



European Council
of
Civil Engineers



Innovative Changes in Europe in Civil Engineering Education

There is no standard Civil Engineer

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1. Introduction



All over the world numerous, magnificently and differently shaped buildings, bridges, open spaces, streets etc. can be found and admired.

Every country in the world features such civil engineering products, recently built or hundreds of years old.

They are built by civil engineers, even though they are often dedicated to architects only, and these civil engineers were influenced by totally different educational backgrounds, learning approaches and professional development and experience as well as culturally very different surroundings.

2. Definition of a Civil Engineer



A civil engineer is an academically educated and practice-oriented professional

who has and uses scientific, technical and other pertinent knowledge

and skills to create, enhance, operate and maintain safe and efficient buildings, processes or devices

of practical and economic value,

for industry and the community.

(one of many different definitions, this is from ECCE)

3. Professional Formation Framework of a Civil Engineer in Europe

European Council of Civil Engineers (**ECCE**) and the European Council of Engineering Chambers (**ECEC**)
(these two non-profit organizations represent about 800 000 civil engineers in 24 countries within Europe)

Description and Creation of a **common platform** for civil engineers within the European Union (EU) according to the **EU-directive 2005/36/EC on Professional Qualifications.**

The most important objective of this directive is to provide the possibility for all European (civil) engineers to live and work or to provide services in other EU member states.

- to be definite, transparent, directly applicable and objectively reviewed;
- to contain sufficient flexibility to meet the national requirements of the different Member States;
- to take into account the two different education/training levels at higher education institutions etc.

European Engineering Professional Card (ENGCARD) (cont.)

FEANI

(European Federation
of National Engineering
Associations)

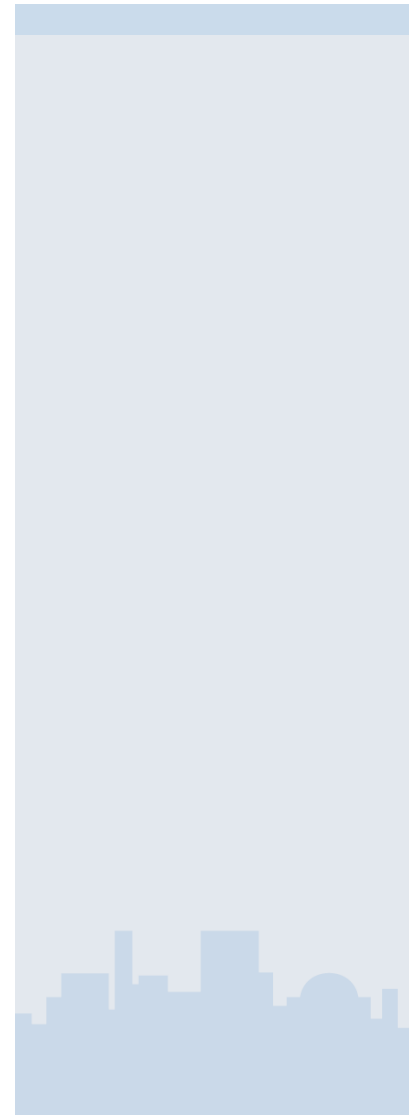


European Engineering Professional Card (ENGCARD) (cont. 2)

