

Civil Engineering

Also relevant for Construction Project Management, Environmental Engineering, Transport Engineering, Engineering Management

Course: Civil Engineering

Group of courses: Engineering

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Last edit: Univ.-Prof. Dr. Carmen Leicht-Scholten, July 2018

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Course objectives:

Initial situation:

A gender-neutral and diversity-sensitive study concept holds both challenges and opportunities. Gender neutrality and diversity must be ensured in academic teaching, and concepts of gender and diversity research should form an integral part of the curricula. The subject-specific teaching objectives of gender research and the development of gender competence can be divided into three areas:

1. Making students of civil engineering aware of and familiar with the interrelation of technology and society and the respective user perspectives in different fields of specialisation.
2. Transfer of knowledge on gender and gender equality: providing prospective engineers with gender and diversity competences as indispensable elements of socially responsible engineering education ([see VDI 2002](#)). Critical analysis of the engineering culture with regard to gender equality.
3. Teaching transfer competences: applying knowledge gained from intersectional gender and diversity research to various civil engineering project works. There are different areas of specialisation in civil engineering:
 - structural engineering
 - water management and environmental technology
 - infrastructure and traffic planning
 - construction and construction site management

Teaching content/subject-specific gender studies content:

An innovative curriculum contributes to the strategic approach of developing a traditionally solely technically-oriented subject culture into a socially responsible technology culture:

- lecture on basic concepts and terms of gender and diversity studies using current social and political discourses to make students aware of the relevance and necessity of the concept of gender
- introductory course in which the different subject areas are presented in a real project development/construction process in interaction with social issues; intersections between gender and diversity issues and engineering topics should be introduced and discussed
- subject-specific seminars at Master's level in which students can apply and implement their acquired gender and diversity knowledge in application-oriented project work
- institutional internships during which students become familiar with the manifold possible applications of gender and diversity knowledge in engineering research and development projects as part of practical work experience

Making students familiar with gender and diversity competences as indispensable for socially responsible engineering education:

- In modularly structured seminars, students receive an introduction to basic concepts of gender and diversity studies.
- Ecological, legal and social issues are presented and discussed with regard to their significance for the various areas of specialisation in civil engineering.
- Furthermore, students gain insight into the importance of gender and diversity competences for the various fields of practice at university and in their future occupational fields as well as for

different areas of research and development.

Integration of gender studies content into the curriculum:

Gender studies content should be implemented by taking a participatory, interdisciplinary, research- and application-oriented approach. Application-oriented teaching concepts enable students to take part in a practical research project and motivate them to develop their own solutions to engineering problems. Using case studies from the fields of specialisation, students learn to apply and present the acquired gender and diversity knowledge in project work (e.g. in infrastructure, water management, project management). The work process of the interdisciplinary teams is moderated and supported by teaching staff, so that students will be made familiar with key qualifications in moderation, communication and presentation as well.

Integrating gender and diversity perspectives into technology is an important element of sustainable technology development, which addresses not only ecological and economic perspectives but also the dimension of social sustainability and thus contributes to socially responsible engineering education.

Forms of integration of gender studies content into Civil Engineering

Many students of engineering have difficulties with the subject's unfamiliarity with gender and diversity issues, which are often perceived as rather abstract and isolated from engineering aspects and activities.

In order to make students familiar with the interrelations of technology and society, an application- and research-oriented approach is an important component of the teaching concept. Based on the close connection of research and teaching, contents with high practical relevance and interdisciplinary perspectives are taught.

In order to support students in dealing with experiences and to convert them into embedded knowledge, these experiences must be ethically reflected upon in critical discussions in different seminars. The ability to work independently and to apply research methods are stimulated and tested in particular by developing solutions in work groups.

