required to enter their personal identification number, name and surname. The survey was open from 08 December 2016 to 01 February 2017. It was accessed by 244 alumni.

In response to the question of whether they were currently employed, 60.66% answered "yes" while 31.15% gave no response.

Aside from employment questions, the survey asked alumni whether they consented to join a network run by the Faculty. This networking strategy is in its early phases, and planned activities will start when the Office is established. Currently the Faculty makes contacts with alumni through the [Alumni Association of the Faculty of Transport and Traffic Sciences](#).

Through the Merlin e-learning system and emails, students are continuously informed about work placements, internships and employment in Croatia, Europe and beyond. Similarly, the Faculty regularly informs students about various types of scholarships in Croatia, Europe and elsewhere.

The Faculty has Student Practice Directors for each study concentration, as well as Coordinators of these Directors, who coordinate all faculty processes related to student practice and participate in the preparation of the document [Internal procedure for signing, archiving and maintaining records on collaborative agreements for student practice](#). The following

individuals can initiate the signing of such agreements with host organisations: the Dean; Vice-Dean; a Head of Division, Department, Centre or Chair; the Student Practice Director for the student's study concentration; or a member of the Department, Independent Chair or Centre. The signing of such agreements must be coordinated with the Student Practice Director of the study concentration as well as the Legal Service. All agreements are archived with the Student Practice Administrator, who enters them into [Microsoft SharePoint](#) (MSP), which is available to Faculty employees. The same folder on MSP also contains a template agreement; an example e-mail to the host organisation; a document containing basic information about the student practice, which can be sent to the host organisation during initiation and finalisation of the agreement; and a list of Student Practice Administrators. This folder is available only via the Merlin system under the course "Student Practice", and access is given only to Student Practice Directors and anyone else registered as an organiser or teacher of this course. Through this course, Student Practice Directors for each study concentration approve requests for practice as well as record completed practices.

Student practice in appropriate partner institutions is quite important because it allows the student to gain practical experience in the field and make contacts with potential employers.

To disseminate possibilities for continued study after graduation, bachelor graduates are informed about diploma studies, while master graduates are informed about post-diploma specialisation and doctoral studies. [Calls](#) for enrolment in post-diploma studies are published on the Faculty website.

4. TEACHING AND INSTITUTIONAL CAPACITIES

4.1. The higher education institution ensures adequate teaching capacities

The number and qualifications of teachers are appropriate for the delivery of study programme and achievement of the intended learning outcomes and performing scientific activity.

The ratio of students and full-time teachers at the higher education institution ensures a high quality of study.

Teacher workload is in line with relevant legislation and policies, regulations of competent bodies, collective agreements, etc.

Teacher workload ensures appropriate distribution of teaching, scientific/artistic activities, professional and personal development and administrative duties.

The number and qualifications of teachers at the Faculty is appropriate for implementing study programmes, as seen in Tables 4.1, 4.3 and 4.4 in the Appendix. During teacher hiring, the necessary qualifications are taken into account. In other words, those who teach mathematics will be hired to teach natural sciences, while those who teach foreign languages or economics will be hired to teach in humanistic or social fields.

In accordance with the Faculty Statute, departments of the Faculty propose a hiring plan for new staff and for promotion of teachers and associates that takes into account the development policies of the department and Faculty as well as the number of full-time equivalents that can be hired. Hiring plans are analysed at the meeting of the Committee for Scientific and Teaching Development, and the final decisions are taken by the Faculty Council. Data in the Appendix indicate that the Faculty has been hiring new teachers and associates (assistants) in recent years. The hiring plan is developmental: the number of associates is greater than the number of teachers because it is expected that associates (postdoctoral researchers) will be promoted to the scientific-teaching rank of docent.

The ratio of students to teachers at institutions of higher education is governed by the [Regulations on granting authorisation to perform higher education activities, operate study programmes and on re-accreditation of higher education institutions](#). In academic year 2017/2018, the ratio of students to full-time teachers at the Faculty was 16.2, taking into account teachers in scientific-teaching, teaching and associate ranks. Teacher workload at higher education institutions is regulated through a [collective agreement](#) that lasted until December 2013, but the rules relating to teacher workload continue to be applied at the University of Zagreb.

The Faculty has developed a system to plan and monitor teacher workload: a teacher workload plan is developed using in-house software for document management (Document Management System, DMS), and its implementation is monitored using software for collaborative work (Microsoft SharePoint). This planning generally takes place in May for the following academic year, and the result is a table available to all teachers.

Data on classes held and student attendance at those classes is collected and monitored using an in-house system for authorisation and monitoring (SAN). All classrooms are equipped with a computer and SAN application, and the teacher is required to use his or her personal login

information to launch the application at the beginning of class and stop it at the end. This creates a record of the class. Student attendance is recorded when students insert their student identification card (IKS) into a smart card reader attached to the teacher's computer. At the end of the academic year, the Vice-Dean for Academic and Student Affairs analyses the classes taught by each teacher and documents this actual workload for the teacher's promotion.

Teacher workload in the last five academic years has been roughly aligned with current legal regulations regarding minimal and maximal teaching load. In collaboration with department heads, the Vice-Dean for Academic and Student Affairs strives to ensure balanced distribution of teaching duties, scientific work, professional and personal development as well as administrative duties. In order to avoid exceeding the maximal permitted teacher workload, the Faculty contracts with external associates from the economy or other higher education institutions. The contracting of external associates for teaching is approved at meetings of the Faculty Council.

4.2. Teacher recruitment is based on objective and transparent procedures that include the evaluation of excellence

Teacher appointment (recruitment) procedures arise from the development goals of the higher education institution.

In selecting, appointing and evaluating teachers, the HEI takes into account their previous activities (teaching activity, research activity, feedback from students, etc).

The higher education institution has adequate methods for the selection of the best candidates for each position.

Procedures for hiring teachers are regulated and transparent and are consistently applied.

Hiring and development of teachers at the Faculty is defined in accordance with teaching demand in the study programmes and with the goals of the Faculty Strategy for 2012-2017 (Section 4.2 on Study Programmes and Students, Measure 2.5). Procedures for hiring and promoting teachers at the Faculty is regulated by the [Regulations on the conditions and procedure of naming teachers to scientific, scientific-teaching, teaching and associate ranks in technical sciences in the field of traffic and transport technology](#), which was adopted at the meeting of the Faculty Council in March 2012. These regulations are based on relevant laws and regulations for higher education as well as regulations at the level of the University of Zagreb. They also contain additional criteria from the Faculty. Changes and extensions of these regulations to align them with new laws and regulations are planned during academic year 2018/2019. These regulations also define the organisation, purview and procedures of the Committee for Scientific and Teaching Development.

New teachers are selected when a current teacher retires or resigns, or when the number of full-time teachers is insufficient and the Faculty has already attempted to compensate by hiring external associates or by exceeding the regulatory limit for teaching workload. In these cases, the head of the relevant department delivers a request for a new teacher to the Dean's Council.