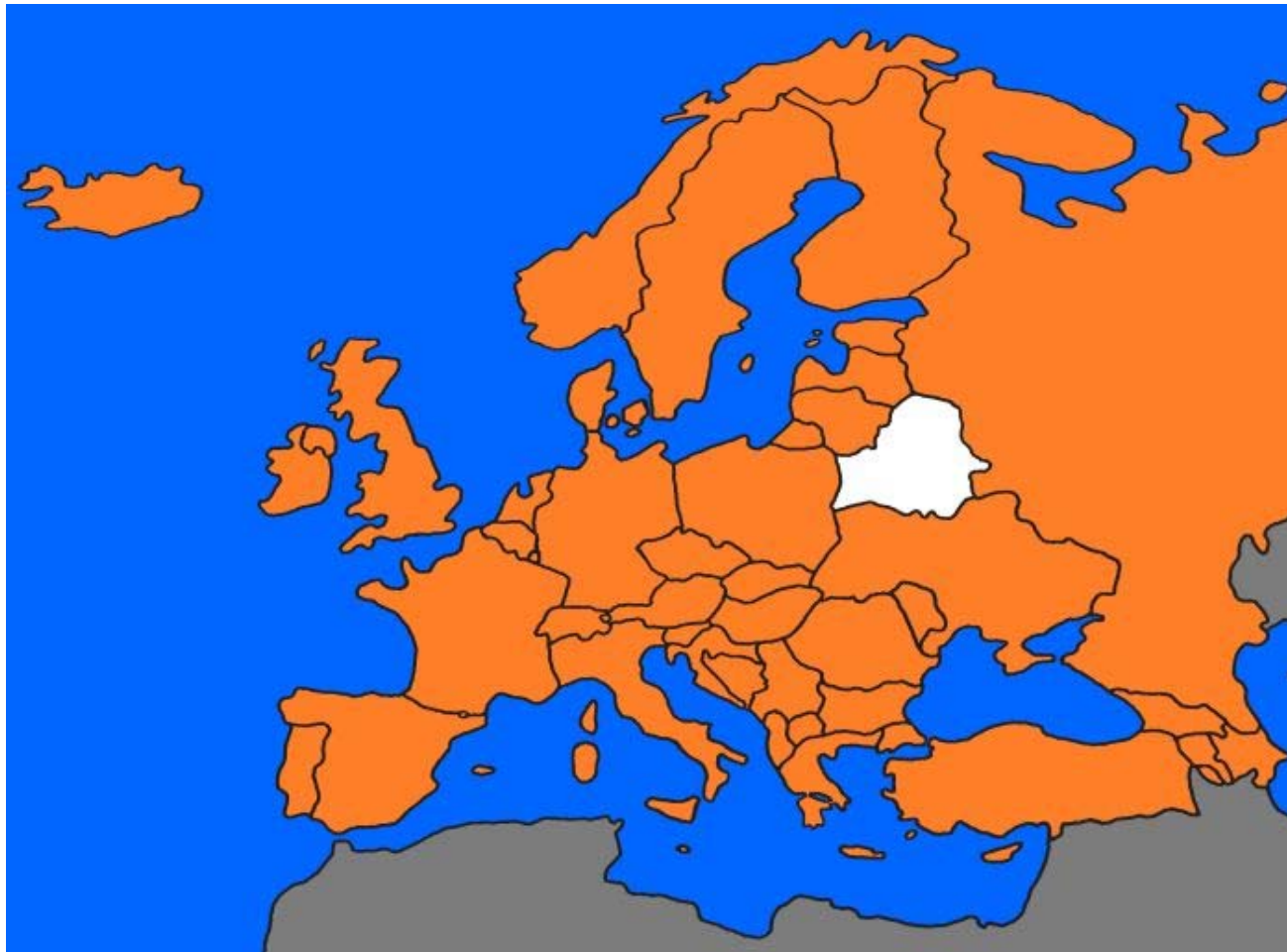


ENGCARD architecture

- the “EUROPASS-CV”, which is a comprehensive standardized document containing GENERIC information;
- the “language Passport” to record language competences;
- the “Diploma Supplement” attached to a higher education diploma to understand the learning outcomes in terms of knowledge and competencies (third party certified);
- the “Mobility Training Certificates”, which records the training and experience spent abroad (third party certified);
- the new ENGCARD-part, which gives the specific engineering-related information (qualifications, experiences, expertises, competences, professional titles, licences, code of conduct, penalties – and, of course, strongly third party certified);
- the optional electronic professional signature.



4. Bologna Process and the European Higher Education Area (EHEA)

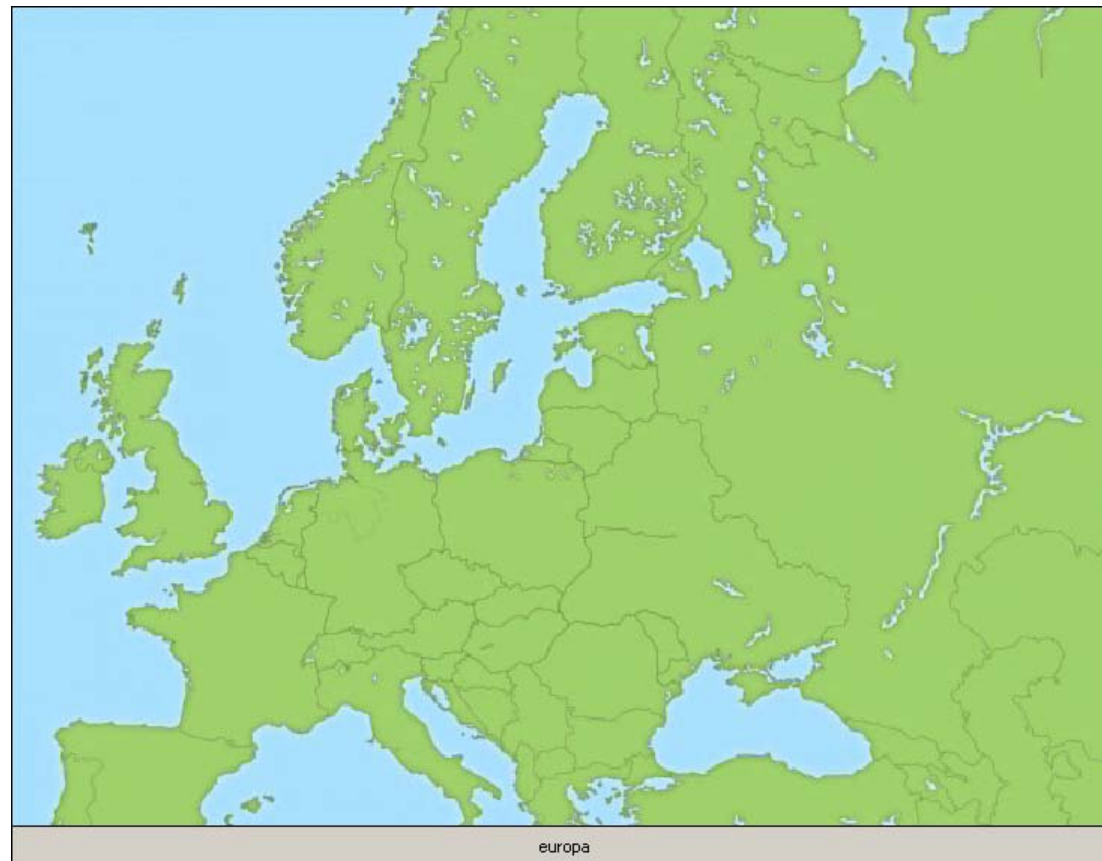


Member countries of the Bologna Region





Europe and „my place“



4. Bologna Process and the European Higher Education Area (EHEA) (cont. 1)



Bologna Process started in Bologna 1999
to establish the European Higher Education Area (EHEA) in 2010

