



Nachname: **Melnychuk** Vorname: **Valentyn**
Geburtsdatum: **29. Mai 1997** Geburtsort: **Kiev**
Matrikelnummer: **11999524**

München, den 22. April 2021

Studiengang: Data Science
Abschluss: Master of Science
Master-Zeugnis vom 22. April 2021

Transcript of Records gemäß der Prüfungs- und Studienordnung der Ludwig-Maximilians-Universität München für den Masterstudiengang Data Science (2016) vom 18. Juli 2017

Studienbegleitende Prüfungsleistungen	Semester	Bewertung	ECTS
Inference and Sampling (Core Module Statistics) (P 1)	WiSe 2019/20	1,30	12
Statistical Reasoning and Inference (Vorlesung) (P 1.1)			(4)
Statistical Reasoning and Inference (Übung) (P 1.2)			(2)
Sampling and Experimental Design (Vorlesung) (P 1.3)			(4)
Sampling and Experimental Design (Übung) (P 1.4)			(2)
Knowledge Discovery and Big Data Management (Core Module Informatics) (P 2)	SoSe 2019	1,00	12
Knowledge Discovery and Data Mining (Vorlesung) (P 2.1)			(4)
Knowledge Discovery and Data Mining (Übung) (P 2.2)			(2)
Big Data Management (Vorlesung) (P 2.3)			(4)
Big Data Management (Übung) (P 2.4)			(2)
Advanced Statistical Modelling and Programming (P 3)	WiSe 2018/19	1,70	6
Advanced Statistical Modelling and Programming (Kolloquium) (P 3.1)			(4)
Advanced Statistical Modelling and Programming (Übung) (P 3.2)			(2)
Multivariate Statistics and Database Management (P 4)	WiSe 2018/19	1,00	6
Multivariate Statistics and Database Management (Kolloquium) (P 4.1)			(4)
Multivariate Statistics and Database Management (Übung) (P 4.2)			(2)
Human Computation and Visual Analytics (P 5)	SoSe 2019	1,00	9
Human Computation and Visual Analytics (Vorlesung) (P 5.1)			(2)
Human Computation and Visual Analytics (Übung) (P 5.2)			(4)
Project in Human Computation and Visual Analytics (P 5.3)			(3)



Studienbegleitende Prüfungsleistungen	Semester	Bewertung	ECTS
Predictive Modelling (P 6)	SoSe 2019	1,00	6
Predictive Modelling (Vorlesung) (P 6.1)			(4)
Predictive Modelling (Übung) (P 6.2)			(2)
Data Ethics and Data Security (P 7)	WiSe 2019/20	1,00	6
Data Security and Data Anonymization (Vorlesung) (P 7.1)			(1)
Data Security and Data Anonymization (Übung) (P 7.2)			(2)
Data Ethics (P 7.3)			(3)
Data Science Practical (Practical Module) (P 8)	SoSe 2020	1,00	12
Presenting Analyses in Data Science (Vorlesung) (P 8.1)			(1)
Presenting Analyses in Data Science (Übung) (P 8.2)			(2)
Applied Data Science (P 8.3)			(9)
Current Research in Data Science (P 9)	WiSe 2019/20	1,30	9
Current Research in Data Science (Seminar) (P 9.1)			(6)
Data Science Workshops (P 9.2)			(3)
Abschlussmodul (P 10)	WiSe 2020/21	1,00	30
Masterarbeit (P 10.1)	WiSe 2020/21	1,00	(25)
<i>Titel: Conditioning Normalizing Flows for Interpretability</i>			
Disputation (P 10.2)	WiSe 2020/21	1,00	(5)
Selected Topics in Statistics (WP 1)	SoSe 2019	1,00	6
Selected Topics in Statistics (Vorlesung) (WP 1.1)			(4)
Selected Topics in Statistics (Übung) (WP 1.2)			(2)
Selected Topics in Informatics (WP 2)	SoSe 2019	1,00	6
Selected Topics in Informatics (Vorlesung) (WP 2.1)			(4)
Selected Topics in Informatics (Übung) (WP 2.2)			(2)

Summe ECTS-Punkte

120

Die Masterprüfung im Studiengang Data Science wurde erfolgreich am 22. April 2021 mit der Endnote 1,08 (sehr gut) abgelegt.

