



URKUNDE

Aufgrund des erfolgreichen Studienabschlusses im Studiengang
Angewandte Informatik
verleiht die Otto-Friedrich-Universität Bamberg

*Following successful completion of the requisite courses in
Applied Computer Science
the Otto-Friedrich University Bamberg confers upon*

Vorname(n) Nachname
Name(s) (first, last) **Jan Martin**
geboren am
born on **04.12.1988**

den akademischen Grad*
the degree of*

MASTER OF SCIENCE (M.Sc.)

Bamberg, 21. Februar 2022

Präsident
President

A handwritten signature in black ink, which appears to read "Kai Fischbach".

Prof. Dr. Kai Fischbach

(Prägesiegel)

*Dieser akademische Grad kann auch mit der folgenden Herkunftsbezeichnung geführt werden:
"Master of Science (Univ. Bamberg)" bzw. "M.Sc. (Univ. Bamberg)"
*Attainment of this degree confers the right to use the title
"Master of Science (Univ. Bamberg)" and the abbreviation "M.Sc. (Univ. Bamberg)"



ZEUGNIS

Vorname(n) Nachname
Name(s) (first, last)

Jan Martin

geboren am
born on

04.12.1988

hat den Masterstudiengang
has completed the requisite courses of studies for a Master's degree in

Angewandte Informatik
Applied Computer Science

mit der Gesamtnote
with a grade of

GUT / GOOD (1,9)

abgeschlossen.

Studienschwerpunkt(e)
Focus (Foci)

Kognitive Systeme
Cognitive Systems

Thema der Masterarbeit
Title of Master Thesis

Applying Structural Analogy to Solve Abstract Reasoning Problems in a More
Human-like Way

Bamberg, 21. Februar 2022

Vorsitzender des Prüfungsausschusses
Head of Examination Board

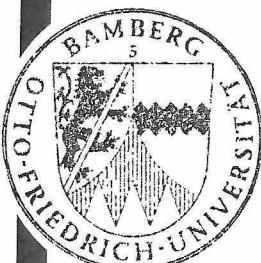
A. Henrich

Prof. Dr. Andreas Henrich

Dekan der Fakultät
Dean of the Faculty

G. Wirtz

Prof. Dr. Guido Wirtz





TRANSCRIPT OF RECORDS LEISTUNGSÜBERSICHT

Vorname(n) Nachname **Jan Martin**
geboren am **04.12.1988**
Matrikelnummer **1796943**
Studiengang **Master Angewandte Informatik**



Vorname(n) Nachname

Jan Martin

geboren am

04.12.1988

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erbrachte
ECTS-
Punkte

Note

Angewandte Informatik

Computergrafik und Animation	2,0	6
Information Retrieval (Grundlagen, Modelle und Anwendungen)	2,0	6
Kognitive Modellierung	2,3	6
Lernende Systeme	1,3	6
Projekt zur Medieninformatik [Master]	1,3	6
Übung: Projekt zur Medieninformatik		

Informatik

Advanced Security and Privacy	3,0	6
Master Project Mobile Software Systems (AI)	1,3	6
Projekt: Medieninformatik		

Anwendungsfächer sowie Wirtschaftsinformatik

Japanese Society I <i>Anerkannte Leistung: Nanzan University, Nagoya, Japan</i>	1,3	6
Topics in Management Science in Japan <i>Anerkannte Leistung: Nanzan University, Nagoya, Japan</i>	1,0	6

Seminare

Masterseminar Grundlagen der Informatik <i>Seminar: Grundlagen der Informatik</i>	3,0	3
Reading Club Kognitive Systeme	3,0	3

Masterarbeit

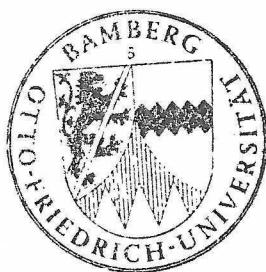
Masterarbeit in Angewandter Informatik <i>Kolloquium</i> Thema der Masterarbeit: Applying Structural Analogy to Solve Abstract Reasoning Problems in a More Human-like Way	2,2	30
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Gesamtnote **gut (1,9)** **90**

Bamberg, den 21. Februar 2022

Vorsitzender des Prüfungsausschusses

Prof. Dr. Andreas Henrich



Bemerkung:

Wenn die Prüfungsgesamtnote im Bereich von 1,0 bis einschließlich 1,2 liegt, wird zusätzlich das Prädikat "mit Auszeichnung" vergeben.