The intention is to:

- adopt a system of easily recognizable and comparable degrees;
- adopt a system with two main cycles (undergraduate/graduate);
- establish a system of credits (such as ECTS);
- promote mobility by overcoming obstacles;
- promote European co-operation in quality assurance;
- promote European dimensions in higher education.

4. Bologna Process and the European Higher Education Area (EHEA) (cont. 2)



Bologna follow-up conferences in

Prague (Czech Republic)

Berlin (Germany)

Bergen (Norway)

added four additional topics

- lifelong learning;
- student involvement;
- doctor's degree in a third education cycle;
- enhancing the **attractiveness and competitiveness** of the European Higher Education Area in other parts of the world (including the **aspect of trans-national education**).

European Erasmus-Mundus Program



Put in force for the period 2004 - 2008

Investment capital of 230 Mio € (in 2008 it is accelerated to 98 Mio €)

Main objectives

- communication on re-enforcing co-operation with third countries;
- preparation of citizens for the global society;
- goal to ensure world-wide recognition of European universities as centres of excellence;
- remaining at leading edge of developments;
- contribution to cultural understanding (intercultural dialogue as a new policy).

Erasmus-Mundus Program (cont. 1)



The main outputs in 2004 – 2008 are:

- 115 Erasmus Mundus Master Courses;
- 6,000 grants for incoming third-country students
(26.000 € each);
- 1,000 grants for incoming third-country scholars
(about 10.000 € each);
- 100 partnerships;
- 4,000 grants for outgoing EU-students;
- 800 grants for outgoing EU-scholars;
- 50 attractiveness projects.

Erasmus-Mundus Program (cont. 2)

Comem Erasmus Mundus MSc - Coastal and Marine Engineering and Management

<http://www.comem.tudelft.nl>

JEMES - Joint European Master Programme in Environmental Studies

http://www.tuhh.de/eciu-gs/pro_joint_jemes.html

SAMHC - Advanced Masters in Structural Analysis of Monuments and Historical Constructions

<http://www.msc-sahc.org/>

MA LLL - European Master's in Lifelong Learning: Policy and Management

www.dpu.dk/malll

EUROMIME: European Master in Media Engineering for Education

<http://www.euromime.org>

EURO-AQUAE - Euro Hydro-Informatics and Water Management

<http://www.euroaquae.org>

European Joint Master in Water and Coastal Management

<http://www.ualg.pt/EUMScWCM/>

Time schedule of undergraduate ECEM-programme at my university FH OOW (Oldenburg)

1. sem.	2. sem.	3. sem.	4. sem.	5. sem.	6. sem.	7. sem.
WS	SS	WS	WS	SS	WS	SS
Basic studies civil and construction engineering two foreign languages			Main studies managerial skills law, construction management, site management, project management, economics, financing, turn key projects, rhetoric, languages etc.			Practical Placement and Thesis in/with Building Company, projecting office, ...
at home institution			abroad at partner university		at home institution	

Educational profile/outcomes of ECEM basic studies

ECEM-students with

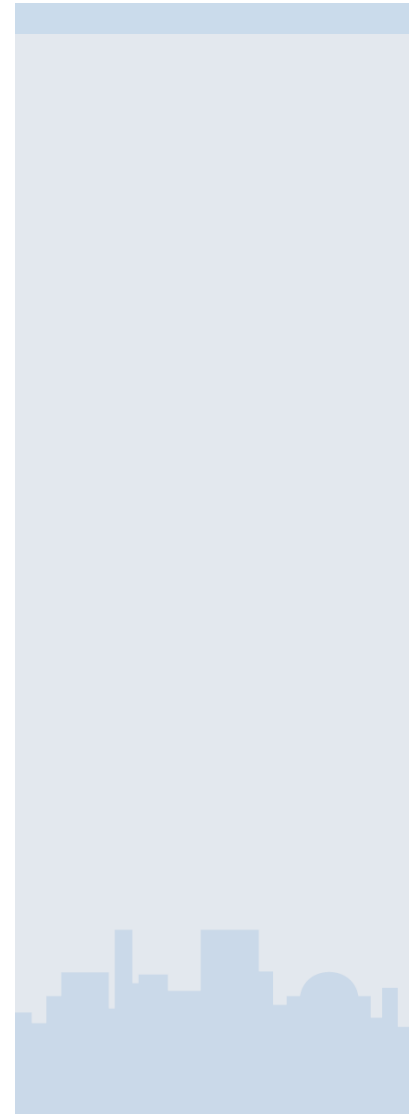
- necessary orientation and
- sound civil engineering background

to understand “pure” civil engineering colleagues

Additionally ECEM-students have to learn

- English and
- a second foreign language

of the later host country.



