



Modernising geodesy education in Western Balkan with focus on competences and learning outcomes – GEOWEB

561902-EPP-1-2015-1-SE-EPPKA2-CBHE-JP

Capacity Building in Higher Education, Cooperation for innovation and the exchange of good practices

http://osgl.grf.bg.ac.rs/survey/accounts/login/

Tirana, 10-12.12.2017

List of partner organisations

- 1. KUNGLIGA TEKNISKA HOEGSKOLAN STOCKHOLM Sweden,
- 2. TECHNISCHE UNIVERSITAET WIEN, WIEN Austria
- 3. UNIVERSIDAD DE LEON LEON Spain
- 4. UNIVERZITET U SARAJEVU SARAJEVO
- 5. UNIVERZITET DZEMAL BIJEDIC U MOSTARU
- 6. JAVNA USTANOVA UNIVERZITET U TUZLI
- 7. Zavod za planiranje razvoja Kantona Sarajevo, Sarajevo
- 8. BNpro d.o.o Sarajevo
- 9. UNIVERSITETI POLITEKNIK I TIRANES, TIRANA Albania
- 10. UNIVERSITY OF TIRANA Tirana Albania
- 11. FACULTY OF CIVIL ENGINEERING BELGRADE Serbia
- 12. UNIVERZITET U NOVOM SADU NOVI SAD Serbia

WORKPLAN

- 1. WP1:Establish project organizations, review project plan
- 2. WP2:Establish regional network in geodesy education
- 3. Establish new geodesy laboratories
- 4. Retrain geodesy staff through 4 intensive courses
- 5. Develop a core curriculum & 3 new MSc programs
- 6. Introduce e-learning and PBL pedagogy
- 7. Quality plan
- 8. Dissemination and exploitation
- 9. Project management

WP1 - Establish project organizations, review project plan/UNSA

- Project organization Due date: 30.11.2015
 PMB, LPT, IAB
- Project plan revision Due date: 15.11.2015
- Kick off meeting / Sarajevo 7-12. mart 2016

WP2 - Establish regional network in geodesy education

http://osgl.grf.bg.ac.rs/survey/accounts/login/

Project plan

- Geodesy database / _____
 30.06.2016
- Cooperation Agreement/ 30.06.2016
- Western Balkan
 Geodesy
 Society/Forum- First
 Forum (regional
 cooperation network)

The results

- UB created three databases on time
- Contracts between partners signed on time
- First forum in **Belgrade**
 - 30.10.2016
- Second forum in Mostar, October 2017

GEOWEB at FCE / Local website Homepage



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About project

The official GEOWEB project web site:

http://gidec.abe.kth.se/GEOWEB.

The project objectives:

- 1. Modernization of higher education in geodesy and geography in partner's countries,
- 2. Integration of partner countries with EU,
- Strengthening regional cooperation within Western Balkan countries.

The Project coordinator: Huaan Fan, Royal Institute of Technology-Division of Geodesy and Satellite Positioning (KTH, Stockholm, Sweden).

The other partner institutions:

- 1. Royal Institute of Technology (KTH, Stockholm, Sweden),
- Vienna University of Technology (TUW, Vienna, Austria),
- 3. University of Leon (ULE, Leon, Spain),
- 4. University of Belgrade, Department of Geodesy&Geoinformatics,
- 5. University of Novi Sad Department of Comuting&Control Engineering UNS,
- 6. University of Tirana, Department of Geography UT,
- 7. Polytechnic University of Tirana, Department of Geodesy UPT,
- 8. University of Sarajevo, Department of Geodesy UNSA,
- 9. University of Mostar, Faculty of Civil Engineering UNMO,
- 10. University of Tuzla Department of Geography UNTZ,
- 11. Institute of Development Planning IDPSA,
- 12. BNPro d.o.o. private co.