If this Council judges the request to be justified, it seeks the approval of the Faculty Council to initiate the selection of a new teacher. This selection process comprises the following steps:

- Sending of a request to the Human Resources Office of the University of Zagreb for their approval to issue a public call for hiring a teacher within the framework of the approved annual hiring plan
- If the University approves the issuing of a public call, then an Expert Commission is formed within the Faculty Council to give its opinions during the teacher hiring procedure
- A public call is announced for 30 days on the Faculty website, in newspapers, in the Public Gazette and on the EURAXESS portal
- After the call concludes, the Expert Commission examines the applications that have arrived and, after taking into account the Regulations, recommends a candidate teacher in a report to the Faculty Council
- The Expert Commission's choice must be supported by a majority in the Faculty Council in order for the candidate to be selected
- When the position to be filled is at the associate rank (assistants and postdoctoral researchers), then an employment contract is signed with the candidate as soon as the Expert Commission's proposal is accepted by the Faculty Council
- When the position to be filled is at the rank of docent, lecturer or higher, then a report with supporting documentation is sent to a Confirmation Council at the University of Zagreb. If this Council approves, then an employment contract is signed with the candidate.

4.3. Advancement of teachers and scientists/articles is based on objective and transparent procedures

Objective and transparent procedures are applied when promoting teachers and scientists/artists.

Procedures for promoting teachers to higher ranks are based on evaluation of excellence.

Additional criteria for teacher promotion to higher ranks reflect the strategic goals of the higher education institution.

Important achievements are taken into account in procedures for promoting teachers (e.g. international contribution to the discipline, prestigious publications, significant scientific discoveries, successfully completed projects, securing of additional funding, mentorship, directing of final and diploma projects, course manuals, study guides and public lectures).

Indicators of excellence include scientific/artistic, teaching and professional work.

The Committee for Scientific and Teaching Development was formed to manage the development of teaching and scientific potential at the Faculty. Procedures for promoting teachers are objective and transparent and are based on the [Regulations on the conditions and selection of employees at scientific, scientific-teaching, teaching or associate ranks in technical sciences in the field of traffic and transport technology](#).

In addition, a promotion policy is described as an Appendix to the Regulations. This policy stipulates a promotion procedure involving the following steps:

- During the academic year, an internal call is issued to teachers asking for expressions of interest in applying for a higher scientific-teaching rank. The call is accompanied by a self-assessment table that asks about teaching and scientific achievements and satisfaction of conditions laid out in the [Regulations on conditions for selection to a scientific rank](#) and [Decisions on required conditions for evaluation of teaching and scientific-professional activities during selection for scientific-teaching ranks](#), as well as additional conditions established by internal regulations of the Faculty. The table also asks the candidate to self-assess his or her contribution to the work and development of the Faculty, such as through leadership and collaboration in the work of Faculty committees and commissions, leadership of a competitive scientific-research project, introduction of new teaching technologies, development of a professional project of national interest, and development of documents of interest for the advancement of Faculty work.
- After receiving the expressions of interest, the Committee prepares documentation and initial proposal of promotion for consideration by the Dean's Council and department heads.
- At the meeting of the Dean's Council and department heads, the proposal is prepared for the Faculty Council.
- On the basis of the Faculty Council decision, the selection process continues according to considerations of excellence mentioned in Section 4.2 of this Self-Evaluation.

4.4. The higher education institution provides support to teachers in their professional development

The higher education institution provides opportunities for the improvement of teaching competencies at the level of the university or university constituent.

The higher education institution encourages the assessment and improvement of teaching competencies based on the peer-review recommendations and the results of student satisfaction surveys.

Teachers participate in international mobility programmes, projects, network, etc.

The Faculty's Development Strategy for 2012-2017 lays out a goal of advancing the teaching and research competencies of teachers and creates a mechanism to support teacher training. The Strategy for 2018-2023 emphasises the continuation of teacher training in educational, managerial and other competencies, such as methodological-pedagogical qualification, education about quality management activities, communication skills, structure and processes at the University and Faculty, management and administration of scientific-research and developmental projects, and foreign language learning. To support teachers' plans for personal research development, the Strategy specifies that conditions for teacher promotion at the

Faculty include continuous education, outgoing mobility as well as internationalisation in teaching and research work.

Since 2011 the Faculty has invested its own funds and programme funding in teacher training to advance teaching competencies. Between 2011 and 2015, a total of 24 workshops were organised for Faculty teachers with the following topics:

- Learning outcomes, and elements and criteria for evaluation
- Student-centred teaching methods
- Motivation through integrated learning
- Team and discipline management
- Generational aspects in communication and teaching
- Active learning and critical thinking
- Public relations and public presentations

Workshops were organised for groups of 15-20 participants from one or more departments. Teacher knowledge of learning outcomes was refreshed in 2018, and training is scheduled to continue in academic year 2018/2019.

In the last five years, the Faculty has organised several workshops titled "Designing high-quality research projects and publishing them in international journals", primarily for young researchers with the goal of developing their research competencies and of promoting scientific production. Two workshops have been organised for doctoral mentors to improve their mentoring skills. In addition, the Faculty provides funding for teachers to attend training in computational tools and foreign language, in accordance with their teaching plans.

The Faculty also supports the participation of teachers in international mobility programmes and collaborative projects as a way for them to gain teaching and research training. Table 4.5 of the MOZVAG Appendix shows the mobility of teachers and associates over the last five academic years. The data indicate strong activities in teaching, professional and scientific mobility. Table 4.7 of the Appendix shows projects completed through mobility programmes over the last five academic years. The table shows that the Faculty will collaborate on two ERASMUS+ projects during the period from 2014 to 2020.

To help students and teachers who are interested in mobility, the Faculty created the [Committee and Office for International Cooperation](#). The Committee organises workshops for students and teachers to promote international cooperation, provide them with information about mobility programmes, and help them fill out the necessary documentation for such programmes. The Faculty has signed numerous agreements with foreign higher education institutions within the framework of the [ERASMUS+](#) and [CEEPUS](#) programmes to ensure mobility and international exchange opportunities for students, teachers, and non-teaching staff.

To facilitate tracking of the mobility of university personnel, including the purpose and length of stay, the University of Zagreb has created a web-based application [Overview of international stays by university personnel](#). Teachers are required to enter details of their stay through this application.

4.5. The space, equipment and the entire infrastructure (laboratories, IT services, work facilities etc.) are appropriate for the delivery of study programmes, ensuring the achievement of the intended learning outcomes and the implementation of scientific/artistic activity

The higher education institution plans and improves the infrastructure development, in line with the strategic goals.

The space, equipment and the entire infrastructure (laboratories, IT services, work facilities etc.) are appropriate for the delivery of study programmes and ensuring the achievement of the intended learning outcomes.

The space, equipment and the entire infrastructure (laboratories, IT services, work facilities etc.) are appropriate for the implementation of scientific/artistic and professional activities.