Zusätzlich erbrachte Prüfungsleistungen, die nicht in die Masterprüfung eingegangen sind:

Studienbegleitende Prüfungsleistungen	Semester	Bewertung	ECTS
Theory of Selected Methods in Data Science (WP 3)	SoSe 2019	1,00	3
Theory of Selected Methods in Data Science (Vorlesung) (WP 3.1)			(1)
Theory of Selected Methods in Data Science (Übung) (WP 3.2)			(2)
Selected Topics in Data Science (WP 4)	WiSe 2019/20	1,00	6
Selected Topics in Data Science (Vorlesung) (WP 4.1)			(4)
Selected Topics in Data Science (Übung) (WP 4.2)			(2)
Summe ECTS-Punkte			9

Die Notenskala lautet:

bis einschließlich 1,50 = "sehr gut", von 1,51 bis einschließlich 2,50 = "gut", von 2,51 bis einschließlich 3,50 = "befriedigend" und von 3,51 bis einschließlich 4,00 = "ausreichend".

(P) = Pflichtmodul, (WP) = Wahlpflichtmodul, (*) anerkannte Leistung



22. April 2021


 Rebecca Ogbonna
 Leiterin des Prüfungsamts
 Naturwissenschaften Innenstadt (PANI)



LUDWIG-
MAXIMILIANS-
UNIVERSITÄT
MÜNCHEN

MASTER OF SCIENCE



DIPLOMA SUPPLEMENT

This Diploma Supplement model was developed by the European Commission, Council of Europe and UNESCO/CEPES. The purpose of the supplement is to provide sufficient independent data to improve the international 'transparency' and fair academic and professional recognition of qualifications (diplomas, degrees, certificates, etc.). It is designed to provide a description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It should be free from any value judgments, equivalence statements or suggestions about recognition. Information in all eight sections should be provided. Where information is not provided, an explanation should give the reason why.

1. HOLDER OF THE QUALIFICATION

1.1 Family Name / 1.2 First Name

See enclosure A / See enclosure A

1.3 Date, Place, Country of Birth

See enclosure A

1.4 Student ID Number or Code

See enclosure A

2. QUALIFICATION

2.1 Name of Qualification (full, abbreviated; in original language)

Master of Science (M. Sc.)

Title Conferred (full, abbreviated; in original language)

Master of Science (M. Sc.)

2.2 Main Field(s) of Study

See enclosure A

2.3 Institution Awarding the Qualification (in original language)

Ludwig-Maximilians-Universität München

Status (Type / Control)

University / State Institution

2.4 Institution Administering Studies (in original language)

Same

Status (Type / Control)

Same / Same

2.5 Language(s) of Instruction / Examination

German and English

3. LEVEL OF THE QUALIFICATION

3.1 Level

Graduate degree

3.2 Official Length of Programme

2 years, 120 ECTS credits

3.3 Access Requirements

First academic degree. Special requirements where appropriate: see enclosure A

4. CONTENTS AND RESULTS GAINED

4.1 Mode of Study

Full-time

4.2 Programme Requirements / Qualification Profile of the Graduate

See enclosure A

4.3 Programme Details (in original language)

See "Transcript of Records" for list of courses, examinations and grades and "Master Certificate" for topic of thesis

4.4 Grading Scheme

1.00 – 1.50	sehr gut	very good	excellent performance
1.51 – 2.50	gut	good	performance considerably exceeding the average standard
2.51 – 3.50	befriedigend	satisfactory	performance meeting the average standard
3.51 – 4.00	ausreichend	sufficient	performance meeting minimum criteria
> 4.00	nicht ausreichend	not sufficient / fail	performance not meeting minimum criteria

4.5 Overall Classification (in original language)

See enclosure A

5. FUNCTION OF THE QUALIFICATION

5.1 Access to Further Study

Qualifies to apply for admission for doctoral work (thesis research)

5.2 Professional Status

See enclosure A

6. ADDITIONAL INFORMATION

On the institution: www.lmu.de

For the national information sources please refer to 8.

7. CERTIFICATION

See enclosure A

8. NATIONAL HIGHER EDUCATION SYSTEM

The information on the national higher education system provides a context for the qualification and the type of higher education that awarded it.

See enclosure B



1. HOLDER OF THE QUALIFICATION

1.1 Family Name / 1.2 First Name

Melnychuk, Valentyn

1.3 Date, Place of Birth

May 29, 1997, Kiev

1.4 Student ID Number or Code

11999524

2. QUALIFICATION

2.2 Main Field(s) of Study

Master of Science in Data Science

3. LEVEL OF QUALIFICATION

3.3 Access Requirements

Bachelor of Science (or equivalent) in Statistics or Informatics or related disciplines (at least 180 ECTS or equivalent); passing a qualification assessment procedure.