ECEM partner universities



- University of Applied Sciences, FH OOW, Oldenburg, Germany
- Czech Technical University of Prague, [CVUT Prague](#),
Czech Republic
- Ecole Supérieure d'Ingénieurs des Travaux de la Construction de
Cachan/Paris, [ESITC Cachan](#), France
- Technical University of Szczecin, TUoS Szczecin, Poland
- Hanze University Groningen, [HvG Groningen](#), The Netherlands
- University of Wolverhampton, [UoW Wolverhampton](#),
United Kingdom
- Högskolan Halmstad, [HH Halmstad](#), Sweden

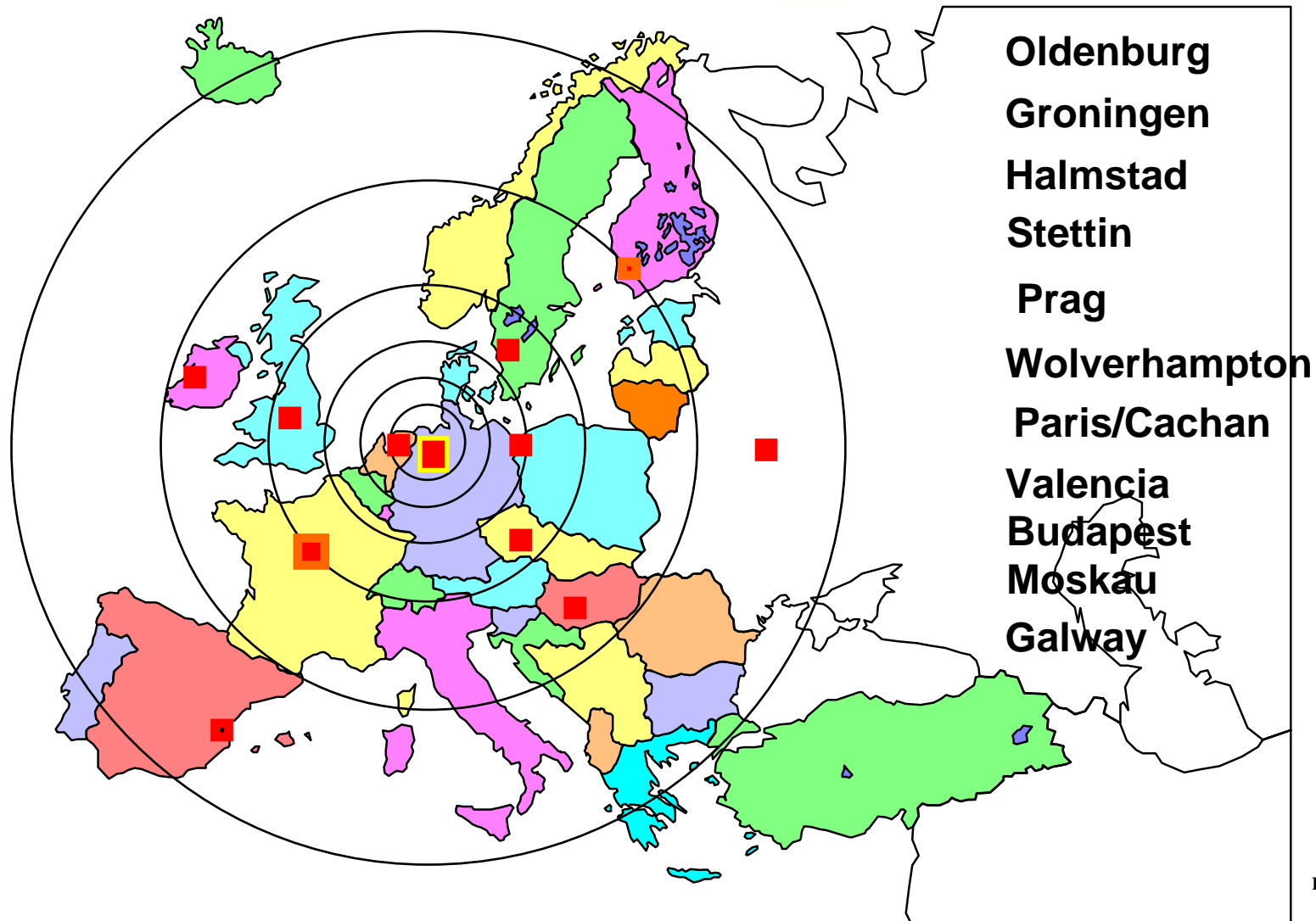
ECEM partner universities (cont.)



- Universidad Politecnica de Valencia,
Escuela de Arquitectura Tecnica, EUAT Valencia, Spain
- Szent Istvan University, Ybl Miklos School of Built Environment,
YMMF Budapest, Hungary
- Galway Mayo Institute of Technology, GMIT Galway, Ireland
- State University of Management / Institute of Business in
Construction and Project Management, SUM Moskau, Russia

In the near future: Zheijang University of Science and Technology,
ZUST Hangzhou, PR China

The ECEM-Net



Strength of absolvents of ECEM/ joint international curricula

International skills:

excellent language abilities in at least two foreign languages;
deep insight in the culture, in socio-economic and in working conditions
in a foreign country and
in a foreign company;
ability of being mobile world wide and, thus, working on international platforms.