Western Balkan Geodesy Educational Database

Institutions for Higher Education in Geodesy (16

Geodesy Educational Programmes (29

Geodesy Stakeholders (45)

Leave your comments or suggestions:

Forum

- → Institutional framework for operation of engineering geodesy Serbia (Mostar, 17 October 2017)
- → New Photogrammetry and Remote Sensing laboratory (Belgrade, October 2017)
- → New GNSS equipment for Surveying laboratory (Belgrade, Septempber 2017)
- → GEOWEB presentation
- → Erasmus+K2 GEOWEB project started at FCE (Belgrade, 15 March 2016)
- → Internal dissemination seminar (Belgrade, 16 March 2016)
- → Belgrade workshop (17-21 October 2016)
- → Curricular development workshop with IAB and WBGF meetings (Belgrade, 24 October 2016)
- → Article Problem based project oriented learning ... (Kopaonik, Serbia, 2-5 June 2016, Proceedings of GEO 2016)
- → Geodesy educational database report (Belgrade, 2 July 2016)
- → Geodesy stakeholders survey report (Belgrade, 4 July 2016)
- → Geodesy educational database report (Stockholm, 20 June 2016)
- → New FCE courses (Stockholm, 20 June 2016)

Institutions for Higher Education in Geodesy



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Western Balkan Geodesy Educational Database

Institutions for Higher Education in Geodesy

| Pk 🛆 | Name of the higher education institution (HEI) | Country 🛆 | Place △ | Street address | Web site of the HEI △ | Name 🛆 | Position 🛆 | contact email \triangle | Telephone △ | Department / Unit △ | user 🛆 |
|------|---|---------------------------|---------------|--|---|--------------------|---|-----------------------------|---------------------|--|------------------|
| 11 | CONSTRUCTION ENGINEERING FACULTY, POLYTECHNIC UNIVERSITY OF TIRANA | Albania | Tirana | Street "MUHAMET GJOLLESHA" NR. 54 | http://www.upt.al /index.php/fakultete- dhe-institute/fin | BILBIL NURCE | PhD | billnurce@gmail.com | 00355 42 244 100 | GEODESY | upt |
| 22 | University of Ljubljana, Faculty of Civil and Geodetic Engineering | Slovenia | Ljubljana | Jamova cesta 2 | http://www3.fgg.uni- lj.si/en/ | Anka Lisec | Assoc. Prof. | anka.lisec@fgg.uni-lj.si | +386 1 476 85 60 | Department of Geodetic Engineering | anka.lisec |
| 9 | University of Tuzla, Faculty of Natural Sciences and Mathematics | Bosnia and Herzegovina | Tuzla | Univerzitetska 4 | http://www.pmf.untz.ba/ | Alma Kadusic | Assistant Professor | alma.kadusic@untz.ba | 0038735320869 | Department of Geography | geografija.tuzla |
| 14 | Faculty of Science | Bosnia and Herzegovina | Banja Luka | Mladena Stojanovica 2 | Http://www.pmfbl.org | Davorin Bajic | Head of Department of Cartography and GIS | davorinbajic@pmfbl.org | +38765680867 | Geography | davorinbajic |
| 10 | Faculty of Civil Engineering, Department of Geodesy | Bosnia and Herzegovina | Sarajevo | Patriotske lige 30 | http://www.gf.unsa.ba/ | Admir Mulahusić | Head of Department of Geodesy | amulahusic@yahoo.com | 0038761212672 | Department of Geodesy | Admir |
| 12 | Građevinski Fakultet Sarajevo | Bosnia i Hercegovina | Sarajevo | Patriotske lige 30 | http://www.gf.unsa.ba/ | haris | Responsible Projectant | haris.lelic@energoinvest.ba | 0038761349732 | Energoinvest | ti84 |
| 23 | Faculty of Geology and Mine | ALBANIA | Tirana | Rruga e Elbasanit | http://fgjm.edu.al /informacione | Edmond Hoxha | Professor | ehoxha63@gmail.com | +355694027170 | Natural Resource | FGJM |

Geodesy Educational Programmes



Modernizing geodesy education in Western Balkan with focus on competences and learning outcomes - GEOWEB

