

# GEOMATICS EDUCATION IN BELGIUM: 2011 PROGRAM REFORMATION AT BELGIAN UNIVERSITIES

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# Geomatics Education at Belgian Academic Universities

- **Structure**
- **Vision**
- **Program**
- **Conclusion**

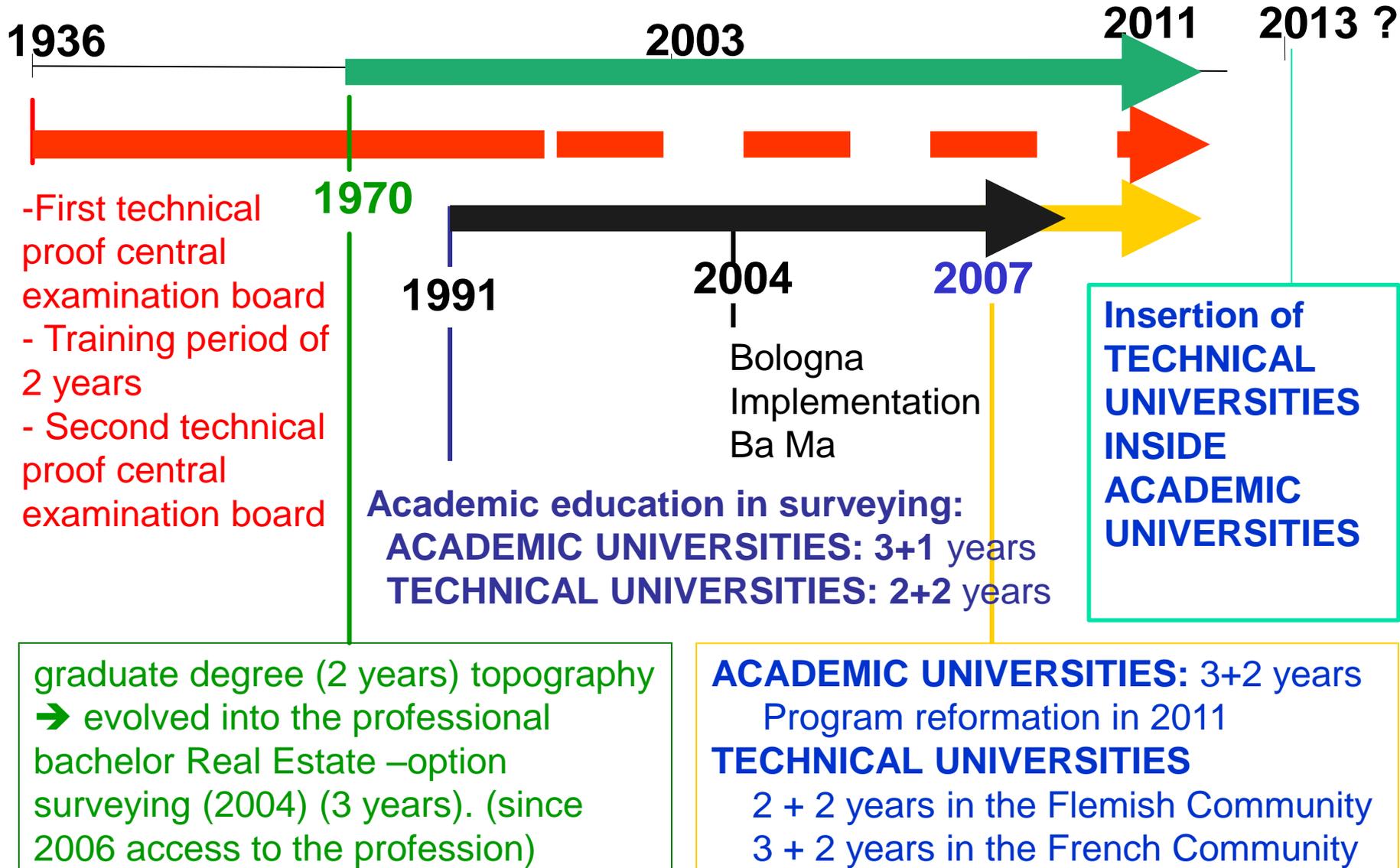


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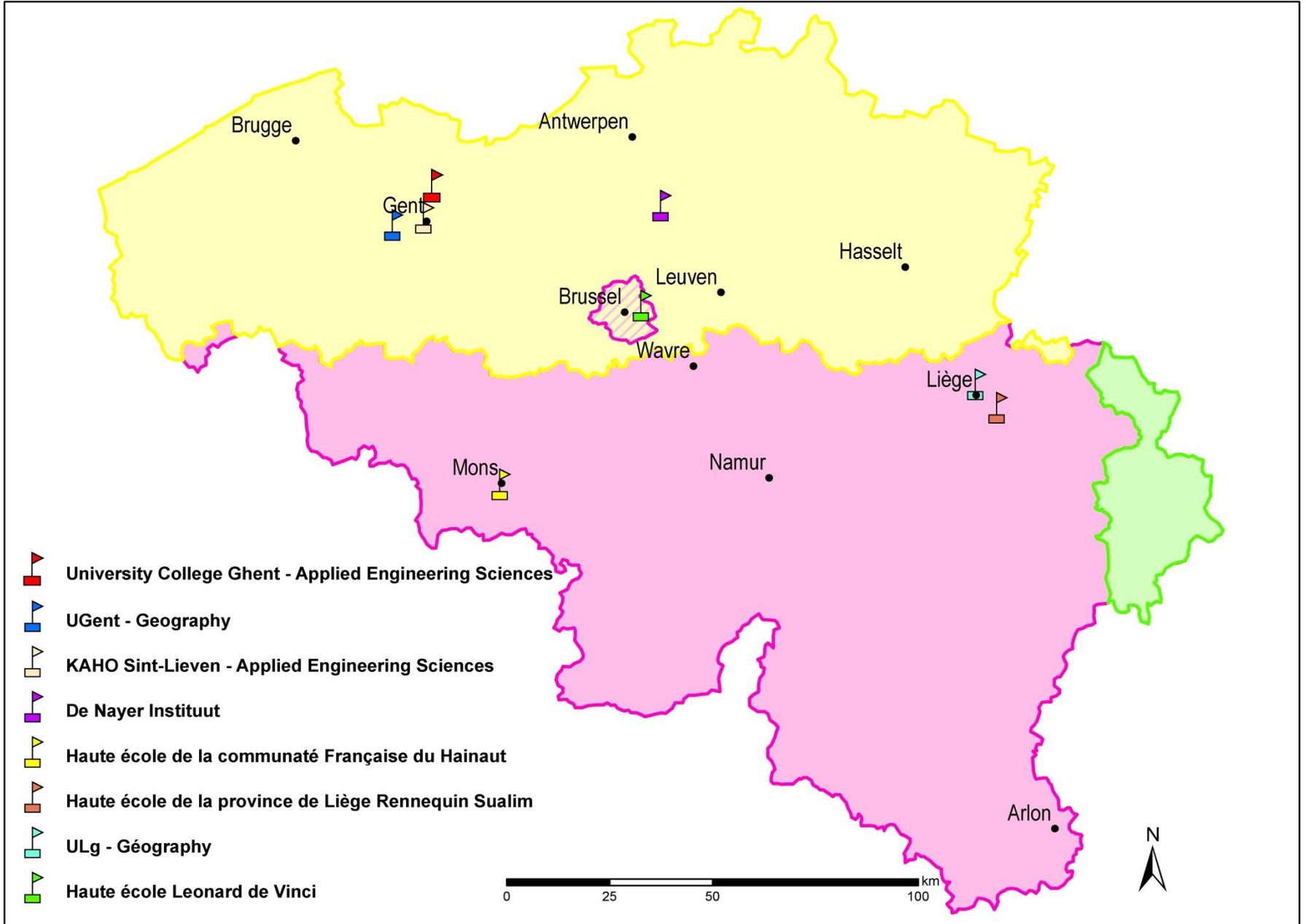
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# History of geomatics education in Belgium