The Faculty carries out its teaching, scientific-research and professional activities at four locations in Zagreb: in an entire building at Vukelićevoj 4, in part of a building at Kušlanovoj 2, in four buildings on the scientific-educational campus Borongaj and in a hangar at Lučko airport. The total surface area of these facilities is 5,070 m², as indicated in Table 4.8 of the MOZVAG Appendix. This space satisfies the needs of the study programmes and allows for scientific and professional activities, although in the coming years, the existing infrastructure will need to be improved and developed.

The planning, development and upgrading of laboratories and laboratory equipment is laid out in strategic documents of the Faculty, primarily the [Development Strategy of the Faculty of Transport and Traffic Sciences for 2012-2017](#) through Strategic Goal 3 ("Strengthen the research profile of the Faculty in the field of traffic and transport technology through systematic, organised improvement of conditions for scientific-research and innovation activities") and Measure 3.5 ("Establish laboratories to support scientific-research work"); and the [Development Strategy of the Faculty of Transport and Traffic Sciences for 2018-2023](#) through Strategic Goal 3 ("Continue to strengthen the research profile of the Faculty in the field of traffic and transport technology through systematic, organised improvement of conditions for scientific-research and innovation activities, as well as through activities to support the founding of a Competencies Centre and ultimately a Centre of Excellence in the field of traffic and transport technology") and Measure 3.5 ("Strengthen laboratory activities in support of scientific-research work"). In 2014, the [Strategic programme of scientific research at the Faculty of Transport and Traffic Sciences for 2015-2020](#) elaborated on research infrastructure in its Section 3.2.1.

Table 4.9 provides data on capital equipment available. Most equipment relates to aircraft, flight simulators and air traffic control simulators, as well as other equipment for teaching and

research. After 2012, the Faculty's space, equipment and entire infrastructure underwent intensive development.

Below is a brief summary of the current space at the Faculty for teaching, scientific-research and professional activities, together with planned space development:

- Vukelićeva 4: an amphitheatre for large groups, specialised multimedia classroom intended primarily for post-diploma teaching, a classroom with 50 places and two laboratories, and offices for the Dean, Student Affairs and teachers. Remodeling is planned for the laboratories in the Department of Transport Planning and for classroom D2, and roof restoration is planned as well.
- Borongaj campus: four buildings, amphitheatre, classrooms, 15 laboratories, offices for teachers, PC classrooms, and library with reading room. Plans for this campus include the creation of an additional floor in two buildings for classrooms, laboratories and offices, relocation of the Library into new space, an increase in space allocated to the Student Council and student societies, remodeling of Block 6 space in Building 210 for use by the Department of Transport Logistics, and remodeling of three spaces in Building 210 for IT Services. The computer classroom in Building 71 is slated for remodeling to serve also as a reading room, since the classroom is located next to the Faculty Library.
- Kušlanova: offices for teachers, a laboratory and a classroom belonging to one department
- Lučko airport: the hanger of the Croatian Aviation Training Centre (HZNS), which is an organisational unit of the Faculty, contains a flight simulator for pilot training, workshops and other spaces necessary for the activities of the study programme Aeronautics. The Faculty has submitted a proposal to build a runway out of construction material and thereby replace the existing grass runway. The Faculty has already received a construction permit for this work from the Office for Management of State Property. This runway construction would significantly improve infrastructure for teaching students at the Faculty and the conditions for flying activities by clubs and other users at Lučko airport. The Faculty is participating in this project as an investor, and financial support is expected from EU funds and from the City of Zagreb.

4.6. The library and library equipment, including the access to additional resources, ensure the availability of literature and other resources necessary for a high-quality study, research and teaching

The library and library equipment, including the additional resources, meet the conditions for a high quality of study.

The library and library equipment, including the additional resources, ensure a high quality of scientific-teaching / artistic-teaching activities.

The Library of the Faculty of Transport and Traffic Sciences provides diverse users (students, scientific-teaching staff, other Faculty personnel and external visitors) a range of services and content to support scientific and teaching activity. The Library also engages in other library activities in accordance with the [Law on Libraries](#), the [Regulations on the Organisation and Activities of the Library at the Faculty of Transport and Traffic Sciences](#), Standards for Libraries at Higher Education Institutions and other laws and regulations.

Library materials are acquired through a procedure based on Article 12 of the Regulations on the Organisation and Activities of the Library of the Faculty of Transport and Traffic Sciences. For each calendar year, scientific-teaching and associate staff submit requests to acquire materials directly to the Library or through the in-house document management system. The Library Committee processes these requests and submits an acquisition plan to the Dean for approval. This process takes into account whether the proposed materials will improve the quality of the library collection based on user needs and on the [Guidelines for building the library collection at the Faculty of Transport and Traffic Sciences](#). The Library receives and preserves acquisitions and makes them available to users using methods aligned with the Law on Libraries and the Regulations on the Organisation and Activities of the Library of the Faculty of Transport and Traffic Sciences.

All bachelor, master and doctoral theses that are defended at the Faculty are copied by the Library and deposited in the DABAR repository. In this way, the Library ensures their public accessibility as required by the [Law on Changes and Additions to the Law on Scientific Activities and Higher Education](#) and the Regulations on the Organisation and Activities of the Library of the Faculty of Transport and Traffic Sciences.

The Library of the Faculty of Transport and Traffic Sciences issues confirmations about whether articles by Faculty scientists and teachers are publicly available through databases in Croatia and about how often they are cited. These confirmations are issued for the purposes of funding/project calls, elections and promotion to scientific-teaching ranks.

Users can also take advantage of inter-library loans according to the [Rules of inter-library cooperation](#).

Users can find general information about the Library, including its working hours, staff and contact details, by clicking on the link "[Knjižnica](#)" on the Faculty website. This page also contains the link to the [Portal of electronic sources for the Croatian academic and scientific community](#), which provides the user with links to all publicly available databases in Croatia, links to search the on-line catalog of the Faculty Library and the integrated catalog of libraries in the science and teaching system in Croatia, and a link to the Centre for Scientific Information at the Ruđer Bošković Institute.

The University Computing Centre approved the Faculty request to create an e-course "Other educational content: [Library](#)" in the Merlin e-learning system, which provides all students with

access to Library announcements, Library services and educational content. This e-course is currently under development.

4.7. The higher education institution rationally manages its financial resources

Financial sustainability and efficiency is evident in all aspects of the higher education institution's activity.

HEI manages its financial resources transparently, efficiently and appropriately.

Additional sources of funding are used for institutional development and improvement.

Additional sources of funding are secured through national and international projects, cooperation with the industry, local community, etc.

The Faculty derives income from various sources. The revenue structure (Table 4.11) shows that the total revenue was 60,396,943.49 HRK in 2016 and 56,196,621.70 HRK in 2017; the share from the national budget was 51% in 2016 and 57% in 2017. The remaining revenue comes from the Faculty's own activities (e.g. scientific and professional projects, fees for post-diploma study) and from specially regulated sources (e.g. fees for full- and part-time students, publishing). Approximately 79.5% to 80.1% of the income from the national budget is used to pay employee salaries. The remainder is used to help cover operational expenses, teaching in the field, international cooperation, journal publishing and maintenance of investments, as well as other expenses.