Western Balkan Geodesy Educational Database

Geodesy Educational Programmes

| Pk 🛆 | Name of the programme \triangle | Institution 🗅 | Country 🛆 | Programme level △ | Number of study years |
|------|---|--|---------------------------|------------------------------|-----------------------|
| 22 | Geodesy and geoinformatics | Faculty of Civil Engineering, University of Belgrade | Serbia | PhD | 3 |
| 9 | Geodesy and geoinformatics | Faculty of Civil Engineering, University of Belgrade | Serbia | B.Sc | 3 |
| 23 | Geodesy and geoinformatics | Faculty of Civil Engineering, University of Belgrade | Serbia | M.Sc | 2 |
| 27 | Geography | University of Tuzla, Faculty of Natural Sciences and Mathematics | Bosnia and Herzegovina | B.Sc | 4 |
| 36 | Undergraduate Academic Studies / Geodesy and Geomatics | Faculty of Technical Sciences, University of Novi Sad | Serbia | B.Sc | 4 |
| 37 | Master Academic Studies / Geodesy and Geomatics | Faculty of Technical Sciences, University of Novi Sad | Serbia | M.Sc | 1 |
| 39 | Doctoral Academic Studies / Geodesy and Geomatics | Faculty of Technical Sciences, University of Novi Sad | Serbia | PhD | 3 |
| 38 | Specialised Academic Studies / Geodesy and Geomatics | Faculty of Technical Sciences, University of Novi Sad | Serbia | University Specialization | 5 |
| 28 | Undergraduate study of geodesy - Prvi ciklus studija geodezije | Faculty of Civil Engineering, Department of Geodesy | Bosnia and Herzegovina | B.Eng | 3 |
| 30 | PhD studies - Doktorski studij geodezije | Faculty of Civil Engineering, Department of Geodesy | Bosnia and Herzegovina | PhD | 3 |

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10 of 29 programmes

Geodesy Stakeholders



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Western Balkan Geodesy Educational Database

Geodesy Stakeholders

| Pk 🛆 | Name of the organisation △ | Country 🗢 | Place 🗢 | Street address △ | Name 🛆 | Position △ | contact email | Office phone △ | Cell phone |
|------|--|---------------------------|-----------------|----------------------------------|-------------------------|--|--------------------------------|---------------------|--------------------|
| 2 | GEOPUT d.o.o. | Serbia | Belgrade | Belgrade, Tome Rosandića 2 | Miroslav Kuburić | manager | geodelta@geoput.com | +381113099100 | +381655434566 |
| 3 | PD za geodeziju Geodet DB doo | Serbia | Mali Zvornik | ul. Kralja Petra I 37 | Dragan Bogićević | CEO | d.bogicevic@geodetdb.com | +38115471052 | +381643544 813 |
| 4 | TOP GEO DOO | Serbia | Belgrade | Baštovanska 96 | Nebojša Mazalica | General Manager | office@topgeo.co.rs | +381604551123 | +381604551123 |
| 5 | Geo Info Strategies d.o.o. | Serbia | Belgrade | Šamačka 3 | Vladimir Vasiljev | General Manager | vv@geoinfo.rs | +381112888066 | +38163688986 |
| 23 | Biro za geodetske poslove GEODET | Srbija | Kovin | Jna 7/14 | Aleksandar Miladinov | employer | salegeodet@gmail.com | 013/744-717 | 064/323-99-00 |
| 26 | Institut for Urbanism Tuzla municipality | Bosnia and Herzegovina | Tuzla | Aleja Alije Izetbegovica 6 | Nedreta Kikanovic | Senior Advisor for the Application of Geodesy in Spatial Planning of Tuzla municipality | nedreta.k@gmail.com | 387 35 252 038 | 387 61 725 018 |
| 1 | MapSoft d.o.o. | Serbia | Belgrade | Ustanička 64/7 | Igor Nedeljković | Sales and marketing sector manager | igor@mapsoft.rs | +381 11 2456 330 | +381 63 338 336 |
| 6 | Institute for Development Planning of Sarajevo Canton | Bosnia and Herzegowina | Sarajevo | Branilaca Sarajeva 26 | Jasmin Taletović | Department Manager | Jasmin.Taletovic@zpr.ks.gov.ba | +38733209542 | +38761375235 |
| 7 | GeoWILD d.o.o. | Bosnia and Herzegovina | Sarajevo | Patriotske lige 30 | Mirza Selesković | Manager | geowild@bih.net.ba | +387 33 278 465 | +387 61 157 775 |
| 8 | Department for Geodesy and Property Affairs | Bosnia and Herzegovina | Tuzla City | ZAVNOBIH 11 | Edis Imamovic | Senior Associate for geodetic and cadastral jobs | edisi@tuzla.ba | +38735307425 | +38761884380 |

