PROFESSIONAL COMPETENCES OF SURVEYING (GEODETIC) ENGINEERS

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Department of Geodesy
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INTRODUCTION

Technical development, globalisation, social economic conditions....

(higher) education, research
renovation of study programmes

SURVEYING PROFESSION
- follow spatial information “revolution”
- maintain traditional services
- land related professional fields (such as land management)

SURVEYING EDUCATION, historical background

From Surveying, Geodesy, Cartography
To Surveying, Geodesy, Geomatics, Geoinformatics etc.

Towards interdisciplinary paradigm
measurement science and land management
supported by spatial information management

“COMPETENCY” – the ability to apply knowledge and skills to produce a required outcome (Trinder, 2008).
Competency is expected to develop from the three components over an employee’s lifetime:
- education,
- training and
- experiences.

“PROFESSIONAL COMPETENCY STANDARDS”
- to test the effectiveness of education and training, improvement of education, training, working conditions etc.
- support for development of global (European) market place for services;
SURVEYING HIGHER EDUCATION in SLOVENIA

- 18th century: technical education in Idrija mercury mine;
- 18-20th century: in the framework of tradesman’s education;
- End of the 18th century: surveying courses in the framework of humanistic educational programmes in Ljubljana;
- 1919 (University of Ljubljana - UL): higher education of surveying (geodesy) with some interruptions;
- 1945/46 (UL, Department of Geodesy): 9 semester study programme
- 1956 (UL, Department of Geodesy) – courses from public infrastructure, urban planning, spatial development were introduced;
- 1957 (UL, Faculty of Architecture, Civil and Geodetic Engineering, Department of Geodesy)
- ....
- Today (UL, Faculty Civil and Geodetic Engineering, Department of Geodesy)

SURVEYING HIGHER EDUCATION in Slovenia before “Bologna”

Phare Tempus Programme (1996-1999):
- new courses from the fields of law, economics, land management
- “German system” of higher education

University study programme of geodesy (UNI):
- 4.5 years (9 semesters)
  - “university diploma engineer of geodesy”
    (univerzitetni diplomirani inženir geodezije, Diplomingenieur(in) Univ. für Geodäsie)
  - comparable to a master’s degree in countries which use consecutive system of higher education.

Higher professional study programme of geodesy (VSŠ):
- 3 years (6 semesters)
  - “diploma engineer of geodesy”
    (diplomirani inženir geodezije, Diplomingenieur(in) FH für Geodäsie)
  - comparable to study programs at Universities or Colleges of Applied Sciences (in Germany Fachhochschulen).
Bologna process at UL, Faculty of Civil and Geodetic Engineering

Graduates’ opinion (2005; 50 UNI diploma engineers and 48 VSŠ diploma engineers):
Evaluation about the efficiency of study programs of geodetic engineering
  a) volume and pretentiousness of study courses,
  b) applicability of knowledge and skills obtained during the study,
  c) importance of knowledge and skills for the future.
Suggestions for improvement of study programs.

Employers’ opinion (2006; 50 employers):
Evaluation of expected and achieved abilities, skills and knowledge

International trend in surveying profession

Fields of work of geodetic diploma engineers in Slovenia
### NEW STUDY PROGRAMMES AT THE Department of Geodesy

- University study programme of the first (Bachelor’s) degree *Geodesy and Geoinformatics (BSc)*
- Higher professional study programme of the first (Bachelor’s) degree *Technical Real Estate Management (BSc)*
- University study programme of the second (Master’s) degree *Geodesy and Geoinformatics (MSc)*
- University study programme of the second (Master’s) degree *Spatial Planning (MSc)*
- PhD study programme (faculty’s common programme) *Built Environment (PhD)*

### COMPETENCES OF GRADUATES

#### GENERAL COMPETENCES

- Understanding and solving technical and/or business related problems using high level thinking skills (applying theory into praxis); the capabilities for individual learning, critical evaluation of learning sources;  
- The possession of appropriate personal and professional values, behaviours and responsibilities; the abilities to make sound judgements in a professional and ethical context;  
- Advanced language, numerical and IT literacy; communication skills and appropriate public appearance; comprehensive knowledge of related fields and the ability for interdisciplinary work;  
- Understanding and using scientific methods; the abilities to define, research, understand and advanced solve practical and theoretical problems, principles;  
- Understanding and critical evaluation and use of professional/scientific literature; the abilities to critical, analytical and synthetic thinking; the abilities to professional and scientific expression;  

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<thead>
<tr>
<th>Competence</th>
<th>BA TUN</th>
<th>BA GG</th>
<th>MA GG</th>
<th>MA SP</th>
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### KNOWLEDGE (PROFESSIONAL SPECIFIC) COMPETENCES

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<tr>
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<th>BA TUN</th>
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<tbody>
<tr>
<td>Understanding the role of surveying, geodesy, spatial data in society;</td>
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<td>Understanding the role of technical real estate management in society;</td>
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<td>Using advanced technology and methodology in surveying measurements;</td>
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<td>Maintaining basic geodetic systems; land cadastre measurements;</td>
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<tr>
<td>Designing, establishing, maintaining, renewing of basic geodetic system;</td>
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<td>Advanced comprehension, critical monitoring of human environment etc.</td>
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<td>Understanding of conceptual modelling and model presentations of the geographical environment, including intangible entities;</td>
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<td>Designing, managing, maintaining geographical, cartographic, land information systems; advanced problem solving and research etc.</td>
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<td>Solving practical problems from the fields of spatial and land related data acquisition, valuation, presentation and maintenance etc.</td>
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<td>Understanding, planning, implementing advanced spatial data acquisition; developing advanced solutions in spatial data management, IT solutions;</td>
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<td>Understanding, designing and maintaining real estate recording, LIS;</td>
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<td>Registering real estate: determining, presenting and recording technical characteristics of real estate and rights referring to the real estate (land).</td>
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<td>The familiarity with legal framework of surveying, spatial data acquisition, real estate recording &amp; management; spatial planning, land management;</td>
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<td>Valuation and appraisal of different values of real property;</td>
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<td>Studying natural and social environments and surveying of land resources; critical use of spatial and land related data in spatial planning;</td>
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<td>Policy making in spatial planning, land development;</td>
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### CONCLUSIONS

- Bologna process launched fundamental reform of higher education systems in Slovenia;  
- The goal of the reform is to make studies more successful, compatible and comparable:  
  - The success, in terms of Bologna reform, means to increase the number of higher educated people.  
  - The learning outcomes are instruments which make studies more compatible and comparable.  
  - Competency standards – measures of the effectiveness of new study programmes….  
- Reality: every study is a compromise, influenced by personal, material, space conditions...
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