4. CONTENTS AND RESULTS GAINED

4.2 Programme Requirements / Qualification Profile of the Graduate

Data Science

The curriculum of the elite master program Data Science is a modularised study program. It contains compulsory modules as well as elective modules, in which students learn statistical and computational methods for collecting, managing, and analysing large and complex data sets and how to extract knowledge and information from these data sets. The program also comprises courses on data security, data confidentiality, and data ethics; practical modules in which students tackle real-world problems in cooperation with industrial partners; as well as summer schools and focused tutorials.

4.5 Overall Classification (in original language)

sehr gut (1,08)

5. FUNCTION OF THE QUALIFICATION

5.2 Professional Status

The Master degree in Data Science entitles its holder to the legally protected professional title "Master of Science" and to work professionally and academically in the field of Data Science.

7. CERTIFICATION

This Diploma Supplement refers to and is only valid in combination with the following original documents: Master Certificate, Master Diploma and Transcript of Records dated April 22, 2021



Certification Date:
April 22, 2021


Director
Examination Office 

8. INFORMATION ON THE GERMAN HIGHER EDUCATION SYSTEM¹

8.1 Types of Institutions and Institutional Status

Higher education (HE) studies in Germany are offered at three types of Higher Education Institutions (HEI)².

- *Universitäten* (Universities) including various specialized institutions, offer the whole range of academic disciplines. In the German tradition, universities focus in particular on basic research so that advanced stages of study have mainly theoretical orientation and research-oriented components.

- *Fachhochschulen* (Universities of Applied Sciences) concentrate their study programmes in engineering and other technical disciplines, business-related studies, social work, and design areas. The common mission of applied research and development implies an application-oriented focus of studies, which includes integrated and supervised work assignments in industry, enterprises or other relevant institutions.

- *Kunst- und Musikhochschulen* (Universities of Art/Music) offer studies for artistic careers in fine arts, performing arts and music; in such fields as directing, production, writing in theatre, film, and other media; and in a variety of design areas, architecture, media and communication.

Higher Education Institutions are either state or state-recognized institutions. In their operations, including the organization of studies and the designation and award of degrees, they are both subject to higher education legislation.

8.2 Types of Programmes and Degrees Awarded

Studies in all three types of institutions have traditionally been offered in integrated „long“ (one-tier) programmes leading to *Diplom-* or *Magister Artium* degrees or completed by a *Staatsprüfung* (State Examination).

Within the framework of the Bologna-Process one-tier study programmes are successively being replaced by a two-tier study system. Since 1998, two-tier degrees (Bachelor and Master) have been introduced in almost all study programmes. This change is designed to provide enlarged variety and flexibility to students in planning and pursuing educational objectives, they also enhance international compatibility of studies.

The German Qualification Framework for Higher Education Degrees³, the German Qualifications Framework for Lifelong Learning⁴ and the European Qualifications Framework for Lifelong Learning⁵ describe the degrees of the German Higher Education System. They contain the classification of the qualification levels as well as the resulting qualifications and competencies of the graduates.

For details cf. Sec. 8.4.1, 8.4.2, and 8.4.3 respectively. Table 1 provides a synoptic summary.

8.3 Approval/Accreditation of Programmes and Degrees

To ensure quality and comparability of qualifications, the organization of studies and general degree requirements have to conform to principles and regulations established by the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany (KMK)⁶. In 1999, a system of accreditation for programmes of study has become operational under the control of an Accreditation Council at national level. All new programmes have to be accredited under this scheme; after a successful accreditation they receive the quality-label of the Accreditation Council⁷.

8.4 Organization and Structure of Studies

The following programmes apply to all three types of institutions. Bachelor's and Master's study courses may be studied consecutively, at various higher education institutions, at different types of higher education institutions and with phases of professional work between the first and the second qualification. The organization of the study programmes makes use of modular components and of the European Credit Transfer and Accumulation System (ECTS) with 30 credits corresponding to one semester.

8.4.1 Bachelor

Bachelor degree study programmes lay the academic foundations, provide methodological skills and lead to qualifications related to the professional field. The Bachelor degree is awarded after 3 to 4 years.