# Geomatics education in Belgium



# 3 types of surveyor-related degrees

**University College = Technical University**

Professional Bachelor in Real Estate option Surveying

**Academic Bachelor in Applied Engineering Sciences in Construction option Land Surveying**

**Master in Applied Engineering Sciences in Land Surveying**



**Academic University**



Academic Bachelor in Geography and Geomatics - Main Subject: Surveying

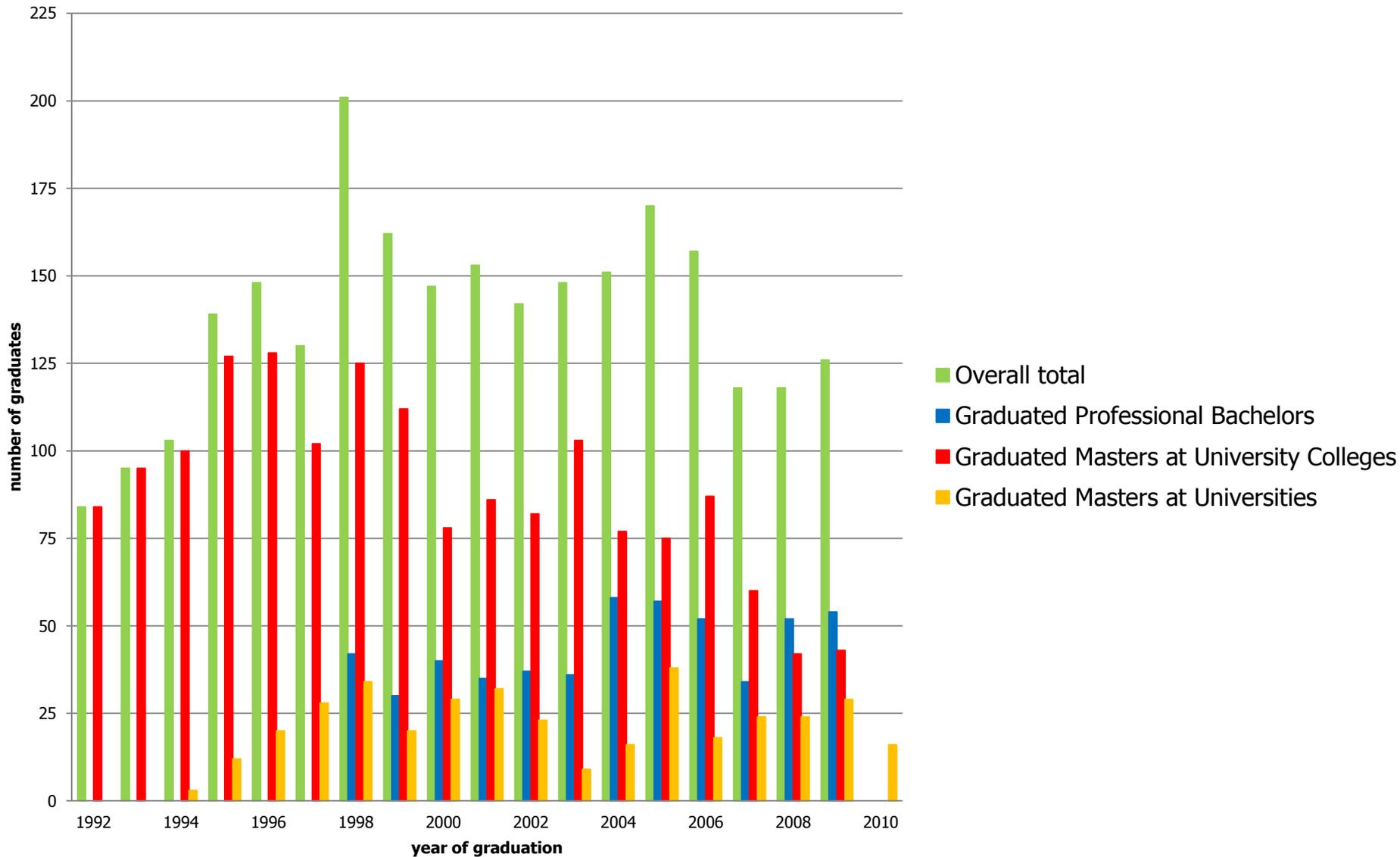
Master in Geomatics and Surveying

Academic Bachelor in Geographical Sciences – Main Subject: Geomatics and Geometrology