10 of 45 stakeholders

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THE CONTENT OF DATABASES

Institutions for Higher Education

- Name of the higher education institution (HEI)
- Complete address
 (country, place, zip code and street address)
- Web site of HEI
- Type of HEI (public/state private/state, private)
- Contact person (name, position, department/unit, email and telephone)

Geodesy Educational Programmes

- Name of the program,
- Program level
 (B.Eng,B.Sc, High School Specialization),
- Number of study years,
- Credit system used,
- Total number of credits,
- Language of study,
- Number of admitted students in 2015/16,
- Courses included

Geodesy Stakeholders

- Name,
- Address data,
- Information on contact person
- The type of organization,
- Number of geodetic/GIS employees
- Main activities of organization.

Activity 2.1: A geodesy educational database report / Conclusions and remarks

- School institutions and their <u>study programs</u> from <u>six regional</u> countries was created and filled
- <u>Fourteen educational institutions</u> from <u>six regional countries</u>, three from partner's countries and three outside (Macedonia, Croatia and Slovenia)
- 28 study programs
- All institutions accepted ECTS policy of the student effort validation
- Bachelor degree lasts three or four years, but mostly three,
- Small number of study programs was offered <u>in English</u>, mainly at the <u>PhD level</u>
- There are a few programs that the students can choose different options to study (MSc in Belgrade and MEng in Zagreb)
- Belgrade, Zagreb and Ljubljana offer all study areas
- GIS, Geoinformatics, GNSS and Land cadaster are more or less implemented in all educational institutions
- Database was published at the Project website and will continue to collect and inform the stakeholders and others who are interesting to see what the geodetic education institutions offer in the region

| Country | 15 |
|------------------------|----|
| Bosnia and Herzegovina | 7 |
| Serbia | 3 |
| Albania | 2 |
| Croatia | 1 |
| Slovenia | 1 |
| Macedonia | 1 |

Activity 5.1 Geodesy stakeholders survey report

Table 1: Number of stakeholders participating in the survey

| Country | |
|------------------------|----|
| Albania | 10 |
| Bosnia and Herzegovina | 20 |
| Serbia | 12 |
| Total | 42 |

Table 3: Activities of stakeholders

| Activity | No. | % |
|---|-----|----|
| Cadastral/topographic surveying | 27 | 64 |
| Engineering surveying | 27 | 64 |
| Geodesy (geodetic networks and reference systems) | 25 | 60 |
| GIS development and geospatial data management | 23 | 50 |
| Land management | 21 | 50 |
| Photogrammetry and remote sensing | 12 | 29 |
| Geodetic software and equipment supply and maintenance services | 11 | 26 |

Table 2: Number of stakeholders participating in the survey

| Stakeholders according to their type | |
|--------------------------------------|----|
| Private enterprises | 31 |
| Local/central government agencies | 8 |
| Public bodies | 3 |
| Total | 42 |

Table 4: Competences needed

| Activity | No. | % |
|---|-----|----|
| GIS and geospatial data management | 31 | 74 |
| Engineering surveying | 27 | 64 |
| Geodesy (geodetic networks and reference systems) | 24 | 57 |
| GNSS | 21 | 50 |
| Land management | 18 | 43 |
| Land cadastre | 17 | 40 |
| Traditional surveying | 15 | 36 |
| Photogrammetry and remote sensing | 14 | 33 |
| Laser scanning | 7 | 17 |