The Bachelor degree programme includes a thesis requirement. Study courses leading to the Bachelor degree must be accredited according to the Law establishing a Foundation for the Accreditation of Study Programmes in Germany⁸.

First degree programmes (Bachelor) lead to Bachelor of Arts (B.A.), Bachelor of Science (B.Sc.), Bachelor of Engineering (B.Eng.), Bachelor of Laws (LL.B.), Bachelor of Fine Arts (B.F.A.), Bachelor of Music (B.Mus.) or Bachelor of Education (B.Ed.). The Bachelor degree corresponds to level 6 of the German Qualifications Framework/ European Qualifications Framework.

8.4.2 Master

Master is the second degree after another 1 to 2 years. Master study programmes must be differentiated by the profile types "practice-oriented" and "research-oriented". Higher Education Institutions define the profile.

The Master degree study programme includes a thesis requirement. Study pro-

grammes leading to the Master degree must be accredited according to the Law establishing a Foundation for the Accreditation of Study Programmes in Germany⁹.

Second degree programmes (Master) lead to Master of Arts (M.A.), Master of Science (M.Sc.), Master of Engineering (M.Eng.), Master of Laws (LL.M.), Master of Fine Arts (M.F.A.), Master of Music (M.Mus.) or Master of Education (M. Ed.). Master study programmes, which are designed for continuing education, may carry other designations (e.g. MBA).

The Master degree corresponds to level 7 of the German Qualifications Framework/ European Qualifications Framework.

8.4.3 Integrated „Long“ Programmes (One-Tier):

Diplom degrees, *Magister Artium*, *Staatsprüfung*

An integrated study programme is either mono-disciplinary (*Diplom* degrees, most programmes completed by a *Staatsprüfung*) or comprises a combination of either two major or one major and two minor fields (*Magister Artium*). The first stage (1.5 to 2 years) focuses on broad orientations and foundations of the field(s) of study. An Intermediate Examination (*Diplom-Vorprüfung* for *Diplom* degrees; *Zwischenprüfung* or credit requirements for the *Magister Artium*) is prerequisite to enter the second stage of advanced studies and specializations. Degree requirements include submission of a thesis (up to 6 months duration) and comprehensive final written and oral examinations. Similar regulations apply to studies leading to a *Staatsprüfung*. The level of qualification is equivalent to the Master level.

- Integrated studies at *Universitäten* (U) last 4 to 5 years (*Diplom* degree, *Magister Artium*) or 3 to 6.5 years (*Staatsprüfung*). The *Diplom* degree is awarded in engineering disciplines, the natural sciences as well as economics and business. In the humanities, the corresponding degree is usually the *Magister Artium* (M.A.). In the social sciences, the practice varies as a matter of institutional traditions. Studies preparing for the legal, medical and pharmaceutical professions are completed by a *Staatsprüfung*. This applies also to studies preparing for teaching professions of some *Länder*. The three qualifications (*Diplom*, *Magister Artium* and *Staatsprüfung*) are academically equivalent and correspond to level 7 of the German Qualifications Framework/ European Qualifications Framework. They qualify to apply for admission to doctoral studies. Further prerequisites for admission may be defined by the Higher Education Institution, cf. Sec. 8.5.

- Integrated studies at *Fachhochschulen* (FH)/Universities of Applied Sciences (UAS) last 4 years and lead to a *Diplom* (FH) degree which corresponds to level 6 of the German Qualifications Framework/ European Qualifications Framework. While the FH/UAS are non-doctorate granting institutions, qualified graduates may apply for admission to doctoral studies at doctorate-granting institutions, cf. Sec. 8.5.

- Studies at *Kunst- und Musikhochschulen* (Universities of Art/Music etc.) are more diverse in their organization, depending on the field and individual objectives. In addition to *Diplom/Magister* degrees, the integrated study programme awards include Certificates and certified examinations for specialized areas and professional purposes.

8.5 Doctorate

Universities as well as specialized institutions of university standing and some Universities of Art/Music are doctorate-granting institutions. Formal prerequisite for admission to doctoral work is a qualified Master (UAS and U), a *Magister* degree, a *Diplom*, a *Staatsprüfung*, or a foreign equivalent. Comparable degrees from universities of art and music can in exceptional cases (study programmes such as music theory, musicology, pedagogy of arts and music, media studies) also formally qualify for doctoral work. Particularly qualified holders of a Bachelor or a *Diplom* (FH) degree may also be admitted to doctoral studies without acquisition of a further degree by means of a procedure to determine their aptitude. The universities respectively the doctorate-granting institutions regulate entry to a doctorate as well as the structure of the procedure to determine aptitude. Admission further requires the acceptance of the Dissertation research project by a professor as a supervisor.