Remarks

Joint ECEM-program is a unique undergraduate curriculum but

- offers a variety of different host countries (13);
- integrates 1 year of study abroad;
- can includes 1 semester/some months of practical experience;
- gives the possibility of double/joint diploma certificates.

European Civil Engineering

EUCEET

one of the strongest and
most competent advisors

Budget:

Network of 10 years
existence

Surviving through

EUCEET Association
after Belgium Law

EUROPEAN COMMISSION

DIRECTORATE-GENERAL
EDUCATION AND CULTURE



SOCRATES PROGRAMME

Thematic Network Project

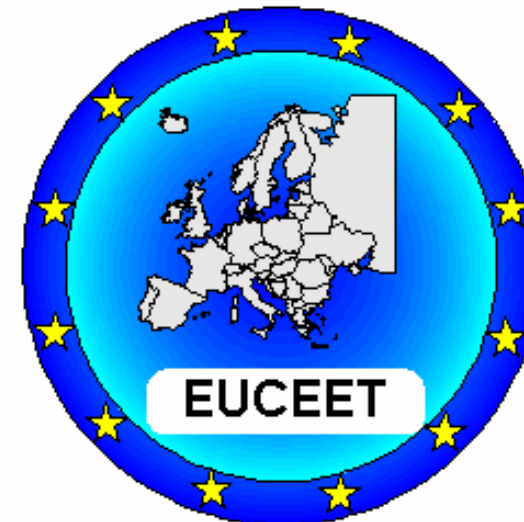
FULL PROPOSAL

EUCEET III

European Civil Engineering
Education and Training III

2006 – 2009

Project Reference Number : 230355 - CP - 1 - 2006 - 1 - FR - ERASMUS - TNPP



Coordinator

ECOLE NATIONALE DES PONTS ET CHAUSSÉES - FRANCE



List of EUCEET III members

SOCRATES Code	Number of partners							
	EUCEET I			EUCEET I DISS	EUCEET II			EUCEET III
	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2005	2006/ 2007
EDU 4	43	50	59	66	97	100	101	75
ASS.1	7	8	13	13	14	14	14	20
ASS.2	2	2	2	2	1	1	1	2
ASS.3	1	1	1	1	1	1	1	1
RES	5	5	5	5	6	6	6	4
SER					7	9	9	4
Total	58	66	80	87	126	131	132	106
	(20)	(24)	(25)	(25)	(29)	(29)	(29)	(29)



Working Groups of EUCEET III

- A. Implementation of the two-tier study programmes in civil engineering education across Europe, following the Bologna process***
- B. Enhancement of the cooperation between civil engineering faculties in Europe by the development of joint degrees***
- C. Doctoral programmes – 3rd cycle – and research in civil engineering faculties***
- D. Best practice in establishing and running multi-disciplinary programmes of education, involving civil engineering and other fields***
- E. Implementation of the framework for qualifications in civil engineering based on learning outcomes and competences***
- F. Approaches to teaching and learning, assessment and performance in civil engineering education***
- G. Making the European civil engineering education better known and more attractive outside Europe***
- H. Developing a synergy between academic and professional worlds***

TUNING: Development of Curricula by outcomes including different parties

	Ranking academics	Ranking employers
3. knowledge area	1	5
6. applying knowledge in practice	2	1
5. analysis and synthesis	3	3
4. knowledge profession	4	2
9. learn	5	7
7. generating new ideas	6	9
1. work in an interdisciplinary team	7	4
8. adapt to new situations	8	8
11. decision-making	9	6
10. critical abilities	10	13
15. second language	11	12
13. ethical commitment	12	15
16. oral and written communication	13	11
12. computing skills	14	14
14. interpersonal skills	15	10
17. research skills	16	16
2. diversity and multiculturality	17	17

Greatest ranking differences

Spearman correlation coefficient between both rankings

$$r = 0,87745098$$

Development of Curricula by including international aspects (capacity building)



ZIMBABWE INSTITUTION OF ENGINEERS

Networking

Powerful tool for Capacity Building

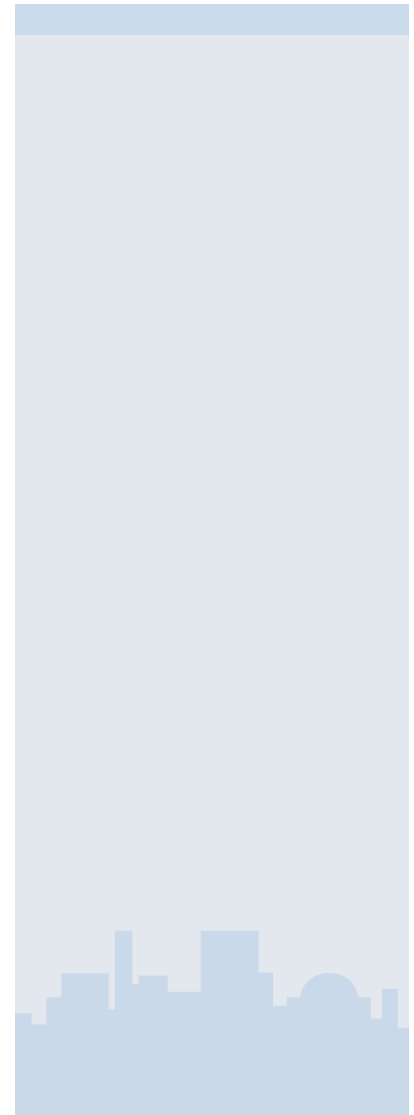
The two logos above speak for themselves (to be added university logo)