Activity 5.1 Geodesy stakeholders survey report /RESULTS

| Country | Comments |
|---------|---|
| ALB | Mostly students need more practice and consolidation of the theoretical concepts in real works |
| ALB | More efforts should be made on Economic Background, Industry standards and Ethic Code |
| ALB | In our opinion, the education in geodesy should go in its modernizing towards the good and solid education in modern technologies, modern geodesy theory. Geo-information (GIS-WebGIS), land management and legislation as well as the new methods and |
| | technologies in engineering geodesy. |
| ALB | Particular needs in -depth knowledge of Geodesy concepts, creation and management of geo-information processing in GIS platform. ASIG is an institution responsible for the implementation of the INSPIRE Directive in Albania. |
| , ALB | ASIG for next year, will receive more responsibility for the production of various maps (as NMCA) for the Republic of Albania. For this purpose, it will be more need for training short and long term for its specialties. (Like In GIS, Remote Sensing, photogrammetry) |
| | Our Organization is always looking for qualified employees, in every department not only survey unit. When something new in |
| | technology is required for the progress of the work, company cares that the employee to be well trained. |
| ALB | 1. Permanent change of teaching mentality. Combined theory and practice in a more efficient way. |
| | 2. Bringing new methods in teaching, as well as combination and attracting engineers with experience in teaching. |
| | 3. A fully equipped laboratory is a must. |
| BiH | More cooperation with faculty of geodesy and support in seminars modern technology in geodesy. |
| BiH | Technology is constantly growing and improving, and we should follow that. Geodesy students need to be closely familiar with new methods and, and most of all, programming. |
| BiH | We usually provide training for the new technology in Geoinformatics-geomatics. |
| | The main problem, in my opinion, with geodesy education is that focus of education is theory and not application. Of course, this is |
| BiH | maybe not intentional but the reason could be expensive software and hardware (geodetic instruments) which is needed for quality |
| | education of geodesy/GIS students. |
| SER | Students have great deal of theoretical knowledge but they lack transversal skills and what is more important work-based skills. |
| | Geodetic engineers should have better skills and knowledge in geoinformatics, especially in terms of solving various problems by |
| SER | programming, i.e. using scripting languages in GIS software or standard programming languages and software development tools, |
| | such as Visual Basic, C# and Visual Studio. |
| SER | There is no any communications and consultations between private companies and educational institutions of Geodesy in Serbia. |
| JLIN | Except sporadic individual cooperation and economic benefits. |
| SER | The program is not adapted for the market, and up to date technology. It doesn't follow trends in geodesy. |

WP3 -Establish new geodesy laboratories/KTH

- Equipment Needs Identification / 15.01.2016
- Purchase and install new geodesy equipment/ 30.06.2016
- Staff training on new geodesy equipment/ 30.06.2016

- Two GNSS Trimble R8s receivers
- One UAV DJI matrix 600 Pro with 20MPs digital camera
- IT 1 server; 4 desktop computers;
 2 3D desktop computers;
 2 notebooks; Geospatial office
 software; Software for point cloud
 processing; Laptop, 3D mouse,
 Active 3D glasses KIT; 3D glasses
 extra; 5 3D glasses for projector
- Staff trained (8 persons)
- Labs opening ceremony was held

WP 4 - Retrain geodesy staff through four intensive courses/UPT

- GIS applications for land, water and environment
- Global Navigation Satellite Systems (GNSS)
- Digital image processing and remote sensing
- Gravity, geoid and reference systems



 Tirana, two PhD students, 10 days



 TU Wien, two PhD students, 10 days



 Ponferada, UL, two PhD students 14 days



Mostar, two
 Assistant
 professors, 7 days

WP5: Core curriculum & new MSc programs /TUW

- Questionnaire survey among geodesy stakeholders
- Workshop on curricular development
- Define learning outcomes at lesson leve
- Accredit and start new curriculum, master programs
- Develop 14 new teaching materials