The doctoral degree corresponds to level 8 of the German Qualifications Framework/ European Qualifications Framework.

8.6 Grading Scheme

The grading scheme in Germany usually comprises five levels (with numerical equivalents; intermediate grades may be given): „*Sehr Gut*“ (1) = Very Good; „*Gut*“ (2) = Good; „*Befriedigend*“ (3) = Satisfactory; „*Ausreichend*“ (4) = Sufficient; „*Nicht ausreichend*“ (5) = Non-Sufficient/Fail. The minimum passing grade is „*Ausreichend*“ (4). Verbal designations of grades may vary in some cases and for doctoral degrees. In addition, grade distribution tables as described in the ECTS Users' Guide are used to indicate the relative distribution of grades within a reference group.

8.7 Access to Higher Education

The General Higher Education Entrance Qualification (*Allgemeine Hochschulreife*, *Abitur*) after 12 to 13 years of schooling allows for admission to all higher educational studies. Specialized variants (*Fachgebundene Hochschulreife*) allow for admission at *Fachhochschulen* (UAS), universities and equivalent higher education institutions,

but only in particular disciplines. Access to study programmes at *Fachhochschulen* (UAS) is also possible with a *Fachhochschulreife*, which can usually be acquired after 12 years of schooling. Admission to study programmes at Universities of Art/Music and comparable study programmes at other higher education institutions as well as admission to a study programme in sports may be based on other or additional evidence demonstrating individual aptitude.

Applicants with a vocational qualification but without a school-based higher education entrance qualification are entitled to a general higher education entrance qualification and thus to access to all study programmes, provided they have obtained advanced further training certificates in particular state-regulated vocational fields [e.g. *Meister/Meisterin im Handwerk*, *Industriemeister/in*, *Fachwirt/in* (IHK und HWK), *staatlich geprüfte/r Betriebswirt/in*, *staatlich geprüfte/r Gestalter/in*, *staatlich geprüfte/r Erzieher/in*]. Vocationally qualified applicants can obtain a *Fachgebundene Hochschulreife* after completing a state-regulated vocational education of at least two years' duration plus professional practice of normally at least three years' duration, after having successfully passed an aptitude test at a higher education institution or other state institution; the aptitude test may be replaced by successfully completed trial studies at least one year's duration.¹⁰

Higher Education Institutions may in certain cases apply additional admission procedures.

8.8 National Sources of Information

- *Kultusministerkonferenz (KMK)* [Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany]; Graurheindorfer Str. 157, 53117 Bonn; Fax: +49(0)228/501-777; Phone: +49(0)228/501-0
- Central Office for Foreign Education (ZaB) as German NARIC; www.kmk.org; E-Mail: zab@kmk.org
- "Documentation and Educational Information Service" as German EURYDICE-Unit, providing the national dossier on the education system (www.kmk.org/dokumentation/zusammenarbeit-auf-europaeischer-ebene-im-eurydice-informationsnetz.html); E-Mail: eurydice@kmk.org
- *Hochschulrektorenkonferenz (HRK)* [German Rectors' Conference]; Ahhrstrasse 39 53175 Bonn; Fax: +49(0)228/887-110; Phone: +49(0)228/887-0; www.hrk.de; E-Mail: post@hrk.de

- „Higher Education Compass“ of the German Rectors' Conference features comprehensive information on institutions, programmes of study, etc. (www.higher-education-compass.de)

¹ The information covers only aspects directly relevant to purposes of the Diploma Supplement. All information as of January 2015.

² *Berufsakademien* are not considered as Higher Education Institutions, they only exist in some of the *Länder*. They offer educational programmes in close cooperation with private companies. Students receive a formal degree and carry out an apprenticeship at the company. Some *Berufsakademien* offer Bachelor courses which are recognized as an academic degree if they are accredited by a German accreditation agency.