Master in Geographical Sciences – Main Subject: Geomatics and Geometrology

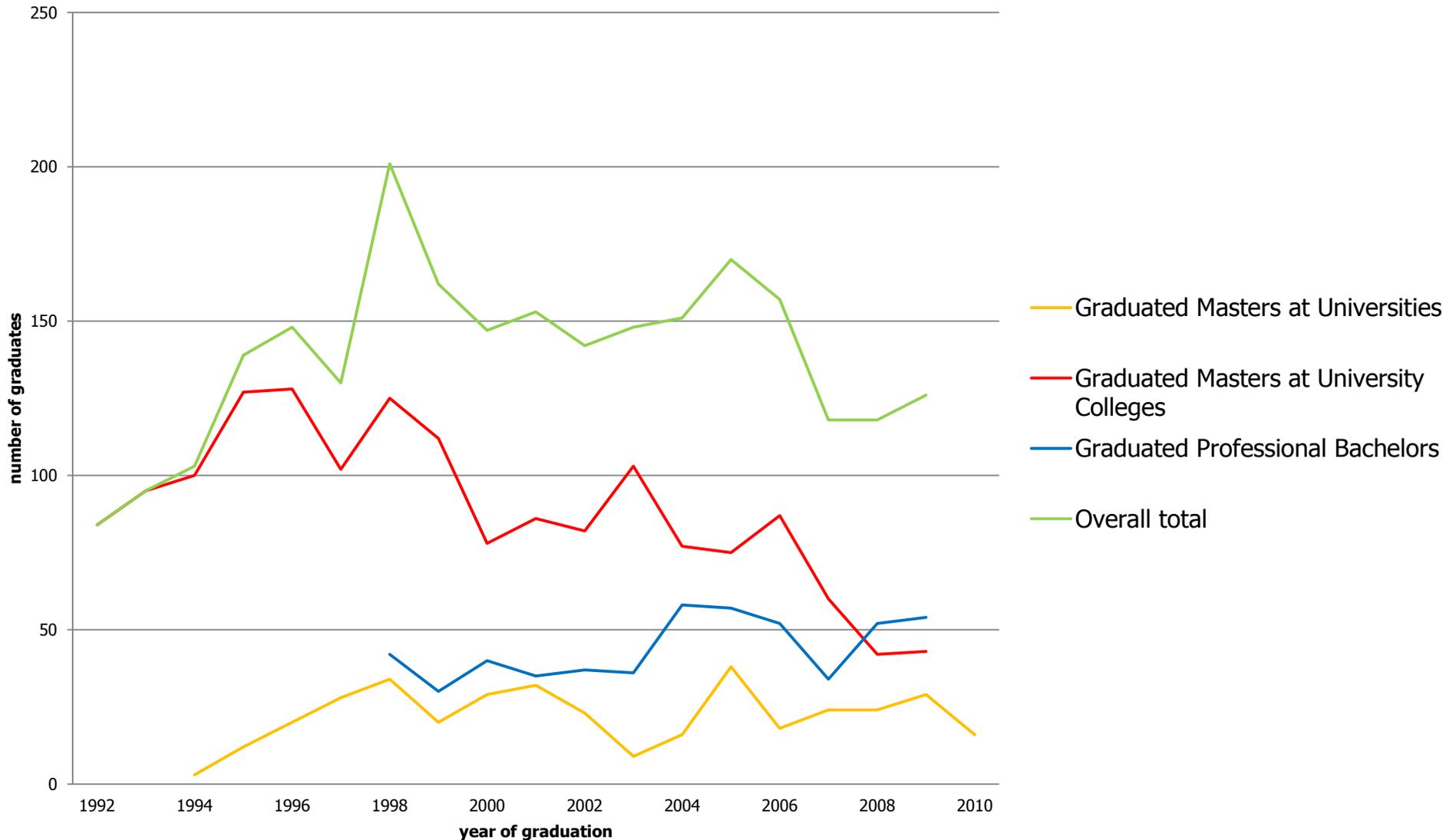
# Number of graduates

## Number of graduates in Landsurvey or Geomatics in Belgium



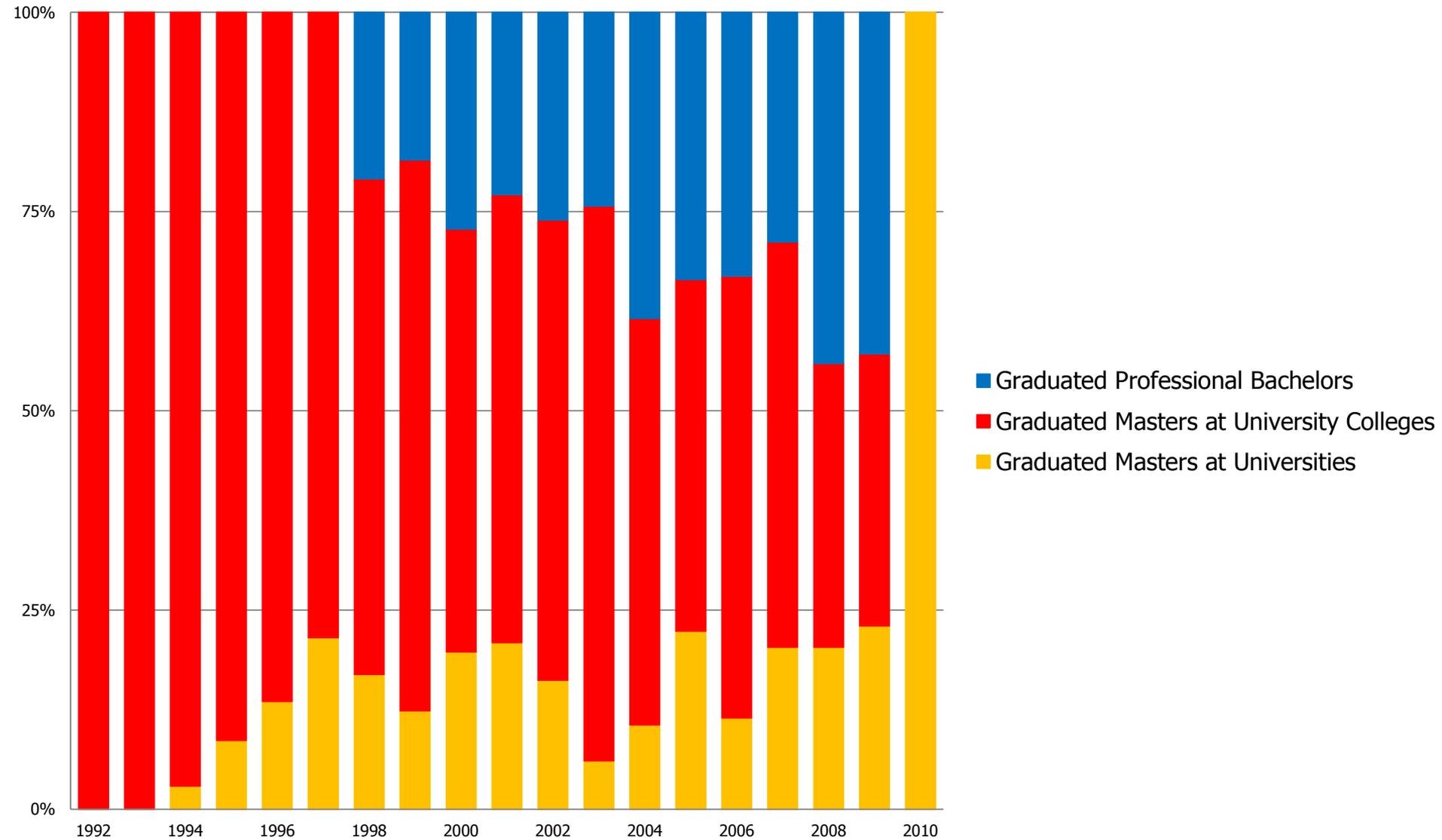
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Number of graduates in Landsurvey or Geomatics in Belgium