 Finished
 http://osgl.grf.bg.ac.rs/survey/ac counts/login/



Belgrade, Oktober
 2016



• Finished, August 2017



 Four new courses accepted in Sep 2017 and 15 revised at FCE



Five new teaching materials at FCE

BSc core curriculla

| Sem:1 | Year: 1 | | | Sem:2 | Year: 1 | | | |
|-------|--|--------|------|-------------|---|--------------|-----------|----------|
| No. | Course Name | Course | ETCS | No. | Course Name | Course | ETCS | |
| 1 | Surveyingl | C | 3 | 1 | Surveying II | С | 4 | |
| 2 | Mathematics I | С | 7,5 | 2 | Mathematics II | С | 7,5 | |
| 3 | Physics I | С | 4 | 3 | Physics II | С | 4 | |
| 4 | Geosciences | С | 5 | 4 | Geodatabases | С | 5 | |
| | Inform atics | С | 5 | 5 | Construciton Engineering | С | 5 | |
| 6 | Spatial Planning | С | 5 | 6 | Law and Economy | С | 6 | |
| | | | | | | | 1 | |
| | | | | | | | \square | |
| | Total= | | 29,5 | | Total= | | 31,5 | |
| | BScC= | | 29,5 | | BSc C = | | 31,5 | _ |
| | BScS= | | 0 | | BScS = | | 0 | |
| Sem:3 | Year: 2 | | | Sem:4 | Year: 2 | | | |
| Vo. | Course Name | Course | ETCS | No. | Course Name | Course | ETCS | |
| 1 | Surveying III | С | 4 | 1 | Surveying IV | С | 4 | _ |
| | | | | | The ory of errors and | | | |
| | Geodetic reference system s | С | 7,5 | 100 | adjustm ent theory II | С | 5 | |
| | Mathematics III | С | 6 | 3 | Photogram metry I | С | 4 | |
| | Theory of errors and | | | | | | | ı |
| 4 | adjustm ent theory I | С | 5 | 4 | Cadastre II (State survey) | С | 5 | |
| | | | 444 | | Geographic Information | | | ĺ |
| 5 | Cadastre I | С | 5 | 5 | System s II | С | 5 | |
| | Geographic Information | | | | | | | ĺ |
| | System s I | С | 5 | ff() (0.00) | Introduction to Program ming | S | 5 | |
| 7 | Geodetic plans | S | 3 | 7 | Technical foreign language | S | 3 | _ |
| | | | | | | | \vdash | |
| | Total= | | 35,5 | | Total= | | 31 | |
| | BScC= | | 32,5 | | BSc C = | | 23 | _ |
| | BSc S = | | 3 | (m) | BScS= | | 8 | <u> </u> |
| | Year: 3 | | | Sem:6 | | | | <u> </u> |
| lo. | Course Name | Course | ETCS | No. | Course Name | Course | ETCS | |
| 0.0 | 2000 | _ | | · . | Geodetic project w ork (incl. | - <u>-</u> - | | |
| | GNSS positioning | C | 7,5 | | professional practice) | C | 5 | |
| 2 | Engineering Surveying | С | 5 | 2 | Remote Sensing | С | 5 | - |
| | | | | | Bachelor | | | 1 |
| _ | Cartography and Map | | | | project/Professional | | | ı |
| | Projections | С | 7,5 | | deepening | С | 12 | |
| | let | | 3.5 | ı 4 | Satellite geodesy | С | 3 | \vdash |
| | Photogram metry II | | | 62 | Brent III a Brent | 8 | | |
| 5 | Land Management | С | 5 | 5 | Digital Im age Processing | S | 5 | ! |
| 5 | | | | 5 | Digital Im age Processing Geosensors | S | 5 | |
| 5 | Land Management | С | 5 | 5 | | | - | |
| 5 | Land Management Digital Terrain Modelling | С | 5 | 5 | Geosensors | | 5 | |
| 5 | Land Management | С | 5 | 5 | | | - | |