Other participants in the actual combined conferences:

African Engineering Federation (FEA)

European Council of Civil Engineers (ECCE)

Student's associations have to be involved at an early stage



Development of Curricula by including modern sustainably acting companies and their projects (ENERCON)

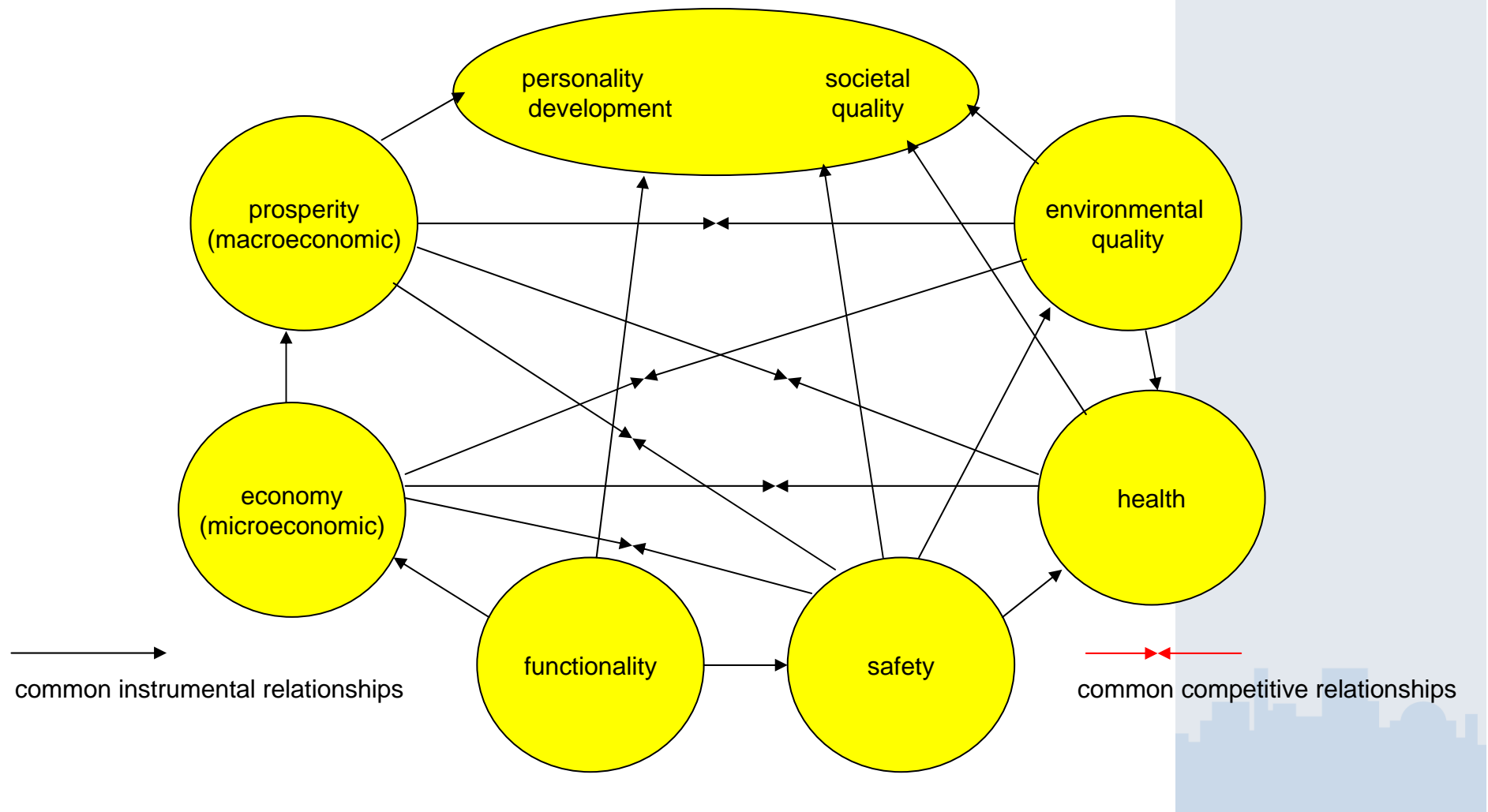


Stand alone wind energy plant



Details of machine room

Development of Curricula by including ethics through Values in technical action (German VDI regulation)





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Development of Curricula by including the European ERASMUS Intensive Project Ethics in the Built Environment (EiBE)

Ethics and Safety (Stettin, PL)