Comparison of income (Table 4.11) and expenses (Table 4.12) indicates the financial sustainability of the Faculty. The financial resources are managed transparently, efficiently and appropriately according to Faculty regulations and procedures.

A substantial part of the Faculty's income is derived from scientific and professional projects for the commercial and public sector, including government institutions. To ensure transparent procedures for making project contracts and spending money derived from those projects, the Faculty in 2013 adopted the [Regulations for contracting, leading and monitoring projects](#). The software [FPZ projects](#), which the Faculty developed in collaboration with the Faculty for Organisation and Informatics in Varaždin, supports project approval, contracting and management. Financial monitoring of projects can be conducted in parallel with the Financial and Accounting Service using the [CIRIS Business Information System](#).

Income from other sources is applied for the development and improvement of Faculty activities. An annual plan about the financing of activities is prepared in collaboration with Faculty service units and departments. It includes planning of the following activities, funded from the Faculty's own income:

- Travel expenses to attend international scientific, scientific-professional and professional meetings
- Expenses to correct scientific manuscripts and then publish them in scholarly journals
- Expenses for laboratory equipment and specialised software packages
- Expenses for training and study stays

- Expenses for visiting (invited) lecturers
- Expenses for English-language and on-line courses
- Expenses for meeting organisation
- Expenses for teaching in the field
- Expenses for other activities
- Expenses for purchasing scientific and professional literature (excluding subscriptions for journals or databases)
- Expenses for purchasing computer equipment

The Dean's Council takes into account expected Faculty income in order to adopt a plan to cover the above expenses. Approved activities are entered into collaborative software ([Microsoft SharePoint](#)). According to a separate plan, the Faculty also funds support for research and innovation through the following programmes:

- PROM-PRO: support to prepare proposals for scientific-research projects,
- PROM-PRODUKT: support to prepare and publish articles in scientific journals, and
- PROM-PRIMA: awards to researchers for completing more significant scientific-research projects.

This funding is granted based on internal calls sent to interested individuals, and the overall [support programme is published on the Faculty website](#).

Other programmes financed from the Faculty's own income include training for administrative-technical staff as well as activities planned in collaboration with the Student Council (e.g.. student activities, student sports competitions, international student meetings).

These plans from organisational units and the Student Council form the basis for a single unified procurement plan, which by law must be published on the Faculty website. Goods and services of large value are procured according to the Law on Public Procurement (NN 101/17), while those of small value are procured according to [Regulations on creating contractual obligations and on procedures for simple procurement at the Faculty of Transport and Traffic Sciences](#). Procurement documentation is loaded into the collaborative software (Microsoft SharePoint).

To assist with procurement planning and execution, the Faculty created the Public Procurement Office. Among other duties, this Office prepares the documentation that is required to be published on the [Faculty's website](#).

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5. SCIENTIFIC ACTIVITY

5.1. Teachers and associates employed at the higher education institution are committed to the achievement of high quality and quantity of scientific research

Teachers and associates publish an appropriate number of high-quality scientific publications.

The higher education institution has efficient procedures for encouraging high-quality scientific publication.

The higher education institution keeps records of publications (publication index, citation impact, h-index, if applicable).

HEI's scientific/artistic activity is evident in PhD theses.

Teachers and associates of the higher education institution actively promote scientific/artistic achievements at national and international conferences.

The field of traffic and transport technology contains a relatively small number of high-impact journals where teachers can publish the results of their scientific investigations. For example, 34 journals were listed in the Web of Science category *Transportation Science & Technology*, compared to 262 journals in the category *Engineering – Electrical & Electronic* and 130 in the category *Engineering – Mechanical* in 2016. For this reason, teachers and researchers at the Faculty often publish their work in the Faculty's own scientific journal, [PROMET – Traffic & Transportation](#). The journal is indexed in internationally accepted databases such as Web of Science, Scopus, TRID, DOAJ, Geobase and Fluidex. Its impact factor in 2017, according to Journal Citation Reports (from the Web of Science database) was 0.456. Since 2009, it has ranked in the second quartile (Q2) among journals in its field based on the SCImago Journal & Country Rank (Scopus). The journal publishes the work of a large number of scientists and experts from around the world. Since 1989, the journal has made all articles open-access. A substantial number of articles are published by Faculty teachers, alone or in coauthorship with domestic and foreign colleagues.

A systematic effort is being made to increase the number of articles published in other internationally recognised journals. The Faculty launched the programme PROM-PRODUKT, which it finances from its own budget, in order to support teachers trying to publish in journals of the highest level. Teachers have recently published articles in the following highly ranked journals (ranked in Q1 or Q2): *Transportation Research Part C: Emerging Technologies*, *Transportation Research Part F: Traffic psychology and behaviour*, *Transportation Research Part C: Emerging Technologies, Telematics and Informatics*, *Multimedia Systems*, *Wireless Communication and Mobile Computing*, *Journal of Navigation*, *Journal of Advanced Transportation*, and *Meccanica*. Among articles published in other journals, the largest numbers are published in *Tehnički vjesnik*, *Transport*, *Strojarstvo* and *Strojniški vestnik*.

Over the last five years, the number of Faculty publications in highly ranked journals has increased significantly: the number of articles published in journals indexed in Web of Science was 17 in 2012, 20 in 2015, 24 in 2016, and 26 in 2017. The [Faculty Self-Evaluation in December 2011](#) reported that 118 scientific articles had been published over the preceding five years in journals indexed in Current Contents, Web of Science (SSCI, SCI-Expanded, A&HCI) and Scopus. The data in Table 5.1 of the MOZVAG Appendix indicate that 145 articles were published in highly ranked journals according to the Regulations on Conditions for Selection to Scientific

Ranks. This increase in the number of publications in highly ranked journals resulted from activities undertaken by the Faculty to address deficiencies identified during re-accreditation in 2012, as described in Section 5 of the [Final report on addressing deficiencies after re-accreditation](#).

Despite this visible increase in the number of articles published in highly ranked journals, the Faculty continues to engage in activities aimed at further increasing scientific productivity.

The journals in which Faculty teachers publish cover a range of fields, which reflects the diversity of scientific research at the Faculty. Most journals are in technical fields and enjoy a relatively high impact factor in those fields.

As the number of articles published by Faculty teachers and researchers in journals indexed in Web of Science has grown, so too has the citation impact of Faculty publications grown. Citation data are shown in Table 4.4 of the Appendix. Based on data currently available, Faculty articles were cited 25 times in 2012, 49 times in 2015, 65 times in 2016, and 80 times in 2017.

Teachers at the Faculty regularly present their work at international scientific and professional meetings and publish their work in proceedings of meetings that include World Conference on Transport Research, World Congress on Intelligent Transport Systems, International Conference on Road and Rail Infrastructure (CETRA), Automation in Transportation (KoREMA), International Symposium on Electronics in Transport (ISEP), Central European Conference on Information and Intelligent Systems (CECIIS), Annual RIN Baška GNSS Conference, International Conference on Transport Science (ICTS), International Scientific Conference Ports and Waterways (POWA), International World Symposium, Danube-Adria-Association-for-Automation-and-Manufacturing (DAAAM), Modern Electrified Transportation (MET), International Conference Science and Transport Development (ZIRP), and International Ergonomics Conference, Congress of the Alps Adria Acoustics Association (AAAA), Research Conference in Technical Disciplines (RCITD), Telecommunications Forum (TELFOR), Symposium on New Technologies in Postal and Telecommunications Traffic (POSTEL), Transport Systems Telematics (TST) and International Conference on Management of Manufacturing Systems (MMS). Teachers' work that has been presented at conferences is published in the [Proceedings Collection](#) on the Faculty website.