Detailed sylabus content was prepared in special Handbook

MSc core curriculla

| Sem: 1 | Year: 1 | | | Sem: 2 | Year: 1 | | | |
|--------|-------------------------------|--------|------|--------|----------------------------|--------|------|-----|
| No. | Course Name | Course | ETCS | No. | Course Name | Course | ETCS | |
| | | | | | Reference systems in space | | | |
| | Physical geodesy | С | 5 | 1 | and time | С | 5 | |
| 2 | Laser Scanning | С | 5 | 2 | Geovisualization | С | 5 | |
| 3 | Advanced programming | С | 5 | 3 | Web-GIS | С | 5 | |
| | Advanced theory of | | | | In te grated sensor | | | |
| 4 | adjustm ent | S | 5 | 4 | technologies | S | 5 | |
| | | | | | Geodynamics and | | | |
| 5 | Geodetic optimization | S | 5 | 5 | deformation analysis | S | 5 | |
| | | | | | Precise industrial | | | |
| | Spatial databases and SDI | S | 5 | 6 | m e a sure m e n ts | S | 5 | |
| 7 | Applied Mathematics | S | 5 | 7 | Spatial Analysis | S | 5 | |
| | Real estate and investment | | | | | | | |
| | analysis | S | 5 | 8 | Digital Photogram metry | S | 5 | |
| 9 | Land Consolidation | S | 5 | | | | | |
| | | | | | | | | |
| | Total= | | 45 | | Total= | | 40 | |
| | BScC = | | 15 | | BSc C = | | 15 | |
| | BScS = | | 30 | | BScS = | | 25 | |
| Sem: 3 | Year: 2 | | | Sem: 4 | Year: 2 | | | |
| | | | | | | | | |
| No. | Course Name | Course | | No. | Course Name | Course | ETCS | |
| 1 | Precise positioning and navig | С | 5 | 1 | Diplom a project | С | 30 | |
| | | | | | | | | |
| 2 | Project m anagem ent | С | 5 | | | | | |
| | | | | | | | | |
| 3 | Research methodology and c | С | 5 | | | | | |
| | | | | | | | | |
| | Geodetic space techniques | S | 5 | | | | | |
| 5 | Geostatistics | S | 5 | | | | | |
| 6 | Location-Based Services | S | 5 | | | | | |
| | GIS in spatial planning | S | 5 | | | | | |
| 8 | Advanced Remote Sensing | S | 5 | | | | | |
| | | | | | | | | |
| | | | | | | | | Σ |
| | Total= | | 40 | | Total= | | 30 | 155 |
| | | | | | | | | |
| | BScC= | | 15 | | BScC= | | 30 | 75 |
| | | | 25 | | | | | |

Detailed sylabus content was prepared in special Handbook

New teaching materials at UB FCE

| VI | University of Belgrade (UB) | | | | |
|----|-----------------------------|---------------|----------|-----------|---------------|
| | | Milan | Textbook | | Zeljko |
| 1 | Geovizualization | Kilibarda, | | June 2018 | Cvijetinovic, |
| | | PhD | | | PhD |
| | Precise GNSS Point | Dragan | Textbook | June 2018 | Oleg |
| 2 | Positioning | Blagojevic, | | | Odalovic, |
| | Fositioning | PhD | | | PhD |
| | | Oleg | Textbook | June 2018 | Dragan |
| 3 | Global geopotential models | Odalovic, | | | Blagojevic, |
| | | PhD | | | PhD |
| | | Zeljko | Textbook | June 2018 | Milan |
| 4 | Laser scanning | Cvijetinovic, | | | Kilibarda, |
| | | PhD | | | PhD |
| 5 | Research methodology and | Branko | Textbook | June 2018 | Branislav |
| | communication | Bozic, PhD | | | Bajat, PhD |

New courses at UB FCE

- Global geopotential models (GGM)
- Precise GNSS point positioning
- Laser Scanning
- Geovizualization

