

Engineering Doctorate

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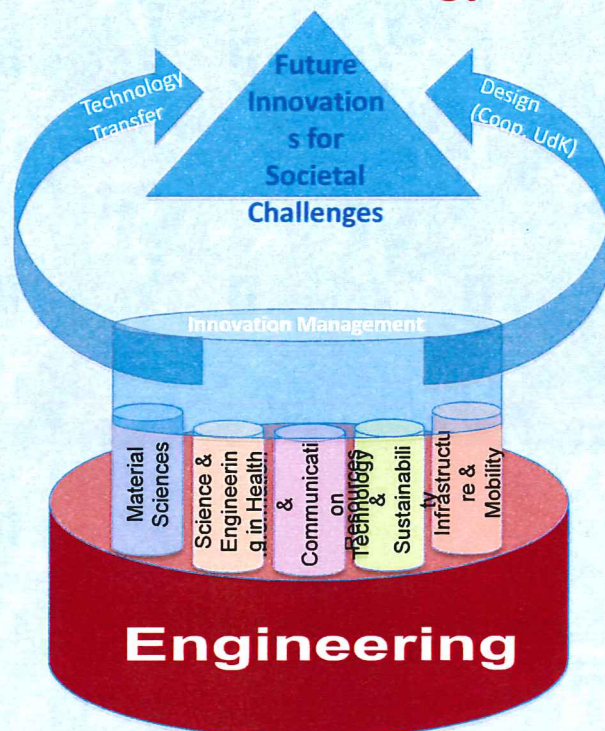
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Students and postgraduates	30635	total student enrollment
	9871	female students
	5919	international students (20%)
	470	doctorates
	17	post doctoral lecture qualification (average per year)
Staff	7	faculties
	322	professors
	67	professors, <i>financed through external funds</i>
	901	scientific staff, <i>governmental grant financed</i>
	1558	scientific staff, <i>financed through external funds</i>
Budget 2010	268,6 m€	Berlin Government grant 2011
	155 m€	<i>acquired external funds 2011</i>
	70 m€	<i>acquired external funds from the associated Fraunhofer Institutes</i>

Fields of Focus

Future Research Strategy TU Berlin



European Society for Engineering Education

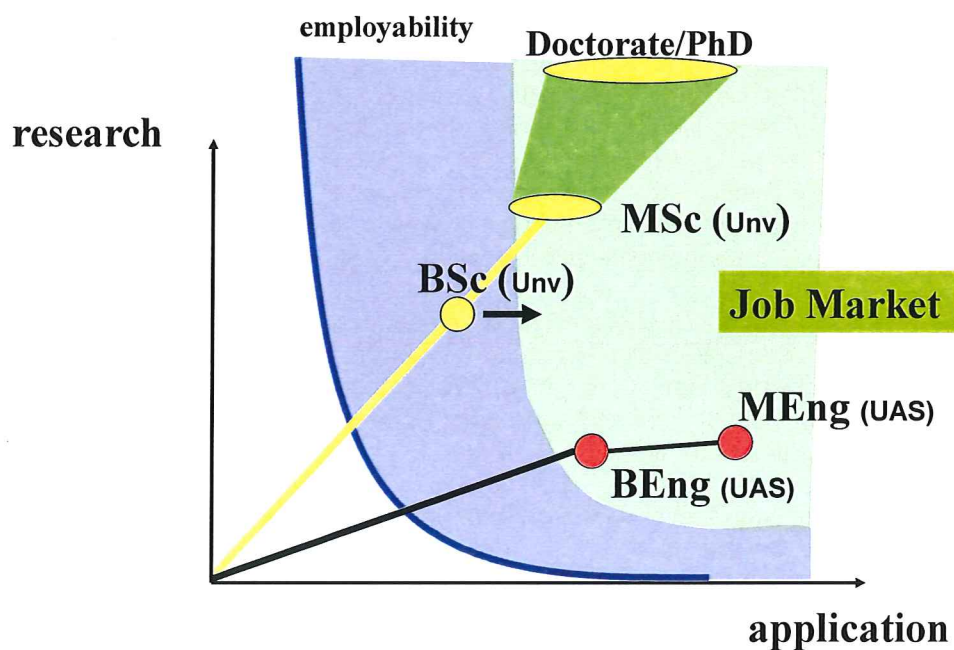
Société Européenne pour la Formation des Ingénieurs