Die Gesamtnote wurde nach der geltenden Prüfungsordnung berechnet.

Notenstufen: 1,0 bis 1,5 = sehr gut; über 1,5 bis 2,5 = gut; über 2,5 bis 3,5 = befriedigend; über 3,5 bis 4,0 = ausreichend; über 4,0 = nicht ausreichend.



DIPLOMA SUPPLEMENT

Vorname(n) Nachname
Name(s) (first, last)

Jan Martin

geboren am
born on

04.12.1988

Matrikelnummer
Student ID

1796943

Studiengang
Program of Studies

Master Applied Computer 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 judgements, 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. INFORMATION IDENTIFYING THE HOLDER OF THE QUALIFICATION

1.1 Family name(s) / 1.2 First name(s)

Martin, Jan

1.3 Date of birth (dd/mm/yyyy)

04.12.1988

1.4 Student identification number or code (if applicable)

1796943

2. INFORMATION IDENTIFYING THE QUALIFICATION

2.1 Name of qualification and (if applicable) title conferred (in original language)

Master of Science (M.Sc.)

2.2 Main field(s) of study for the qualification

Applied Computer Science

2.3 Name and status of awarding institution (in original language)

Otto-Friedrich-Universität Bamberg / State University

2.4 Name and status of institution (if different from 2.3) administering studies (in original language)

same as 2.3

2.5 Language(s) of instruction/examination

German

3. INFORMATION ON THE LEVEL AND DURATION OF THE QUALIFICATION

3.1 Level of the qualification

Master Degree

3.2 Official duration of programme in credits and/or years

1.5 years, 90 ECTS-credits

3.3 Access requirement(s)

Bachelor Degree in Applied Computer Science or related Studies (210 ECTS credits) with grade point average 2.7 or better.

4. INFORMATION ON THE PROGRAMME COMPLETED AND THE RESULTS OBTAINED

4.1 Mode of study

full time or part time



Vorname(n) Nachname | Name(s) (first, last)
geboren am | born on
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Jan Martin
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4.2 Programme learning outcomes

Applied Computer Science (24-42 ECTS credits), Computer Science (12-30 ECTS credits), Application Areas and Information Systems (0-18 ECTS credits), Seminars (6 ECTS credits), Master Thesis (30 ECTS credits).

4.3 Programme details, individual credits gained and grades/marks obtained

See "Transcript of Records" for secondary subjects, list of modules and courses, topic of thesis, and for ECTS and grades achieved.

4.4 Grading system and, if available, grade distribution table

1 = very good: an excellent achievement;

2 = good: an achievement significantly above average;

3 = satisfactory: an average achievement;

4 = sufficient: an achievement fulfilling requirements in most ways (minimum pass grade);

5 = insufficient: an achievement not fulfilling requirements.

To further differentiate between levels of achievement grades may be increased or decreased in increments of 0.3. The grades 0.7, 4.3, 4.7 and 5.3 are excluded.

4.5 Overall classification of the qualification (in original language)

gut (1,9)

5. INFORMATION ON THE FUNCTION OF THE QUALIFICATION

5.1 Access to further study

Access to Doctoral Studies

5.2 Access to a regulated profession (if applicable)

No special professional status applicable

6. ADDITIONAL INFORMATION

6.1 Additional information

n.a.

6.2 Further information sources

http://www.uni-bamberg.de/abt-studium/aufgaben/pruefungs_studienordnungen/

7. CERTIFICATION

This Diploma Supplement refers to the following original documents:

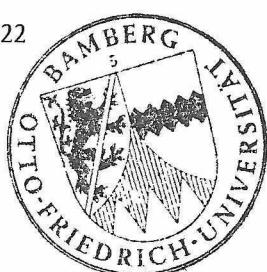
Document on the award of the academic degree (Urkunde über die Verleihung des Akademischen Grades) 21.02.2022

Certificate (Zeugnis) 21.02.2022

Transcript of Records 21.02.2022

Bamberg, den 21. Februar 2022

Prof. Dr. Andreas Henrich
Head of Examination Board



8. NATIONAL HIGHER EDUCATION SYSTEM

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

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 specialised 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 (FH)/Hochschulen für Angewandte Wissenschaften (HAW)* (Universities of Applied Sciences, UAS) concentrate their study programmes in engineering and other technical disciplines, businessrelated 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-recognised institutions. In their operations, including the organisation 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's and Master's) have been introduced in almost all study programmes. This change is designed to enlarge variety and flexibility for students in planning and pursuing educational objectives; it also enhances international compatibility of studies.