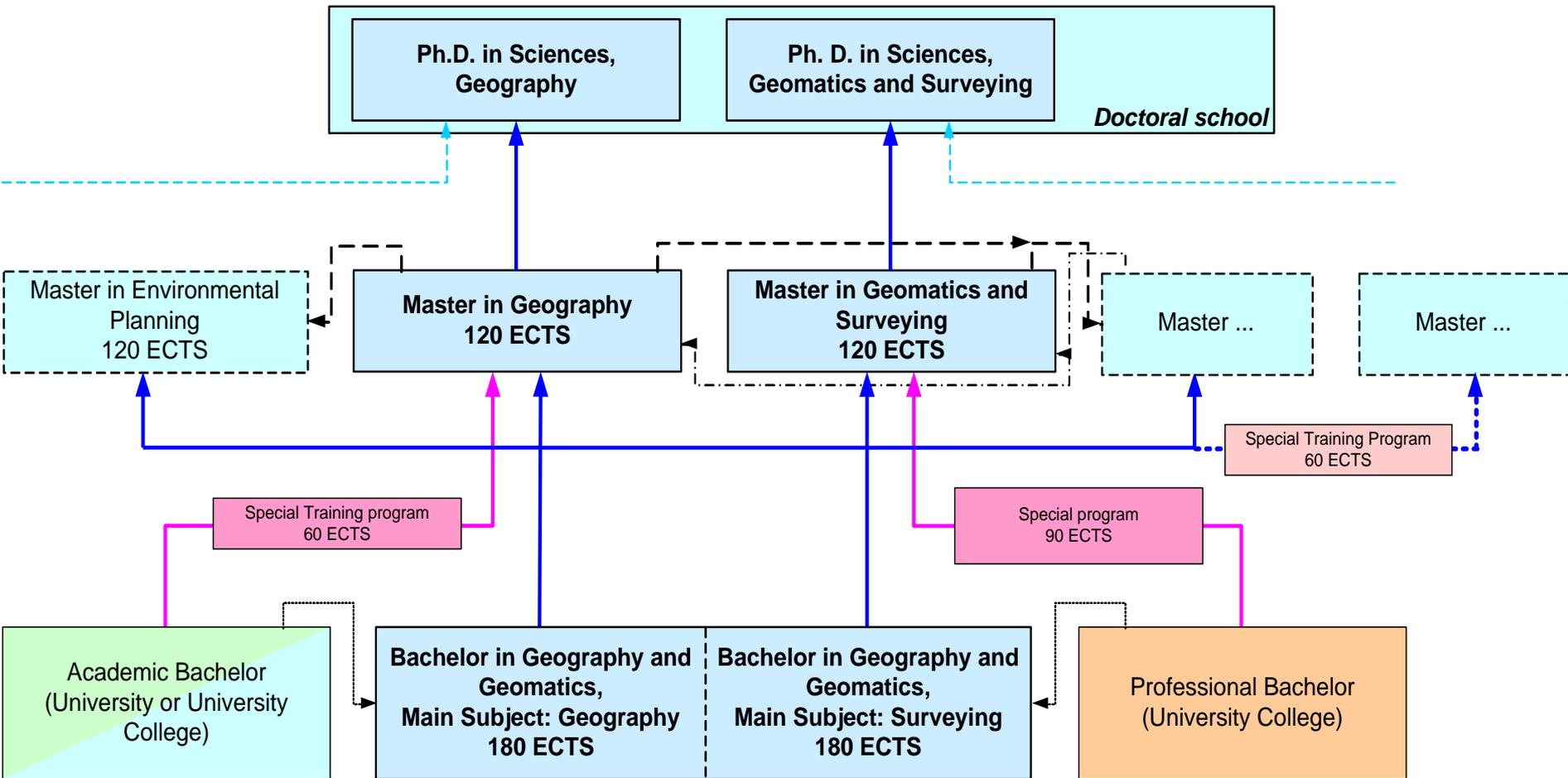


# Number of graduates

Graduates in Landsurvey or Geomatics in Belgium



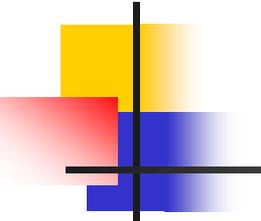
# Number of graduates



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# Definition of Surveyor: FIG

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FIG definition:

A surveyor is a professional person with the academic qualifications and technical expertise to conduct one, or more, of the following activities:

- to determine, measure and represent land, three-dimensional objects, point-fields and trajectories;
- to assemble and interpret land and geographically related information,
- to use that information for the planning and efficient administration of the land, the sea and any structures thereon; and,
- to conduct research into the above practices and to develop them.

3 pillars:

- acquisition
- information management, analysis and communication
- real estate (construction, law, planning, value estimations ...)

# Surveyor = ?

“classical”  
surveyors

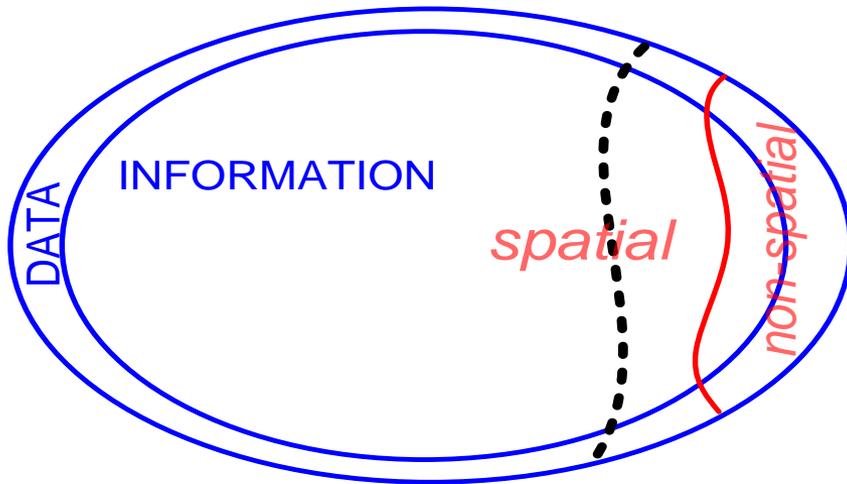
spatial [geographic] data [and  
information] *gathering* and  
*structuring*

“Modern”  
surveyors

*Idem* + *management, analysis*  
and *communication* of [spatial]  
geographic [data and]  
information

# "Modern" surveyor focusses on "Geomatics"

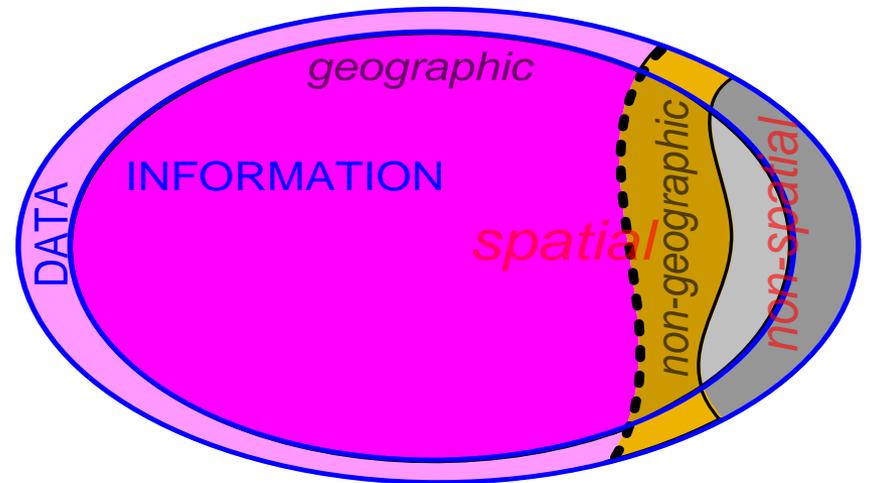
*Geomatics → dealing with spatial and geographic data and information*