Europäische Gesellschaft für Ingenieurausbildung

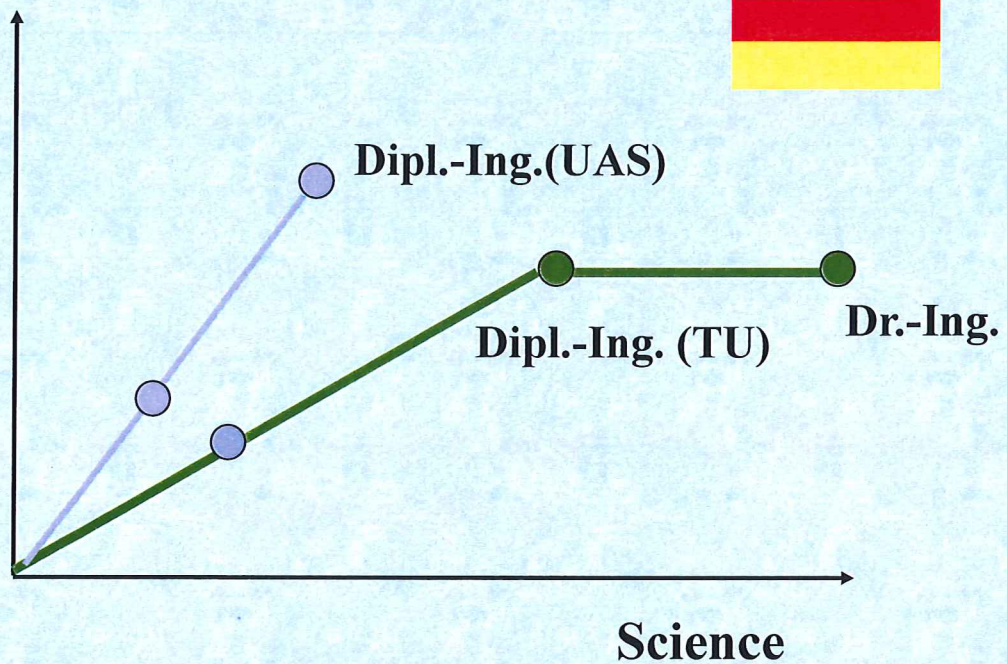
About 400 (250 institutions, associations, individuals)
in 38 countries

Founded in 1973

Prof. C. Borri



Application



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Alois Riedler (1850-1936)

Alois Riedler was born in Graz on 15 May 1850, the son of a bleacher. He studied mechanical engineering at the TH Graz from 1866 to 1871 before becoming an assistant at the Faculty of Mechanical Engineering at the German Technische Hochschule in Brunn. In 1873 he moved to the TH Vienna, where he was active first as an assistant, and then from 1875 onwards as a designer of machines. In 1880 Riedler was called to the TH Munich and four years later moved to the TH Aachen. He was finally appointed Professor for Mechanical Engineering at the Technische Hochschule Berlin in 1888. Riedler always paid special attention to how machines operated in industrial practice. Riedler was actively involved in the development of the Otto (petrol) engine and the diesel engine.

In 1899 Riedler was appointed principal of the TH Berlin and as such led the discussions on how to prepare for the TH's hundredth anniversary. In this context, Riedler together with Adolf Slaby (1849-1913) succeeded in convincing the Emperor Wilhelm II. (1859-1941) to grant Prussian technical universities the right to award doctorates.

Riedler was elected emeritus professor aged 70. He returned to Austria, to die almost forgotten on 25 October 1936.

Lit.: Karl-Heinz Manegold: Alois Riedler, in W. Treue u. W. König: Berlinische Lebensbilder Bd. 6 (Pictures of Life in Berlin) - Techniker, Berlin: Colloquium Verlag 1990, p. 293-307



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Traditional Doctorate

The traditional German doctorate is awarded for producing a substantial, independent research thesis under the supervision of a university professor. This means that after selecting your own research topic you draw up a research portfolio with which you look for a personal supervisor (so-called "Doktorvater" or "Doktormutter") at the university. Your supervisor will then help, supervise and support you during your research.

Working in Engineering Departments or at Research Institutions

As a traditional doctoral candidate, you can work as a research assistant at an engineering department which collaborates with industry, or at one of the affiliated institutes (research institutions like the Fraunhofer Institutes). Emphasis is placed on practical, applied research commissioned by industry and public institutions; for this reason, the thesis project is defined in agreement with your supervisor.

The doctoral students are employed at the university or affiliated institute and they usually hold full-time positions. The tasks include specific responsibilities within various projects, communication with customers, project acquisition activities, and writing research proposals. PhD students not only work as researchers but also perform teaching and organizational and management tasks.

Laboratory-Based Research

Another traditional option is laboratory-based research. This model is available in the natural sciences (physics, chemistry, biology) and to a large extent in the engineering sciences and computer science.

Research work is mainly conducted in the lab, at the technology centre, or at the workstation in the institute, and you will be employed part-time as a research assistant.