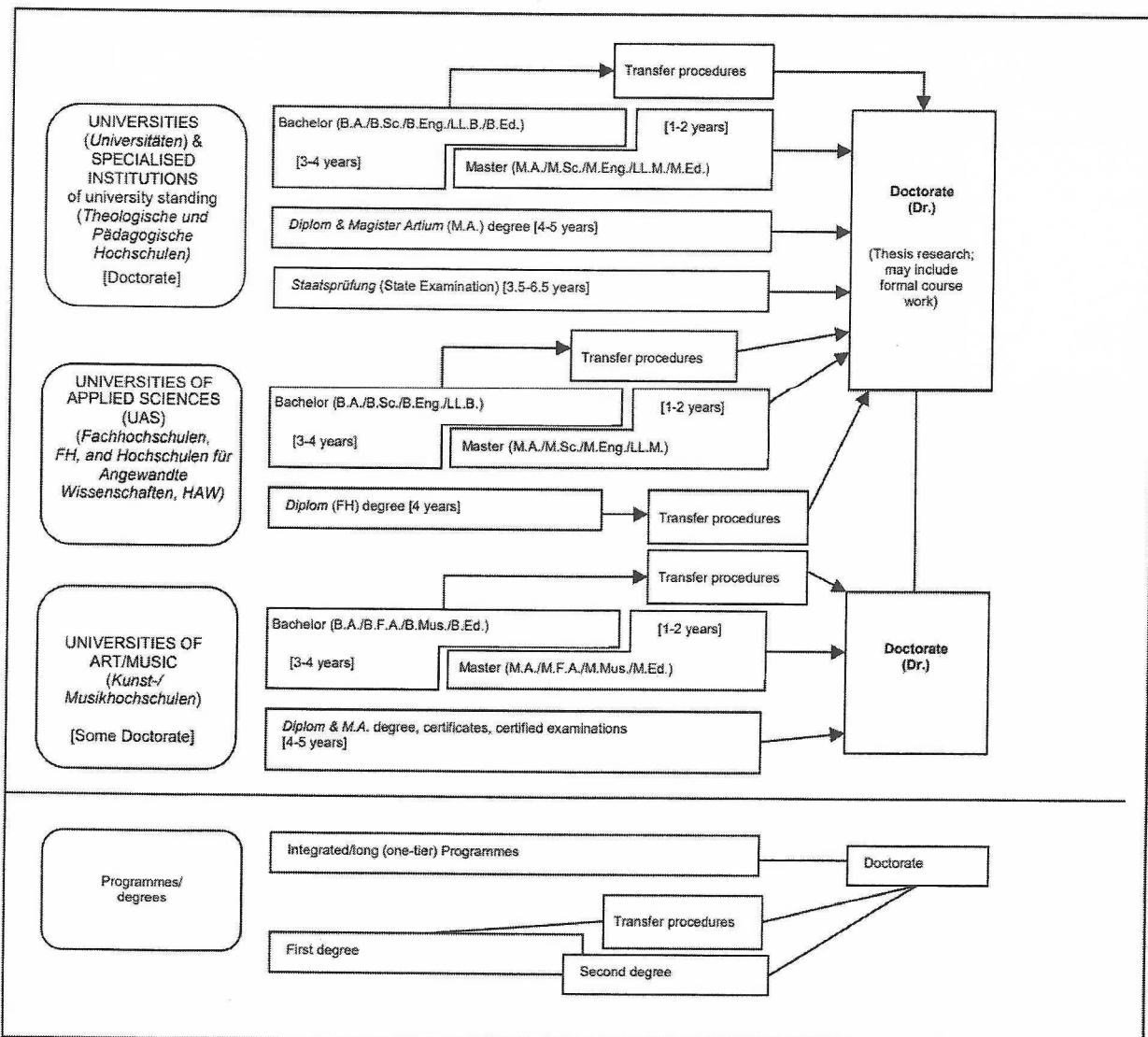
The German Qualifications Framework for Higher Education Qualifications (HQR)³ describes the qualification levels as well as the resulting qualifications and competences of the graduates. The three levels of the HQR correspond to the levels 6, 7 and 8 of the German Qualifications Framework for Lifelong Learning⁴ and the European Qualifications Framework for Lifelong Learning⁵.