geographic

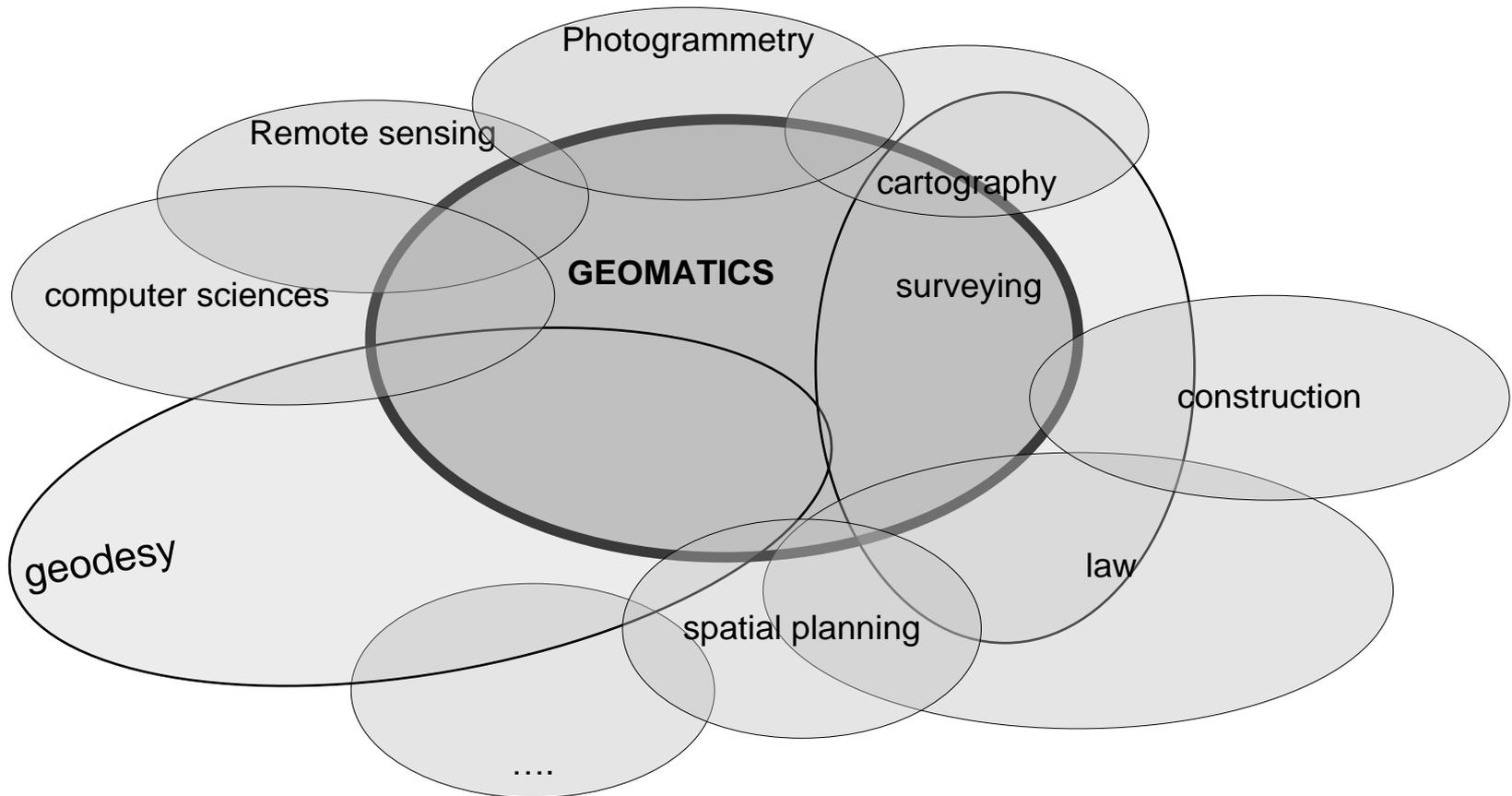


non-geographic



# "Modern" surveyor focusses on "Geomatics"

*Geomatics → dealing with spatial and geographic data and information*



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# First Bachelor Old (2007) <> New (2011)

1st Bachelor Geography and Geomatics		1st Bachelor Geography and Geomatics	
<i>GEOGRAPHY</i>	<i>Geomatics</i>	<i>GEOGRAPHY</i>	<i>Geomatics</i>
MATHEMATICS I 5	MATHEMATICS I 5	MATHEMATICS I 5	MATHEMATICS I 5
MATHEMATICS II 5	MATHEMATICS II 5	MATHEMATICS II 5	MATHEMATICS II 5
PHYSICS I 5	PHYSICS I 5	PHYSICS I 5	PHYSICS I 5
PHYSICS II 5	PHYSICS II 5	PHYSICS II 5	PHYSICS II 5
INTRODUCTION TO GEOLOGY 5	INTRODUCTION TO GEOLOGY 5	INTRODUCTION TO GEOLOGY 5	INTRODUCTION TO GEOLOGY 5
ECONOMICS 5	ECONOMICS 5	CHEMISTRY 5	CHEMISTRY 5
CHEMISTRY 5	CHEMISTRY 5	ECONOMICS 5	ECONOMICS 5
INTRODUCTION TO GEOMATICS 5	INTRODUCTION TO GEOMATICS 5	INTRODUCTION TO INFORMATICS 5	INTRODUCTION TO INFORMATICS 5
INTRODUCTION TO INFORMATICS 5	INTRODUCTION TO INFORMATICS 5	INTRODUCTION TO ENGINEERING SURVEYING 5	INTRODUCTION TO ENGINEERING SURVEYING 5
INTRODUCTION TO PHYSICAL GEOGRAPHY 5	INTRODUCTION TO PHYSICAL GEOGRAPHY 5	INTRODUCTION TO SOCIAL AND ECONOMIC GEOGRAPHY 5	INTRODUCTION TO SOCIAL AND ECONOMIC GEOGRAPHY 5
INTRODUCTION TO SOCIAL AND ECONOMIC GEOGRAPHY 6	INTRODUCTION TO SOCIAL AND ECONOMIC GEOGRAPHY 6	INTRODUCTION TO PHYSICAL GEOGRAPHY 5	INTRODUCTION TO PHYSICAL GEOGRAPHY 5
BIOSPHERE: PLANTS 4	INTRODUCTION TO LAW 4	INTRODUCTION TO GEOMATICS 5	INTRODUCTION TO GEOMATICS 5