The research topic is either set by your supervisor or you and your supervisor arrive at a mutually agreed research topic. Usually there are workgroups whose members work on closely related topics. As you are employed in an institute, you have to perform certain tasks not directly related to your PhD project, such as assisting in teaching, or maintenance of machines, equipment and appliances in the lab.

Concerning your research work, there is regular communication between PhD students and the professor. The institutes usually offer regular seminars and other educational events for doctoral students. The following degrees may be awarded: Dr.-Ing. by the engineering faculties, Dr.rer.nat by the natural science faculties.

Structured Programmes

The TU9 Universities also offer the opportunity to complete your doctorate in research training groups, graduate schools or university doctoral programmes.

Research training groups, or Graduiertenkollegs, are organized and funded by the German Research Foundation (DFG). A group of researchers study a thematically similar subject with an interdisciplinary focus. Seminars and programmes are offered to doctoral students in research training groups.

Graduate schools are broader in scope and more interdisciplinary in nature than the thematically more focused research training groups.

Doctoral programmes have a clearly defined curriculum that prescribes participation in seminars and the production of papers.

Structured programmes have a high degree of funding, support and additional training, and are therefore seen as the last and highest level of university education.

Research

Research doctorates are awarded in recognition of academic research that is (at least in principle) publishable in a peer-refereed [academic journal](#). In many countries, including the United States, earning a research doctorate also requires successful completion of a regimen of coursework beyond the masters level. The best-known degree of this type, in the Anglophone world, is that of [Doctor of Philosophy](#) (Ph.D., or sometimes D.Phil) awarded in many countries throughout the world. Others include the degree of [Doctor of Education](#), various doctorates in engineering, such as the US [Doctor of Engineering](#)^[7] (also awarded in Japan and South Korea), the UK [Engineering Doctorate](#)^[8] and the German Engineering Doctorate [Doktor-Ingenieur](#) and the German degree of *Doctor rerum naturalium* (Dr.rer.nat.). The [Doctor of Theology](#), often stylized Th.D., is also a research doctorate.

Criteria for award of research doctorates vary somewhat throughout the world, but typically requires the submission of a substantial body of original research undertaken by the candidate. This may take the form of a single [thesis](#) or dissertation, or possibly a portfolio of shorter project reports, and will usually be assessed by a small committee of examiners appointed by the university, and often an oral examination of some kind. In some countries (such as the US) there may also be a formal taught component, typically consisting of graduate-level courses in the subject in question, as well as training in research methodology.

The minimum time required to complete a research doctorate varies by country, and may be as short as three years (excluding undergraduate study), although it is not uncommon for a candidate to take up to ten years to complete.

SEFI Position on the Doctorate in Engineering

The European Society for Engineering Education (SEFI) issues this statement to underscore its position regarding the third cycle: the Doctorate in Engineering.

1. A Doctorate in engineering must be the result of individual research work

Research activities of Doctoral candidates are an important source of new knowledge in engineering. SEFI emphasizes that a PhD in Engineering is an individual qualification. The research should reflect the individual's research competencies, even if the research work is often embedded in teams and clusters. It is characterized by achieving results beyond boundaries of existing scientific and /or technological knowledge.

2. The Doctorate is regarded as the third cycle of qualification within the Bologna Process

Qualifying as a researcher with a PhD within the Bologna Process should be the result of an individual learning process rather than curriculum-based education. Because of its particular research character, it should be considered as the first step in the research career of Doctoral candidates.

3. Diversity in Doctoral careers must remain possible

The Doctoral career path differs among European countries. In some countries the majority of PhD theses originate from professional activity as scientific co-workers at universities. Other career paths include research activities based on third party funding at universities and research work performed at external research institutions and in industry in co-operation with universities. This diversity must be maintained by all means.

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SEFI Position on the Doctorate in Engineering

4. Quality of mentoring must be enhanced

The quality of mentoring has an important impact on the quality of the PhD thesis. The mentor should be an experienced researcher, who spends sufficient time on supervision and feedback. Applying the rules of project management to the Doctoral research results in more efficient time management.

5. Clear entrance qualifications must be defined

The quality of a PhD thesis reflects the quality of the candidate. The European Universities of Technology will ensure sustainability of the quality of the PhD theses by defining clear and transparent entrance qualifications to a Doctoral program, which are as a rule based on a theory-oriented Second Cycle degree in a scientific/technological study program.

6. The doctoral degree program should not take the form of a formal curriculum

SEFI acknowledges the necessity of a continuous process of optimization of PhD projects, e.g. by offering integrated and structured PhD programs. Nonetheless, this must not turn them into educational programs. Any credit system should be used only in order to enhance the mobility of Doctoral candidates and the internationalisation of Doctoral Programs, but not lead to formal accreditation. It is the intrinsic the fundamental character of a PhD project that the related study and research environment remains within the autonomy of the universities.

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