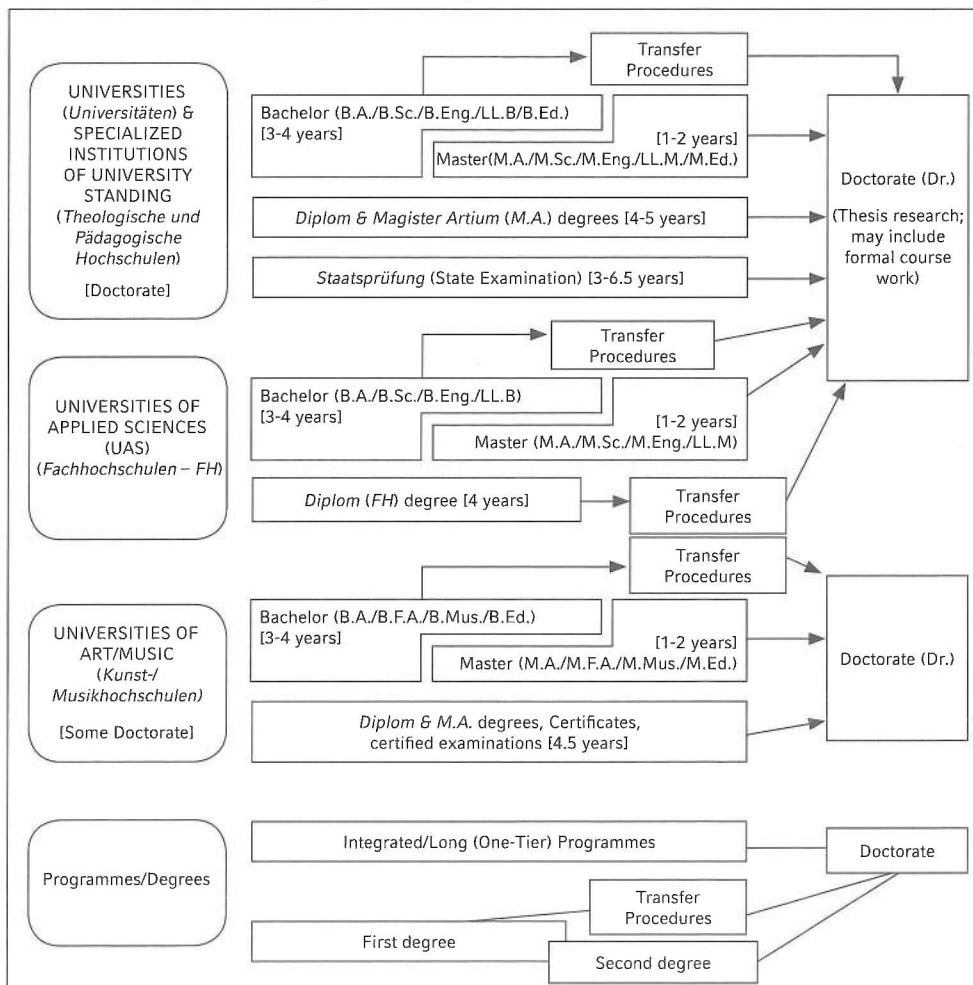
³ German Qualification Framework for Higher Education Degrees (Resolution of the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany of 21.04.2005).

⁴ German Qualifications Framework for Lifelong Learning (DQR). Joint resolution of the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany, the German Federal Ministry of Education and Research, the German Conference of Economics Ministers and the German Federal Ministry of Economics and Technology (Resolution of the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany of 15.11.2012). More information at www.dqr.de

⁵ Recommendation of the European Parliament and the European Council on the establishment of a European Qualifications Framework for Lifelong Learning of 23.04.2008 (2008/C 111/01 – European Qualifications Framework for Lifelong Learning – EQF).

⁶ Common structural guidelines of the *Länder* for the accreditation of Bachelor's and Master's study courses (Resolution of the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany of 10.10. 2003, as amended on 04.02.2010).

Table 1: Institutions, Programmes and Degrees in German Higher Education



⁷ "Law establishing a Foundation 'Foundation for the Accreditation of Study Programmes in Germany'", entered into force as from 26.2.2005, GV. NRW. 2005, No. 5, p. 45 in connection with the Declaration of the *Länder* to the Foundation "Foundation: Foundation for the Accreditation of Study Programmes in Germany" (Resolution of the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany of 16.12.2004).

⁸ See note No. 7.

⁹ See note No. 7.

¹⁰ Access to higher education for applicants with a vocational qualification, but without a school-based higher education entrance qualification (Resolution of the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany of 06.03.2009).