# Second Bachelor Old (2007) <> New (2011)

2nd Bachelor Geography and Geomatics		2nd Bachelor Geography and Geomatics	
GEOGRAPHY	Geomatics	GEOGRAPHY	Geomatics
STATISTICS 5	STATISTICS 5	INTRODUCTION TO LANDSCAPE SCIENCE 5	INTRODUCTION TO LANDSCAPE SCIENCE 5
PHILOSOPHY 3	PHILOSOPHY 3	GEOGRAPHIC INFORMATION SYSTEM 5	GEOGRAPHIC INFORMATION SYSTEM 5
GEOGRAPHIC INFORMATION SYSTEM 4	GEOGRAPHIC INFORMATION SYSTEM 4	REMOTE SENSING 6	REMOTE SENSING 6
INTRO TO GEOGRAPHIC INFORMATION SCIENCE 3	INTRO TO GEOGRAPHIC INFORMATION SCIENCE 3	STATISTICS 5	STATISTICS 5
REMOTE SENSING; registration and processing 3	REMOTE SENSING; registration and processing 3	PHILOSOPHY 5	PHILOSOPHY 5
REMOTE SENSING; image interpretation 4	REMOTE SENSING; image interpretation 4	METHODS OF SPATIAL AND REGIONAL RESEARCH 4	METHODS OF SPATIAL AND REGIONAL RESEARCH 4
INTRODUCTION TO LANDSCAPE SCIENCE 5	INTRODUCTION TO LANDSCAPE SCIENCE 5	SOCIOLOGY 4	DATABASES 6
METHODS OF SPATIAL AND REGIONAL RESEARCH 4	METHODS OF SPATIAL AND REGIONAL RESEARCH 4	INTRODUCTION TO CLIMATOLOGY AND METEOLGY 5	GLOBAL NAVIGATION SATELLITE SYSTEMS 5
ENGINEERING SURVEYING I 4	ENGINEERING SURVEYING I 4	GEOMORPHOLOGY 5	INTRODUCTION TO LAW 5
GEOMORFOLOGIE	ENGINEERING SURVEYING II 5	TRANSPORT GEOGRAPHY 5	NUMERICAL MATHEMATICS 5
POPULATION GEOGRAPHY	APPLIED INFORMATICS I 3	INTRODUCTION TO MINERALOGY 3	APPLIED INFORMATICS: COMPUTER ASSISTED DESIGN 4
INTRODUCTION TO HISTORICAL GEOGRAPHY	APPLIED INFORMATICS II 3	INTRODUCTION TO PETROLOGY 3	TOPOMETRY I 5
INTRODUCTION TO GEOLOGY	BUILDING CONSTRUCTION ENGINEERING 4	PHYTOLOGY 5	
SOCIOLOGY	NUMERICAL MATHEMATICS 5		
	ADMINISTRATIVE LAW 5		

# Third Bachelor Old (2007) <> New (2011)

## 3th Bachelor Geography and Geomatics

<i>GEOGRAPHY</i>	<i>Geomatics</i>
SPATIAL ANALYSIS METHODS AND TECHNIQUES 7	SPATIAL ANALYSIS METHODS AND TECHNIQUES 7
SPATIAL ANALYSIS/MAPALGEBRA AND GEOSTATISTICS 3	SPATIAL ANALYSIS/MAPALGEBRA AND GEOSTATISTICS 3
CARTOGRAPHY 5	GENERAL AND THEMATIC CARTOGRAPHY 4
SPATIAL ECONOMICS AND REGIONAL PLANNING 5	ASTRONOMIC_GEODETTIC POSITIONING 5
GEOMORPHOLOGY 4	TOPOMETRY 5
INTRODUCTION TO CLIMATOLOGY AND METEOROLOGY 4	PHOTOGRAMMETRY 5
SOIL SCIENCE 4	INTEGRATED EXERCISES 3
LOCATION THEORY 5	PROGRAMMING I 6
LANDSCAPE SCIENCE 6	BUSINESS LAW 5
BACHELOR DISSERTATION 7	BACHELOR DISSERTATION 7
<i>ELECTIVE COURSES</i> 10	<i>ELECTIVE COURSES</i> 10

## 3th Bachelor Geography and Geomatics

<i>GEOGRAPHY</i>	<i>Geomatics</i>
SPATIAL ANALYSIS 6	SPATIAL ANALYSIS 6
GIT 5	GIT 5
BACHELOR DISSERTATION 10	BACHELOR DISSERTATION 10
CARTOGRAPHY 5	CARTOGRAPHY 5
SOIL SCIENCE 4	INTEGRATED EXERCISES 4
POPULATION – AND URBAN GEOGRAPHY 5	ADMINISTRATIVE LAW 5
ECOLOGY 5	PROPERTY LAW 5
QUARTAIR STUDIES 5	PHOTOGRAMMETRY 5
LANDSCAPE SCIENCE 6	TOPOMETRY II 5
INTRODUCTION TO HISTORICAL GEOGRAPHY 4	GEOMATICS APPLICATION PROGRAMMING 5
<i>ELECTIVE COURSES</i> 5	<i>ELECTIVE COURSES</i> 5

# Master Geomatics and Surveying

Masterthesis (30)

(30)

## Minor a RESEARCH

### Recommended Subjects

Internet applications (5)  
 Communication networks (6)  
 Historical cartography (5)  
 Geographical Information Science (5)  
 Information management (6)  
 Multimedia techniques (6)  
 Image processing (6)  
 Constructive design and infrastructure (5)  
 Practical Training II (1 month) (5)