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 organisation 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 Bachelor's and Master's programmes has become operational. All new programmes have to be accredited under this scheme; after a successful accreditation they receive the seal of the Accreditation Council.⁷

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





8.4 Organisation and Structure of Studies

The following programmes apply to all three types of institutions. Bachelor's and Master's study programmes 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 organisation 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's degree programmes lay the academic foundations, provide methodological competences and include skills related to the professional field. The Bachelor's degree is awarded after 3 to 4 years.

The Bachelor's degree programme includes a thesis requirement. Study programmes leading to the Bachelor's degree must be accredited according to the Interstate study accreditation treaty.⁸

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's 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's programmes may be differentiated by the profile types "practice-oriented" and "research-oriented". Higher Education Institutions define the profile.

The Master's degree programme includes a thesis requirement. Study programmes leading to the Master's degree must be accredited according to the Interstate study accreditation treaty.⁹

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

The Master's 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 specialisations. 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's level.

- Integrated studies at *Universitäten* (U) last 4 to 5 years (*Diplom* degree, *Magister Artium*) or 3.5 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)/*Hochschulen für Angewandte Wissenschaften* (HAW) (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.

Qualified graduates of FH/HAW/UAS 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 organisation, depending on the field and individual objectives. In addition to *Diplom/Magister* degrees, the integrated study programme awards include certificates and certified examinations for specialised areas and professional purposes.

8.5 Doctorate

Universities as well as specialised institutions of university standing, some of the FH/HAW/UAS and some Universities of Art/Music are doctorate-

granting institutions. Formal prerequisite for admission to doctoral work is a qualified Master's degree (UAS and U), a *Magister* degree, *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's degree 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. Specialised variants (*Fachgebundene Hochschulreife*) allow for admission at *Fachhochschulen* (FH)/*Hochschulen für Angewandte Wissenschaften* (HAW) (UAS), universities and equivalent higher education institutions, but only in particular disciplines. Access to study programmes at *Fachhochschulen* (FH)/*Hochschulen für Angewandte Wissenschaften* (HAW) (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 qualification in vocational education and training 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), *Betriebswirt/in* (IHK) und (HWK), *staatlich geprüfte/r Techniker/in*, *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 of 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, D-53117 Bonn;
Phone: +49(0)228/501-0; www.kmk.org; E-Mail: hochschulen@kmk.org
- Central Office for Foreign Education (ZAB) as German NARIC; www.kmk.org; E-Mail: zab@kmk.org
- German information office of the *Länder* in the EURYDICE Network, providing the national dossier on the education system; www.kmk.org; E-Mail: Eurydice@kmk.org
- *Hochschulrektorenkonferenz* (HRK) [German Rectors' Conference]; Leipziger Platz 11, D-10117 Berlin, Phone: +49 30 206292-11; 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.

² *Berufssakademien* 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 *Berufskademien* offer Bachelor courses which are recognised as an academic degree if they are accredited by the Accreditation Council.

³ German Qualifications 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 16 February 2017).

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 November 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 April 2008 (2008/C 111/01 – European Qualifications Framework for Lifelong Learning – EQF).

⁶ Specimen decree pursuant to Article 4, paragraphs 1 – 4 of the interstate study accreditation treaty (Resolution of the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany of 7 December 2017).

⁷ Interstate Treaty on the organization of a joint accreditation system to ensure the quality of teaching and learning at German higher education institutions (Interstate study accreditation treaty) (Decision of the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany of 8 December 2016), Enacted on 1 January 2018.

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 6 March 2009).