Structure and Significance of Fieldwork Courses in Transformed Surveying Education

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CR - Historical Review

- Charles University in Prague (founded 1348)
- First technical schools:
  - Mining School in Jáchymov (1716)
  - Institute of Engineering Education in Prague (1717)
  - German-Czech Utraquistic Institute in Brno (1849)
- First Surveying University Studies
  - Prague 1896
  - Brno 1900

Transformation of Higher Educational System in CR

- begun shortly after 1989 velvet revolution
- establishment of governmental Accrediation Commission
- renewing of academic privileges
- transfer of most of the universities from state to public form of financing, new private higher schools
- Higher Education Act Nr. 170/1990 Sb.
- partitioning of former CSFR into two new countries CR, SR
- Higher Education Act Nr. 111/1998 Sb. (…..)
- CR joined EU in 2004
- full adopting of Bologna process principles

Bologna Process in CR

- all the Czech universities have implemented the three-cycles system of studies (Bc, Mgr, PhD)
- credit system
- promotion of mobility
- overlay period for the second cycle (Mgr and Mgr Follow-Up)
- new Act Nr. 552/2005 Sb.
- only accredited study programmes are supported
- accrediation is given for limited period only
- system of life-long learning is being established
- system of quality assurance is being established

Numbers of University Graduates in CR 1990 - 2003

Year of grad.	total					public HS					private HS			
	total	Bc	Mgr	Mgr Foll.	Ph. D.	total	Bc	Mgr	Mgr Foll.	Ph. D.	Bc	Mgr	Mgr Foll.	Ph. D.
1990	15318					15318								
1991	18043					18043								
1992	17726					17726								
1993	17587	1491	16022		74	17587	1491	16022		74				
1994	19238	2095	17034		109	19238	2095	17034		109				
1995	19017	3764	15037		216	19017	3764	15037		216				
1996	20517	5023	15156		338	20517	5023	15156		338				
1997	23389	7152	15782		455	23389	7152	15782		455				
1998	26656	8076	15263	2621	696	26656	8076	15263	2621	696				
1999	27446	7653	15981	3053	759	27446	7653	15981	3053	759				
2000	28235	7659	16467	3317	792	28223	7647	16467	3317	792	12	0	0	0
2001	29156	7398	17014	3764	980	29156	7398	17014	3764	980	0	0	0	0
2002	30646	7916	17674	3838	1218	30224	7494	17674	3838	1218	422	0	0	0
2003	32194	8335	18419	4029	1411	31503	7644	18419	4029	1411	691	0	0	0

Higher Surveying Education in CR

In present time it is possible to study the branches Geodesy and Cartography, Geomatics or Mining Surveying at 5 universities:

- Czech Technical University in Prague,
- Brno University of Technology,
- Technical University in Ostrava,
- West Bohemian University in Pilsen,
- University of Defence in Brno

Significancy of Practical Training

- Surveying covers many special scientific, technical and economical disciplines
- Besides theoretical knowledge it necessarily includes also wide pracical aspects and experiences
- For practice the new didactic methods are valid only partly, or not valid at all
- Internet (e-learning) may solve problems of distant training, but it cannot substitute practical field measurement with geodetic instruments

Practical Training in Surveying

- regular term practices in single subjects, laboratories, seminars, colloquiae (only partially devoted to field surveying)
- complex project and other project -oriented tuition (working in groups, solution of problems requiring more complex knowledge)
- intensive field training courses (face to face tuition, feedback, special locality)
- free time and vacation practice in private enterprises (increasing the professional skills)

Field Training Courses
Advantages and Disadvantages

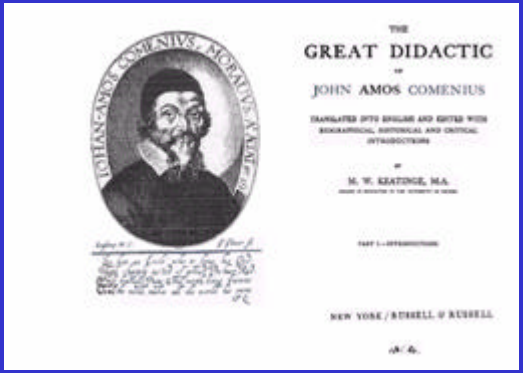
- several days to few weeks duration,
- oriented either on one subject or on a group of interrelated subjects,
- favorable is an external distant locality minimizing distractions of both the students and tutors,
- project - or task-oriented work,
- conditional is reliable horizontal and vertical control enabling the feedback and evaluation ,
- face to face contact between tutors and students,
- possible connection of teaching, research and/or practice
- demanding as to instrumental equipment, time and financing

Jan Amos Komenský (Comenius)

1592 - 1670

Moravia, Poland, Germany, England, Sweden,Netherlands

- Creator of modern educational system
- First complete system of pedagogic terms
- 6 years cycles (Family. Primary school, Latin school, University)
- Education according to the abilities and individual differences
- Main book: Didactica Magna (Great Didactic) 1657



10 Comenius Principles

Process of education will be easy if

- it begin early, before the mind is corrupted,
- the mind be duly prepared to receive it,
- it proceed from the general to the particular,
- it proceed from the easy to the the difficult,
- the pupil be not overburdened by too many subjects,
- progress be slow in every case
- the intellect be forced to nothing which its natural bent does not incline it,
- everything be taught through the medium of the senses,
- the use of everything taught be continually kept in view,
- everything be taught according to one and the same method

Comenius Wrote on Practical Education:

"the task of the pupil will be made easier, if the master, when he teaches him anything, show him its practical application"

"those things only should be taught, whose application can be easily demonstrated"