Authors of work at the Faculty take part in a scientific meeting, usually held once a year, on modern topics in transport problems that is organised by the Scientific Council on Transport of the Croatian Academy of Sciences and Arts. Some of the members of the Scientific Council are teachers at the Faculty. Faculty teachers also participate in activities of the [Transport Committee of the Croatian Academy of Technical Sciences](#).

The Faculty implements a policy of supporting the scientific development of young scientists in several ways. It supports the writing of articles for international scientific meetings, and it covers all costs of participation and article publication. Some young scientists who work exclusively on projects are funded from the budget of the corresponding project. Young

scientists take part in all the more important international scientific and professional meetings in Croatia and abroad. In addition, the Faculty has recently been supporting young scientists' membership in international scientific and professional associations. An initiative has also been launched to facilitate access to high-quality data that are crucial for research of the highest quality. As a result, the EU Office of Statistics (EUROSTAT) has categorised the Faculty as a [research entity](#), which means that the Faculty enjoys free access to microdata of all studies performed by EUROSTAT and can use those data exclusively for scientific purposes. Each year the Faculty plans and funds the purchase of new books and journals for the Library.

In the last five years, the involvement of young scientists and researchers in scientific research and professional projects has increased. By founding the [Project and Technology Transfer Office](#) and purchasing project management software, the Faculty provides basic infrastructure for the systematic inclusion and tracking of young scientists at this stage of their training and professional advancement. An added value from working on these projects is that the scientists can apply their newly gained experience and knowledge to their teaching in the classroom, and they can use project results to develop a doctoral thesis. Examples of such projects are [SORDITO](#), [SELFPROPRAIL](#), and [ERTMS](#). Table 5.3 of the MOZVAG Appendix lists all scientific and professional projects in the last five years.

The Faculty draws on its own finances to support scientific research and article publishing in highly ranked journals through the programmes PROM-PRO, PROM-PRODUKT and PROM-PRIMA according to the [Support programme for promotion of research and innovation](#). These programmes support the creation of research groups that can apply for funding from Croatian and European sources.

A particular stimulus for excellence is the creation of the new doctoral studies programme [Transport](#) beginning in academic year 2018/2019. The new concept in this study programme are research seminars, in which students engage in research work. This conception of doctoral studies also reflects support from the Faculty Economic Council, visible in the collaborative definition of research topics according to the [Strategic programme of scientific research at the Faculty of Transport and Traffic Sciences for 2015-2020](#), and in the joint creation of the Foundation for Doctoral Funding by the Council, Faculty and University. Care for young scientists is provided throughout doctoral studies according to the [Regulations on doctoral studies at the Faculty of Transport and Traffic Sciences at the University of Zagreb](#), in which Article 13 describes the duties of mentors to supervise doctoral students during their research, monitor the quality of doctoral work, support article publishing, and enable participation in scientific projects. The most successful students at enrolment in doctoral studies are excused from paying study fees.

To acquaint young scientists with methods for preparing research articles and selecting journals where they can submit them, the Faculty supports their participation in the workshop "Designing high-quality research projects and publishing them in international journals". The workshop is generally organised once a year for doctoral students.

Monitoring of the range and quality of scientific work occurs at several levels. The Faculty tracks the scientific development of individuals based on their promotion through the ranks; in departments, scientific development is tracked through the human resources plans and policies of each department. A system is in place to track participation at meetings. After a meeting, the author who presented the work must enter it into the [Croatian Scientific Bibliography](#) and [Record of International Cooperation of the University of Zagreb](#).

The range and quality of scientific work of doctoral students is also monitored in the Student Affairs Office for post-diploma studies, where the success of all students at each stage of the doctoral studies is verified. Student progression is followed through the [Regulations on doctoral studies at the Faculty of Transport and Traffic Sciences at the University of Zagreb](#) and the [Diagramme of the steps in doctoral studies](#), both of which are published on the website of the post-diploma studies programme at the Faculty. The booklet [Professionalisation of Doctoral Education](#), prepared in 2016 in Croatian and English, serves as a guidebook for mentors and doctoral students and is available on the website of post-diploma studies at the Faculty.

To further raise the quality of scientific-teaching work, the Faculty supplemented the conditions in the [Regulations on the conditions and procedure of naming teachers to scientific, scientific-teaching, teaching and associate ranks in technical sciences in the field of traffic and transport technology](#) with legal regulations and additional conditions specific to the Faculty. Conditions for the rank of associate are also proscribed in the Regulations. The selections are conducted according to Faculty conditions to ensure that teachers in higher scientific-teaching ranks are constantly engaged in scientific research, teaching and professional work. All teachers are required to continually update data on publications in the Croatian Scientific Bibliography [CROSBI](#), and the Faculty has a coordinator specifically assigned to work with this database.

As part of monitoring results from scientific projects, the Faculty produces a publication "Scientific projects 2012-2017" with data on goals achieved and results obtained in scientific projects that were financed with Faculty funds within the framework of PROM-PRO and that began and ended within the indicated five-year period. Through the programme PROM-PRO, the Faculty independently finances the preparation of project teams and submission of scientific project proposals. Every two years, project results are presented in a final conference and published in a catalogue. So far, two cycles of support have completed:

- [Professional Meeting and Workshop on Programme for Stimulation of Research and Innovation at the Faculty of Transport and Traffic Sciences PROM-PRO -- Programming period 2015 - 2017 - Proceedings of the Technical Reports](#)
- [Proceedings of the Second Workshop on the Programme for Stimulation of Research and Innovation at the Faculty of Transport and Traffic Sciences -- Programming period 2016 - 2018](#)

Post-diploma studies in the topic of Technological Systems in Traffic and Transport are based on the approved plan and curriculum from 2005. In academic year 2017/2018, the new doctoral

studies programme Transport was accredited, and the first cohort of students was enrolled in 2018/2019. This study programme qualifies students for scientific work in technical sciences in the field of traffic and transport technology. In addition to providing scientific training, the programme also aims to strengthen links to the economy as well as increase the number of doctors of science in the production-technology sector in order to develop a knowledge-based economy, which is a strategic goal of Croatia.

Doctoral studies at the Faculty of Transport and Traffic Sciences is aligned with the [Strategy of research, technology transfer and innovation of the University of Zagreb](#) and the [Strategic programme of scientific research at the Faculty of Transport and Traffic Sciences for 2015-2020](#).