1. Modules to impart basic knowledge for a common engineering knowledge canon
2. Integrated seminars
Integrated seminars for different study courses, e.g. elective modules (engineering history, social responsibility, technical ethics)
3. Subject-specific gender issues on key topics, e.g. mobility, urban planning, etc., are offered in specialisation modules

Degree Stage:

Gender sensitivity and key qualifications should be acquired in the Bachelor's degree course. We recommend that students should be made familiar with these contents at an early stage of studies (in the first semesters), so they can apply their knowledge and skills already during the course of studies, prior to professional practice.

Subject-specific gender issues should be taught in the second/third year of the Bachelor's degree course. In subject-specific seminars at Master's level, students can apply their knowledge of gender and diversity issues acquired at Bachelor's level in research and development projects.

Bachelor's and Master's theses that deal with gender- and diversity-related civil engineering issues indicate the importance that is attached to these topics with regard to providing socially responsible engineering education.

Basic Literature/Recommended Reading:

- Collmer, Sabine/Döge, Peter/Tenner, Birgit (Hrsg.) (1999): Technik + Politik + Geschlecht. Zum Verständnis von Politik und Geschlecht in der politischen Techniksteuerung. Bd. 112. Bielefeld.
- Harding, Sandra (1990): Feministische Wissenschaftstheorie. Zum Verhältnis von Wissenschaft und sozialem Geschlecht. Hamburg.
- Jansen, Sarah (1991): Naturwissenschaftlerinnen und Ingenieurinnen: Von der Forderung nach Gleichstellung zur feministischen Forschung. Band 1 der Schriftenreihe des Vereins Frauen in Naturwissenschaft und Technik NUT e.V. Wiesbaden.
- Kahlert, Heike/Thiessen, Barbara/Weller, Ines (Hrsg.) (2005): Quer denken – Strukturen verändern. Gender Studies zwischen Disziplinen. Wiesbaden.
- Steuer, Linda/Berg, Tobias/Leicht-Scholten, Carmen (2015): Breaking the habit – New approaches in engineering education, within the framework of the conference publication SEFI 2015, Orléans. "Best Conference Paper".

Space and Gender

- Ardener, Shirley (ed.) (1997): Women and Space. Ground Rules and Social Maps. Oxford.
- Bauriedl, Sybille/Schier, Michaela/Strüver, Anke (Hrsg.) (2010): Geschlechterverhältnisse, Raumstrukturen. Ortsbeziehungen: Erkundungen von Vielfalt und Differenz im spatial turn. Münster.
- Benhabib, Seyla (1994): Feministische Theorie und Hannah Arendts Begriff des öffentlichen Raums. In: Brückner/Meyer (Hg.): Die sichtbare Frau. Die Aneignung der gesellschaftlichen Räume. Forum Frauenforschung. Freiburg i.Br.: Bd. 7: 270-299.
- Massey, Doreen (1994): Space, place and gender. Cambridge.
- Ruhne, Renate (2011): Raum Macht Geschlecht. Zur Soziologie eines Wirkungsgefüges am Beispiel von (Un)Sicherheiten im öffentlichen Raum, Wiesbaden.

Sustainability

- Hofmeister, Sabine/Katz, Christine (2011): Naturverhältnisse. Geschlechterverhältnisse. Nachhaltigkeit. In: Groß, Matthias (Hrsg.): Handbuch Umweltsoziologie. Wiesbaden.
- Weller, Ines (2004): Nachhaltigkeit und Gender. Neue Perspektiven für die Gestaltung und Nutzung von Produkten. München.

Mobility

- von den Driesch, Elena/Steuer, Linda/Berg, Tobias/Leicht-Scholten, Carmen (2017):

Implementation of Gender and Diversity Perspectives in Transport Development Plans.
Bookchapter in the conference proceedings "Engendering Cities", Rom (25-26. September 2014). In Press.

Journals:

- "Rundbrief". Monatszeitschrift des dib deutscher ingenieurinnenbund e. V. Darmstadt
- Der „Bauingenieur“, Springer VDI Verlag (one of the most read German Journals in Civil Engineering, even though it hardly reflects Gender) | [Website](#)