"nothing is more useless than to learn and to know much, if such a knowledge be of no avail for practical purposes; and again, that not he who knows much is wise, but he who knows what is useful"

BUT - Faculty of Civil Engineering

A Brief History of Brno UT

1849 Beginnings of technical education in Moravia
1899 The Czech Technical University in Brno is established
1900 First course of Surveying
1911 New faculty building opened
1939 The University is closed until 1945
1951 The Military Academy is established. The University is reorganised into the Civil Engineering University in Brno
1956 University is renamed the Technical University of Brno
1989 Academic freedom returns

Total Student Numbers at BUT

to 31st October 2005

Programme type		Study form		total
		full-time	combined	
Bc.	Bachelor`s degree	10 335	923	11 258
Ing./Mgr.	Follow-up Master`s degree	1 810	486	2 296
Ing./Mgr.	Master`s degree	4 744	317	5 061
Ph.D.	Doctor`s degree	952	996	1 948
total		17 841	2 722	20 563

FCE Study Programmes

BACHELOR STUDY PROGRAMMES	# students
Building Construction (3 years)	244
Civil Engineering (4 years)	2 000
Geodesy and Cartography (3 years)	162
Military Geodesy and |Cartography (3 years)	0
Architecture of Building Structures (4 years)	40
MASTER STUDY PROGRAMMES	
Civil Engineering (1,5 years) – new	0
Geodesy and Cartography (2 years) – new	0
Civil Engineering (5 years) - finished	2 280
Geodesy and Cartography (5 years) – finished	171
DOCTORAL STUDY PROGRAMMES	
Civil Engineering (3 years)	465
Forensic Engineering (3 years)	59
Geodesy and Cartography (3 years)	14

Numbers of Students at BUT

2001 - 2005

	2001	2002	2003	2004	2005
BUT	15 090	15 740	17 561	18 623	20 563
FCE	4 312	4 260	4 489	4 742	5 435
G&C	277	268	277	301	347

Field Practices in Bc and Mgr SP

Field practices and Project oriented education in Bachelor study programme (3 years = 6 terms)

Field practice I :	after first year of studies – 3 weeks
Field practice II :	after the second year – 3 weeks
Field practice III :	after the third year – 2 weeks
Bachelor seminar I :	2 hours per week during the fifth term
Bachelor seminar II :	3 hours per week during the sixth term
Bachelor work :	1 week for bachelor work and to complete bachelor thesis

Field practices and Project oriented education in Master study programme (2 years = 4 terms)

Field practice IV :	after first year of studies – 3 weeks
Complete project :	4 hours per week during the third term
Diploma seminar :	4 hours per week during the fourth term
Diploma work :	3 weeks for diploma work and to complete diploma thesis

Structure of Field Training Courses

Field Trainning I: Fundamental methods of point positioning (polar point, intersection, traversing). Control establishment. Levelling. Detail horizontal and vertical surveys. Checking and adjustment of instruments. Creation of a simple map.

Field Trainning II: GPS Positioning (control densification), Mapping (large scale horizontal and vertical surveying including the computer elaboration), Profiling, Cadastre (simple geometric plan, setting out of property boundary)

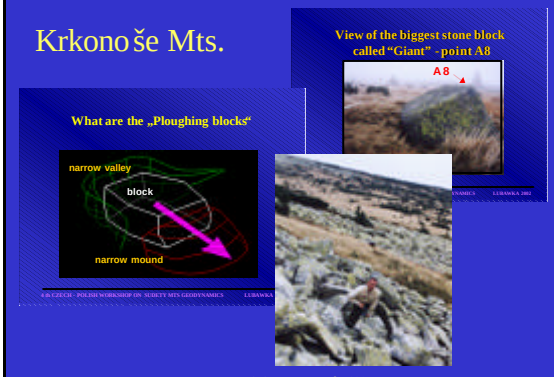
Field Trainning III: Engineering Geodesy (simple control network, setting out of a construction, setting out of a road axis), Photogrammetry (determination of naturally marked control points), Cartography, GIS

Field Trainning IV: Theoretical Geodesy (precise angle measurement, precise levelling), Satellite Geodesy (observation in a GPS network), Gravimetry (gravimetric profile surveying), Special Geodetic Networks (special control network according to accuracy demands, setting out by intersection, precise setting out of a distance including the accuracy analysis), 3D Networks

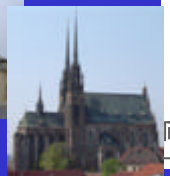
Snežník Geodynamic Network (CZ-PL)

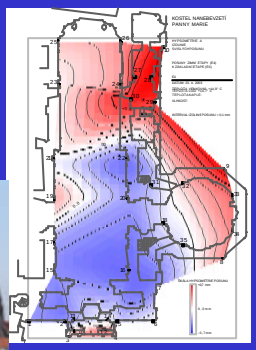
- Experimental Measurements
- Testing Measurements
- Education and Field Training

Krkonoše Mts.

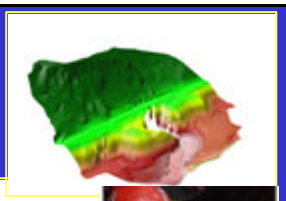


Deformation Measurements





Student Activities in Moravian Karst



Conclusive Remarks

- Practical training in a modern system of surveying education still plays an important role
- Step towards the standartisation of surveying studies may be the „minimal curricula“, also for field practice courses
- Field training is a suitable form for international student exchanges
- Preparation of undergraduate students for active leadership and responsibility in future occupation
- Problem: Growing numbers of students in CR are in contradiction with demands on individualisation of practical teaching