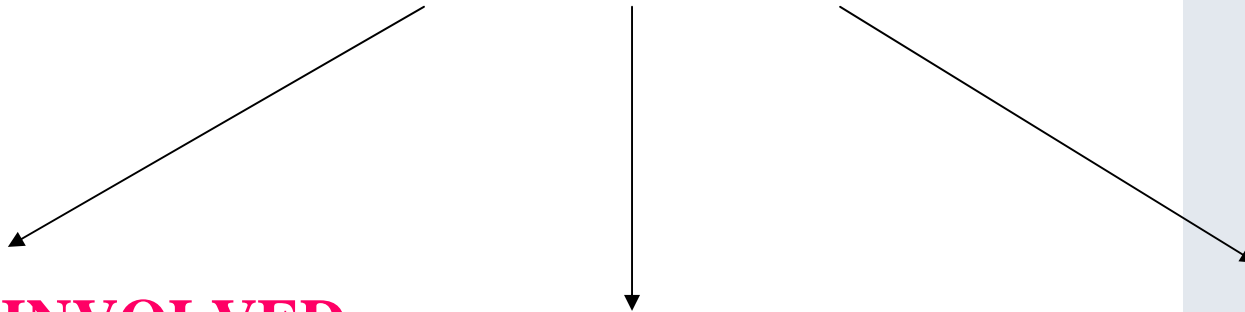
SAFETY

influences on

**PEOPLE INVOLVED
IN THE BUILT
ENVIRONMENT**

**USERS
(SOCIETY)**

**ECONOMY
+ ENVIRONMENTAL
IMPACT**



Ethics and Safety (Stettin, PL) (cont.)

INDIVIDUAL CONDITIONS FOR ALL KINDS OF WORKS

- organizing the building site
- ground works
- concrete & reinforced concrete works
- steel works
- brick works
- carpentry works

PERSONAL EQUIPMENT

- uniforms
- helmets
- glasses
- gloves
- special shoes



BUILDING EQUIPMENT UTILITY

- due to individual instructions
- attended by qualified workers

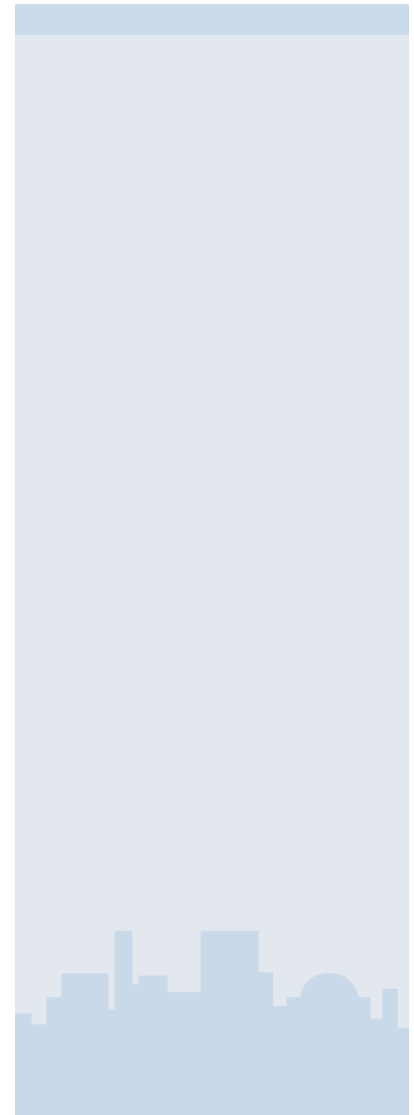
OCCUPATIONAL TRAINING

- obligatory for every worker (eg. first aid)

PROMOTER'S RESPONSIBILITY

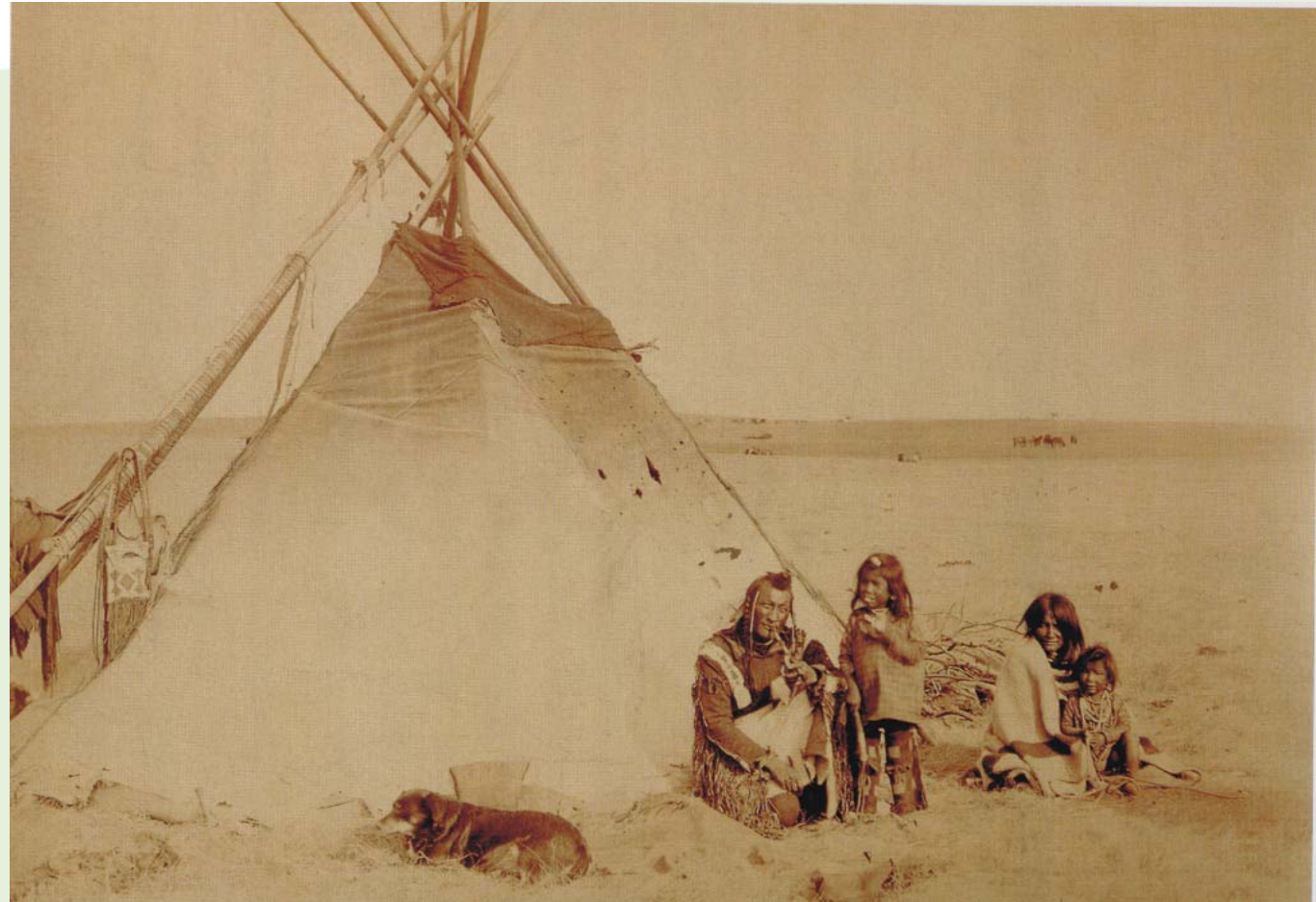
Ethics in the Built Environment (all)