It should be emphasised that earning ECTS credits in doctoral studies depends on publishing articles in high-quality scientific journals and internationally peer-reviewed conference proceedings. In this way, the publishing of research results is promoted. One of the conditions for defending the doctoral thesis is to publish at least one article linked to the thesis topic in a journal in the highest quality category.

During the last five years, Faculty teachers have participated on the organising committees of 19 scientific meetings (Table 5.4 of the MOZVAG Appendix) and on the editorial boards of 16 scientific journals (Table 5.5 of the MOZVAG Appendix). The Faculty also organises several conferences on its own or with partners, including the International Conference Science and Traffic Development (ZIRP), International Scientific Conference Ports and Waterways (POWA), Annual RIN Baška GNSS Conference, Modern Electrified Transport (MET), International Ergonomics Conference, Congress of the Alps Adria Acoustics Association (AAAA), Research Conference in Technical Disciplines (RCITD), and Management of Manufacturing Systems Conference. At these conferences, research results are actively disseminated through appropriate definition of thematic content and sessions with predefined topics.

5.2. The higher education institution provides evidence for the social relevance of its scientific / artistic / professional research and transfer of knowledge

The higher education institution monitors and takes into consideration the needs of society and labour market in planning its research activities.

The higher education institution has an efficient support system for research and transfer of knowledge and technologies.

Teachers and associates participate in the activities of scientific, arts and professional organisations.

The sections of the Strategy of the Faculty of Transport and Traffic Sciences concerning professional and developmental projects and services are aimed at developing the transport and logistics sector of the domestic economy. In this sense, the professional and developmental projects are defined and focused based on the [Development Strategy of the Faculty of Transport and Traffic Sciences for 2018-2023](#) and on extremely precise project tasks, requirements and legal norms as defined by the requesting parties, who come from the economy, public services and other types of administrative bodies. The Faculty plays an

important role in the conception and steering of the development of the transport-logistics sector as well as the Croatian economy more broadly by preparing the following strategic documents:

- [Development strategy for the postal services market in Croatia through 2020](#)
- [National programme for development and implementation of intelligent transport systems](#)
- [National programme for railway infrastructure 2015-2020](#)

In order to increase the profile of its activities in the transport sector, the Faculty collaborated with the University of Zagreb in 2012 to perform a mapping of the research groups at the Faculty within the project to [map research potential of the University of Zagreb](#). This mapping resulted in the identification and definition of 13 research groups in the field of transport, logistics and aeronautics technology.

As a continuation of the previously described activities to intensify collaboration with the economy, the Economic Council of the Faculty, comprising 23 Croatian companies from the transport and logistics sector, was formed in July 2015. Extension of the Council to include new members is also planned. The Economic Council actively participates in Faculty activities. This involves, in the first instance, the definition of economic needs and the corresponding development of teaching programmes and processes, in which the Council collaborates on the development of proposals of new curricula and teaching plans that reflect the needs of the labour market, on the collaborative definition of doctoral topics, on student scholarships, on organisation of student practice, and other activities. The Council and Faculty work together through their jointly created Foundation for Doctoral Funding within the new doctoral studies programme at the Faculty. The joint definition of research fields and topics and their joint financing ensures, for the participating companies and the Faculty itself, the development, innovation and direct knowledge transfer through high-quality connections and interpersonal communication. As essential infrastructure for this process, the Faculty also founded the [Project and Technology Transfer Office](#) and equipped 19 laboratories with its own funds.

The mission of the Project and Technology Transfer Office is to raise awareness about the importance of international and domestic scientific research and professional projects; strengthen the Faculty's profile in efforts to create transport strategies and key projects in public administration and the economy more broadly; and offer advisory, administrative and technical support to teaching and non-teaching staff in project preparation and implementation. Among other goals, the vision of the Project and Technology Transfer Office is to support technology transfer developed at the Faculty for the public and private sectors. Activities of the Project and Technology Transfer Office include collaboration with offices at the University of Zagreb and with agencies and ministries responsible for project implementation; dissemination of calls for financing scientific research and developmental projects; collection of project proposals; administrative monitoring of funded projects; provision of information to project leaders and associates on rules, procedures and documents necessary for project

implementation; assistance with completion of financial reports for projects; and receipt and sending of project progress reports. In order to fulfill its tasks as effectively as possible, the Project and Technology Transfer Office worked with the Faculty of Organisation and Informatics to develop software for project registration and monitoring.

An example of the work of the Project and Technology Transfer Office in the railway sector is a signed agreement on the creation of a consortium of technical faculties at the University of Zagreb (Faculty of Electrical Engineering and Computing, Faculty of Mechanical Engineering and Naval Architecture, Faculty of Civil Engineering, and Faculty of Transport and Traffic Sciences) for carrying out research, project development, studies and reports. The consortium has entered into an agreement on business-technical collaboration with HŽ-Infrastruktura Ltd. in Croatia, and an agreement with MULTITEL in Belgium for railway work throughout the EU.

Extensive research-developmental and innovative projects have been completed, such as the project [SORDITO](#) to develop a system to optimise routes in a dynamic transport environment, and the project [SELFPROPRAIL](#) to develop a self-propelled railcar for bulk cargo transport. The latter project, funded by the EU Fund ECOINNOVATION, resulted in a patent. Within IRI projects, the Faculty has signed two contracts for projects with the private sector: one is the project Spark Sense in collaboration with Penta Ltd., and the other is a project to develop STM devices to ensure interoperability of INDUSI and ETCS technology on global railways in collaboration with ALTPRO Ltd.

An example of the global recognition of the Faculty's work is its recent work to assess road safety based on iRAP or EuroRAP methodologies in Britain, Senegal and Moldavia.

Together with the University of Zagreb, the Faculty founded the Centre for Transport and Logistics, Ltd. The goal of this firm is to employ successful researchers who wish to commercialise the discoveries and solutions that they achieved during their doctoral work. The firm is oriented towards research-developmental projects in transport and logistics and engages in projection and certification in these fields; transport-technical assessments in road, railway, air, water and post-telecommunications transport and traffic; testing of traffic signaling systems and equipment in transport and logistics; and development of traffic and transport technology. During the last two years, the Centre for Transport and Logistics has completed three projects co-financed by the National Programme in Road Safety of the Ministry of Internal Affairs. After the successful completion of these projects, the Centre was granted funds from the National Programme for New Project Co-Financing.

The Faculty, together with 13 other scientific and higher education institutions in Croatia, is a member of the Centre of Research Excellence for Data Science and Advanced Cooperative Systems, which is the first centre of research excellence in the technical sciences and which is led by the Faculty of Electrical Engineering and Computing of the University of Zagreb. Through this Centre's Research Unit on Data Science, the Faculty of Transport and Traffic Sciences participates in the project [DATACROSS](#) on advanced methods and technologies on data science and advanced cooperative systems, co-financed by the European Regional

Development Fund. The goal of this project is to accelerate economic growth in Croatia and promote employment of new professionals.

The Faculty of Transport and Traffic Sciences receives information about economic needs and the labour market not only from its Economic Council, but also from the Croatian Chamber of the Economy, the Croatian Chamber of Traffic and Transport Engineers, the IPC - Dunav Jadran Association, the Council for Railways, the Croatian Intelligent Transport Systems Association, and other bodies. The Faculty has signed collaborative agreements with most of these groups. Individual members of the Faculty actively participate in the work of societies and associations.