15 courses revised at FCE

1. Techniques geodetic measurements Plane surveying, field practice 3. Global navigation satellite systems **BSc** Plane (geodetic) surveying 3 4. 5. Engineering surveying, field practice 6. Geoinformatics, Practical work 7. Photogrametry, Practical work 8. Geodetic reference network 9. Geodesy Field practice **Engineering Surveying in industry** 10. 11. Engineering photogrammetry **MSc** 12. Quality assurance of geodetic measurements 13. Digital photogrametry 14. Project in Photogrametry 15. **Project in Geoinformatics**

WP6: Introduce e-learning and PBL pedagogy/ULE

- Workshop on e-learning and PBL pedagogy
- Install e-learning web server MOODLE
- Pilot course using PBL

- Finished in Ponferada,
 Sep. 2017, two
 Teaching assistances
- Installed e-learning web server MOODLE
- Pilot course using PBL (Problem-Based Learning) – in

progress

 Design and Implementation of Geoinformation Systems and
 GIS Programming

WP7: Implement quality assurance in geodesy education/ULE

- Workshop on quality assurance
- Introduce systematic course evaluations by students

- In 2018
- In 2018

WP8: Quality plan: Monitoring and quality control/KTH

Quality assurance, dissemination and sustainability strategy / plan

Quality assurance

- An "Activity Monitoring Table" has been created and distributed to all project members so that every member knows the content of activities, their objective and expected outcome, responsible partner/persons, relevant date and place, deadline for completion/reporting
- Project coordinator met project members regularly to monitor ongoing activities, evaluate achieved results, identify problems and plan future activities
- Project consortium reports project work to the International Advisory Board which will review project results and provide feedbacks and advices
- Local project team provides timely progress report to the management of the local organization for guidance and advice
- In the middle of the project period, the project will be reviewed by three international experts as an external quality control

Dissemination

- A project web site has been created: http://gidec.abe.kth.se/GEOWEB
- A project leaflet has been printed and distributed
- Project newsletter is published twice a year to inform on ongoing and completed project activities and forthcoming events
- Each Western Balkan university has organized an internal dissemination seminar in spring 2016 with staff, students and university administration as main target groups. The prupose is to inform the targeted groups on the GEOWEB project's objectives, planned activities, major events, expected results and outcomes. In particular, the seminar presented specific activities and tasks to be taken at the respective partner university
- The project will organize annual conferences of Western Balkan Geodetic Forum to disseminate the project results to geodesy stakeholders in Western Balkan
- A final dissemination conference will be organized at the end of the project period

Sustainability and exploitation

- Work closely with university administrations to obtain long term support
- Involve labour market partners, geodesy employers and other stakeholders in the project
- Take advantage of stakeholder support to develop education programs and courses which meet the needs of the geodesy labour market and the Balkan societies
- Build regional and international cooperation networks to develop geodesy education and research capacity in Western Balkan
- Promote regional integration and student mobility among Western Balkan geodesy educational institutions

WP9: Dissemination and exploitation/UB

- Create and maintain project web site
- Publish project leaflets and newsletters
- Dissemination via annual WBGS conferences
- Final dissemination conference in Tirana (or Belgrade)

Project web site, local web site established in http://osgl.grf.bg.ac.rs/survey/accounts/login/

and http://gidec.abe.kth.se/GEOWEB/

- Reports created and put on the local site
- Project leaflets and newsletters dissimeneted
- Internal dissimenation seminar was held in March 2016
- An article published at International scientific conference regarding to PBL pedagogy in May 2016 and put on local web site
- About the GEOWEB on the Faculty website http://www.grf.bg.ac.rs/p/docs/informatori/p o etak rada na erasmus projektu geoweb 1458047411845.pdf

International conference







Lab for photogrametry



PBL paper at International conference



Field practice



Internal dissemination seminar



Lab for surveying

WP10: Project management/KTH

- Project management by Project Management Board
- Annual meeting of Project Management Board (PMB))- Annual meetings were held in Sarajevo (March, 2016), Belgrade (Okt. 2016), Stockholm from 21th to 25th of June, 2017 and Mostar 20.10.2017
- Day to day project management