Socrates Intensive-Project EiBE



Early Curricula in Children University

Living in the deserts – Indian tipi



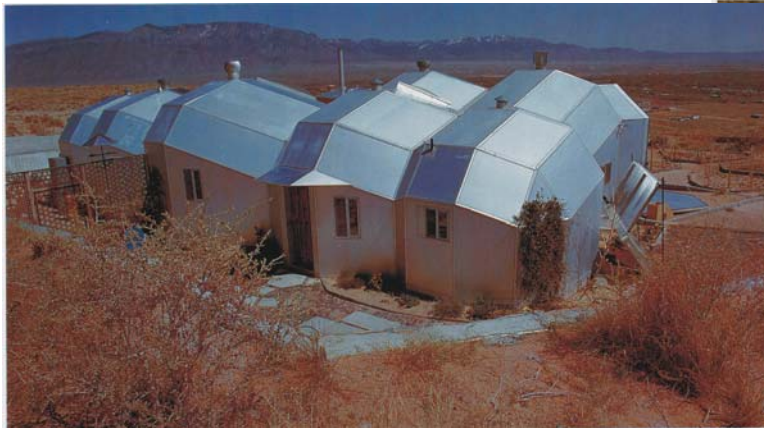
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Kinder
universität
OLDENBURG



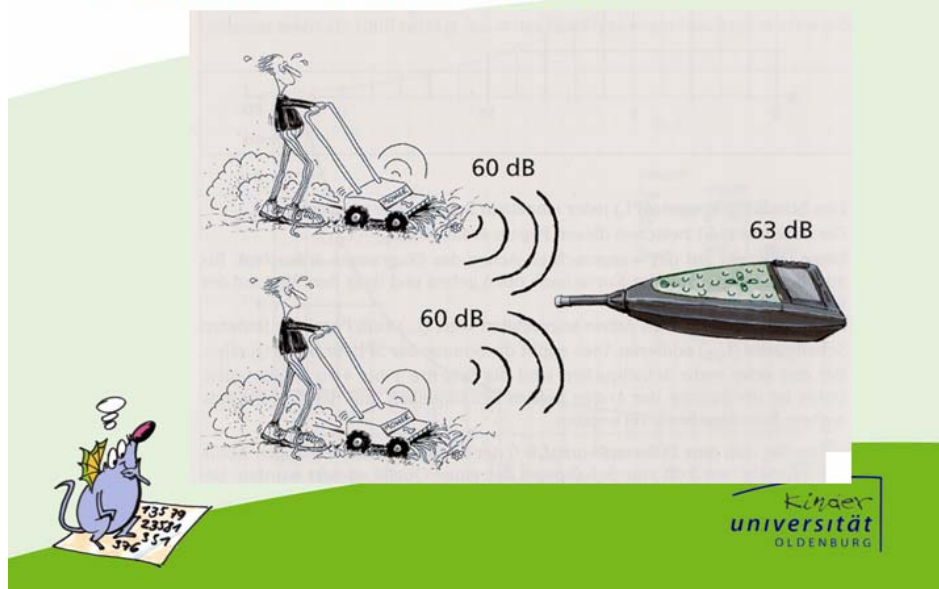
Early Curricula in Children University (cont.)

Living here – wooden houses



Early Curricula in Children University „new mathematics“

„Addition“ of sound levels



Airplane (acoustic „Foto“)



World of sound: mathematical - visible
decibel - colour



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Thank You!

Questions and remarks are welcome...