The social engagement of the Faculty is also reflected in its participation in human resource development projects funded by the European Social Fund (ESF) and European Regional Development Fund (ERDF). The Faculty collaborates as a partner of Croatia Control Ltd. on two international research projects with the goal of implementing a common (European) system for air traffic and airspace management. These projects are SESAR PJ01 – Enhanced Arrivals and Departures and SESAR PJ24 – Network Collaborative Management. Both projects form part of the European research-development programme Horizon 2020. Within the framework of the Danube SKILLS Project, the Faculty conducts research aimed at improving institutional capacities in Danube navigation through support of shared trans-national competencies and skills in education and development of public services.

The Faculty implements lifelong learning programmes with the goal of supplementing individuals' existing knowledge and business experience with new concepts from modern science and practice. The programmes achieve this goal through exchange of experiences with colleagues from the same business field during the solving of practical problems in an educational context. This is described in detail in Section 2.7 of the Self-Evaluation.

The Faculty provides additional infrastructure to support research as well as technology and knowledge transfer through 19 [laboratories](#) that it established and completely equipped from its own budget.

For the last three years, the Faculty has self-financed the PROM-PRO programme, which supports the creation of groups of young researchers at the Faculty working on topics defined in the [Strategic programme of scientific research at the Faculty of Transport and Traffic Sciences for 2015-2020](#).

Results from the PROM-PRO programme are presented at workshops and in proceedings ([Programme period 2015-2017](#), [Programme period 2016-2018](#)). The results from this scientific research testify to the interdisciplinarity of teams in this programme and to the inclusion of scientists and researchers from other parts of the University and from the economy. In this way, the programme integrates all interested stakeholders in science and the economy. The results from this programme are highlighted in Reports on Scientific Activities at the Faculty, which is sent annually to the University of Zagreb.

An indication of knowledge transfer from the Faculty to the economy is its post-diploma doctoral studies programme, which in the last five years has enrolled experts employed in the economy. The doctoral studies of these experts are financed by their employers. Since academic year 2013/2014, employers have financed the studies of 11 doctoral students.

Members of the Faculty are members of organising committees of scientific and professional conferences, a list of which is provided in Table 5.4 of the MOZVAG Appendix. The Faculty and its members are active in scientific and professional associations.

The Faculty continuously develops its system for self-promotion in society in order to become as visible as possible through dissemination of its results and announcements of future activities, which serves to further integrate the Faculty into all economic and social flows. The Faculty actively works on its social profile to promote, as effectively as possible, the values that it develops and that are aligned with its mission, vision and strategy. The Committee for Faculty Promotion is a permanent working body with 11 members (teachers, non-teaching staff and students) who organise [promotional programmes and activities](#) on the basis of an annual plan. One activity is annual trips to high schools to acquaint students with the opportunities that they can enjoy by studying at the Faculty; other activities are Faculty Day, Open Door Day, Careers Day, the University Fair, and various workshops and forums.

5.3. Scientific/artistic and professional achievements of the higher education institution are recognized in the national and international context

Teachers, associates and professional staff have received university, national and international awards for their scientific / artistic / professional achievements.

The higher education institution is a holder of an adequate number of scientific / artistic / professional projects (university, national and international projects).

Teachers, associates and professional staff participate as invited lecturers in an adequate number of national and international conferences.

Teachers and associates are members of the scientific / artistic / professional boards of conferences, and editorial boards of scientific journal.

Teachers at the Faculty have received several awards over the last five years, granted by international, domestic, university and faculty bodies, committees and organisations. Three awards were granted by the international body European Road Assessment Programme (EuroRAP), UN Economic Commission for Europe, and the Town and Spatial Planning Association of Slovenia together with the Maks Fabiani Foundation and the Slovenian Ministry of Culture and Ministry of Environment and Spatial Planning. Of particular importance are the Award for Highest Scientific and Artistic Achievement in Croatia in the Field of Technical Sciences, conferred by the Croatian Academy of Sciences and Arts, and the Annual Award of the Society of University Teachers, Scholars and Other Scientists - Zagreb. The Faculty has received one award for life's work, one award for outstanding achievement in teaching and two awards within a programme to promote scientific productivity. Over the last five years, teachers

at the Faculty have received awards for best work and best presentation at international conferences, and awards for scientific excellence from the editorial boards of journals.

Scientific research at the Faculty takes the form of participation in international and domestic projects within the framework of University support. Since 2012, the Faculty has been a partner in several international projects financed from international and domestic funds and programmes. These projects include the 7th Framework Programme (FP7), Horizon 2020, Instrument for Pre-Accession Assistance (IPA), IPA Adriatic, EUREKA, Competitiveness and Innovation Programme – Intelligent Energy Europe (CIP IEE), MED, EMPIR, EMFF (EASME), EURAMET, SEE, NEWFELPRO/MZO, ERASMUS+ KA2, EFRR, INTERREG CENTRAL EU, INTERREG MED, and ESF. Table 5.3 in the Appendix show all projects in which teachers at the Faculty have participated during the last five years. The data show an increase in the number of projects over time.

During this period, the Faculty has participated in the following COST Actions:

- TUD COST Action TU1102 (Towards autonomic road transport support systems)
- TUD COST Action TU1305 (Social networks and travel behaviour)
- TUD COST Action TU1408 [Air transport and regional development (ATARD)]
- TUD COST Action TU1407 [Scientific and technical innovations for safer powered two-wheelers (PTW)]
- ICTCOST Action IC1406 [High-performance modelling and simulation for Big Data applications (cHiPSet)]
- TUD COST Action TU1302 [Satellite positioning performance assessment for road transport (SaPPART)]
- COST CA15127 Action (Resilient Communication Services Protecting End-user Applications from Disaster-based Failures)

Teachers at the Faculty regularly take part in COST Action meetings and in the programme for short-term scientific mobility called "Short-term Scientific Mission". In addition to mobility programmes, young researchers participate in summer schools held in Europe (France, 2013; Bulgaria, 2014; Serbia, 2017; Greece, 2018).

Teachers and associates at the Faculty regularly deliver invited lectures at national and international meetings.

Teachers and associates at the Faculty are members of organising, programme and scientific committees of conferences. They also sit on editorial boards of scientific journals. Detailed information about these activities are shown in Table 5.5 of the MOZVAG Appendix.

5.4. The scientific / artistic activity of the higher education institution is both sustainable and developmental

The research / arts development strategy is aligned with the vision of development of the higher education institution.

Scientific / artistic activities are established by the strategic programme of the higher education institution.

The higher education institution has appropriate resources for its scientific / artistic activities.

HEI recognizes and rewards scientific / artistic achievements of its employees.

HEI continuously improves its scientific / artistic activities by appropriate financing, human resource management, investing in spatial resources, equipment and appropriate literature, supporting dissemination of results and development of doctoral theses.