## Minor b EDUCATION

## Minor c ECONOMICS AND BUSINESS ADMINISTRATION

3D- Acquisition and visualisation (5)

Geographical Information Management (5)

Over- and underground landregistration (4)

Juridical instructions concerning Evironmental Planning and Urban Development (5)

House Building Technique, inventory of fixtures and valuation of real estate (5)

Bathymetry (5)

Mapprojections and Co-ordinate systems (5)

Quality of measurements (5)

Real Estate and Estimation Assessment (5)

Integrated Geographical Information Applications (7)

Practical training (1 month) (5)

Geographical Information Platforms (4)

<b>Bachelor/Master in Geomatics and Surveying (source: EEGECS, WG1)</b>	<b>Technical Universities</b>	<b>Academic Universities</b>			
<b>SUBJECT</b>	AVERAGE University Colleges	ULg	UGent 2005	UGent 2011	AVERAGE
					Academic Universities
<b>BASIC SCIENCES (mathematics, physics, chemistry)</b>	60	59	25	30	44.5
<b>COMPUTER SCIENCES - CAD</b>	9	20	22	25	22.5
<b>STATISTICS - ADJUSTMENT</b>	4	9	25	11	10
<b>GEOSCIENCES</b>	2	48	21	25	36.5
<b>GEODETIC SURVEYING</b>	13	24	17	20	22
<b>GEODESY - POSITIONING</b>	5	14	10	10	12
<b>PHOTOGRAMMETRY – REMOTE SENSING</b>	2	13	17	11	12
<b>CARTOGRAPHY</b>	2	15	19	15	15
<b>HYDROGRAPHICAL SURVEY</b>	2	0	5	5	2.5
<b>GEOINFORMATION – GIS</b>	4	11	32	31	21
<b><u>(CIVIL) ENGINEERING SKILLS</u></b>	68	26	9	10	18
<b>LAND MANAGEMENT</b>	2	10	10	10	10
<b>CADASTRE – LAND LAW</b>	10	7	24	24	15
<b>ECONOMICS – QUALITY MANAGEMENT – ENVIRONMENTAL MANAGEMENT</b>	19	2	8	14	8
<b>PRACTICAL TRAINING - PROJECTS</b>	20	12	20	19	16
<b>BACHELOR + MASTER THESIS</b>	18	30	36	40	35
<b>TOTAL</b>	240	300	300	300	300

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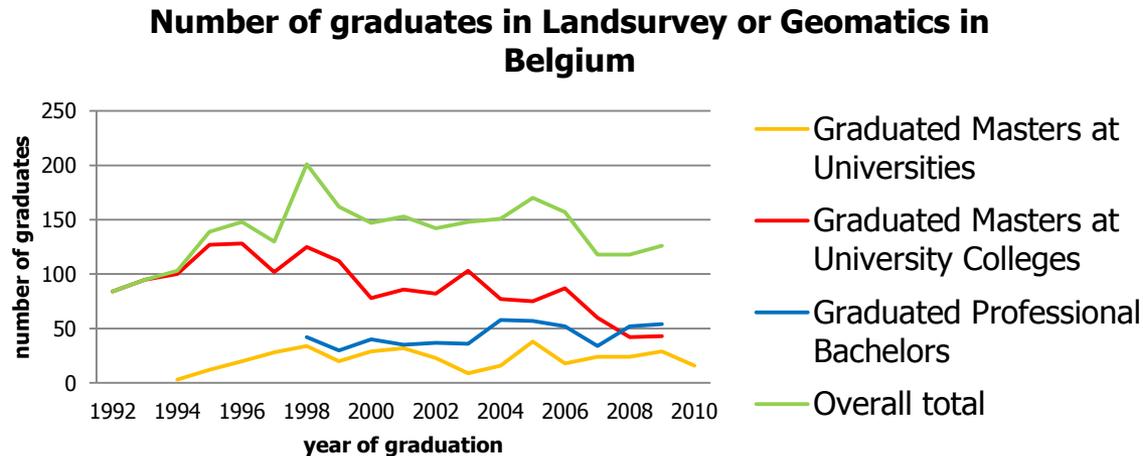
# Conclusion

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- 3 challenges: typical for Belgium or not ?



# Challenge 1: Limited number of "Surveying" students



- Total number of SURVEYORS/GEOMATICIAN students: only 12-13 students for every 1.000.000 inhabitants/year, SLIGHTLY DECREASING
- "Academic University Surveying" (5 year study) = 1-2 students for every 1.000.000 inhabitants/year, DECREASING
- "Technical University Surveying" (4 or 5 year study) = 4-5 students for every 1.000.000 inhabitants/year, DECREASING
- "Professional Bachelors" (3 years study) = 5-6 students for every 1.000.000 inhabitants/year, INCREASING

## Challenge 2: Quality/Funding

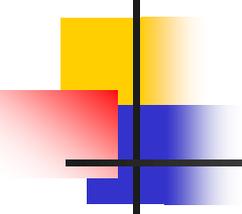
- Spread of funding
  - Many Universities in small country
  - 2013: Insertion of technical universities within universities.
  - But: Is this the “easy” solution (funding, administrative organisation,...) ?
- Change (since approx. 2007) in financing universities
  - Output financing mechanism
  - Publication related financing mechanism
  - Competition model
- Professors evaluation model
  - Research oriented
  - Students can now easily “harm” professors



## Challenge 3: Cultural

- “Student” attitude
  - Study = first priority ?
    - Basic School
    - Humanities
    - University
    - Ph.D.
  - Knowledge is rapidly decreasing <= “Not knowledge but skills are important !” ???
- Erasmus/Socrates exchange
  - More or less qualified students ? Eclectism or Student “tourism” ?
  - Erasmus Mundus (facing Belgian law restrictions) ?





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# Thank you for your attention !

## Contact & Information:

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