The [Strategic programme of scientific research at the Faculty of Transport and Traffic Sciences for 2015-2020](#) is a direct continuation of the [Foundation for the strategic programme of scientific research at the Faculty Transport and Traffic Sciences for 2012-2017](#) and is aligned with the [Development Strategy of the Faculty of Transport and Traffic Sciences for 2012-2017](#) and the [Development Strategy of the Faculty of Transport and Traffic Sciences for 2018-2023](#). As part of the strategic programme, the Faculty has elaborated its mission and vision with respect to scientific research and scientific activity on the basis of the [Strategy for education, science and technology](#) and the proposal [Development and transformation of the University of Zagreb – Elaboration of initial assumptions](#). Most guidelines from these documents have been incorporated into the Faculty's strategic programme and help define the Faculty as a higher education institution and constituent of the University of Zagreb that provides university studies, develops scientific research and performs professional work in traffic and transport technology.

The Faculty's Development Strategy for 2012-2017 stipulated the creation of laboratories to advance scientific, professional and teaching activities. The Decision on Temporary Structure and Operation of Laboratories, Specialised Classrooms and Practical Exercises has significantly improved the level of informatics and hardware available to students and teachers. All lecture halls at the Faculty are fully equipped with modern informatics equipment, new specialised computer classrooms are available, and 19 new laboratories have been built and equipped. Updated information about the equipment is published in the [Laboratory equipment catalog](#). Laboratory equipment significantly influences the teaching and learning process at all levels of study, as well as the level of quality of scientific and professional work.

Faculty awards for scientific and research achievements are conferred on teachers who publish articles in recognised international scientific journals, who have won domestic or international awards for scientific research and who have been successful leading and participating in scientific and research projects, as stipulated in the [Regulations on conferring awards on Faculty members](#).

At the end of the academic year, organisational units of the Faculty propose a financial plan that includes expenses related to participation at international scientific meetings, procurement of research and laboratory equipment, acquisition of relevant literature and specialised software packages for research and development, staff training, study stays, conference organising, and other activities. This financial plan is accepted at a meeting of the Faculty Council. In this way, the Faculty continuously advances its scientific, teaching and professional activities through systematic planning of human, space and equipment resources and through support to teachers in their scientific research and teaching work.

5.5. Scientific/artistic and professional activities and achievements of the higher education institution improve the teaching process

Space and equipment for scientific / artistic research and professional activities is used in teaching at undergraduate, graduate and postgraduate level.

Undergraduate, graduate and postgraduate students are involved in scientific / artistic / professional projects of the HEI.

Both teaching at the undergraduate and graduate levels, and doctoral theses reflect the scientific / artistic research and professional activities and achievements of the higher education institution.

A total of 19 laboratories have been built at the Faculty within Departments and Chairs to support bachelor, master and doctoral theses within pre-diploma, diploma and post-diploma programmes. In addition, the Departments of Transport Planning, Road Transport and Urban Transport share the Laboratory for Planning and Modelling in Road and Urban Traffic, whose resources are used for shared courses taken by students in these departments.

The [Laboratory equipment catalogue](#) serves primarily as a source of information to students in the pre-diploma, diploma and post-diploma studies about equipment available for research within the framework of seminar, bachelor, master, specialisation and doctoral projects. The catalogue contains the name and technical characteristics of the equipment, as well as a list of uses that can help students find the appropriate resources for their research.

Students are included in scientific research with the goal of giving them additional knowledge and research skills. Through programme contracts and the PROM-PRO programme to support the creation of research activities and groups, students are able to participate in Faculty projects and obtain financing for the purchase of relevant equipment for research work. Students are also able to disseminate their research results through active participation at conferences. On the basis of these results, students and their teachers co-author articles and present them at international and domestic scientific meetings as well as professional meetings of students. Two examples of such meetings are [Zagreb Energy Week](#) and the [Silicon Valley International Invention Festival \(SVIIF\)](#). The best student projects apply for the [Rector's Prize of the University of Zagreb](#). Over the past five years, Faculty students have received 12 Rector's Awards (2 in 2017/2018, 4 in 2016/2017, 5 in 2015/2016, 1 in 2014/2015). Every year, a call is issued for the [Dean's Award](#) for the best student work at the Faculty at the pre-diploma, diploma and post-diploma levels.

An example of the inclusion of students in scientific research through developmental projects is the master thesis [Proposal for traffic regulation on the road segment Langov trg – Ribnjak – Medveščak in Zagreb](#), which became the urban development project "Feasibility study of dynamic change in traffic lanes on the road segment Langov trg – Ribnjak – Medveščak in Zagreb". Another example of a successful master thesis is [Sustainable mobility in rural areas](#), which examined the city of Jastrebarsko as a case study. This work became an urban project, [Study of public transport in the area of Jastrebarsko](#), which is being carried out at the Faculty on a project that employs the thesis author. In addition, results from master thesis work has

been included in the Horizon 2020 project [HiReach – Innovative mobility solutions to cope with transport poverty](#).

The Regulations on Doctoral Studies specify the participation of post-diploma students in scientific research and publishing of articles in journals of the highest category and in internationally peer-reviewed meetings in the area of the students' doctoral work.

Teaching and research in post-diploma doctoral studies allow students to gain new and relevant knowledge in the field of traffic and transport technology, including in the areas of sustainable transport, new technologies for vehicles and for traffic management, transport infrastructure, multimodal interurban traffic and transport networks, multimodal cargo corridors for sustainable transport networks, air traffic management, spatial planning and management of urban traffic demands, sustainable urban mobility, mobility and infrastructure planning, multimodal logistical chains, intelligent transport systems, safety in transport, availability and reliability of transport services, innovative models of mobility, cargo safety, information systems to facilitate transport mobility services, telecommunications market research, measurement and optimisation of information-communication network performance, safety and forensic analysis of information-communication systems, as well as development and application of information-communication technology-based assistive technologies in the traffic environment.

Teachers and mentors participate in the work of the following centers of scientific excellence: CETRA – Centre for Transport Research of the University of Žilina (Slovak Republic), the Centre of Excellence for Computer Vision and the Centre of Research Excellence for Data Science and Advanced Cooperative Systems of the University of Zagreb. At this last Centre, one Faculty teacher is leader of a local research group within the Research Unit on Data Science.

According to guidelines in the Regulations on Doctoral Study, the Commission for Postgraduate and Doctoral Studies defines the field, topic and mentor of doctoral research and in that way determines the department where the student will be based during his or her research. Departments of the Faculty are grouped into research clusters, the expertise of which is published on the website of the [Centre for Research, Development and Technology Transfer](#) of the University of Zagreb.

Added value of the newly instituted doctoral studies programme Transport is the potential of the research and its results to influence society and the economy as well as the development of creative thinking. For this reason, the programme is conceived with a reduced number of exams (5 altogether) and with a focus on scientific research from the very beginning (through research seminars). Topics of doctoral projects are defined through research seminars and are linked with the economy. The Economic Council of the Faculty, embodying the collaboration between Faculty and the economy, plays a significant role in the determination of doctoral research topics through the creation of shared research programmes.