University of Zagreb, Faculty of Geodesy

Syllabus of postgraduate doctoral study program for the academic year 2015/2016.

The Syllabus of teaching postgraduate doctoral study program in the academic year 2015/2016, for students admitted at the doctoral studies according to the New Study Program (from the academic year 2010/2011), was adopted at the second regular session of the Faculty Council in the 347. academic year 2015/2016, held on 26. November 2015.
STUDY ACTIVITIES IN INDIVIDUAL SEMESTERS AND THE NUMBER OF ECTS POINTS

<table>
<thead>
<tr>
<th>Semester</th>
<th>Activity</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>I*</td>
<td>2 courses</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>1 project-seminar</td>
<td>10</td>
</tr>
<tr>
<td>II</td>
<td>2 project-workshops</td>
<td>30</td>
</tr>
<tr>
<td>III</td>
<td>Research work</td>
<td>30</td>
</tr>
<tr>
<td>IV</td>
<td>Research work</td>
<td>30</td>
</tr>
<tr>
<td>V</td>
<td>Research work</td>
<td>30</td>
</tr>
<tr>
<td>VI</td>
<td>Final completion of doctoral thesis</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>180</strong></td>
</tr>
</tbody>
</table>

*In the first semester, 3 courses can be taken instead of the 2 courses and 1 project-seminar, for a total of 30 ECTS credits.

LIST AND DESCRIPTION COURSES, NUMBER OF LESSONS AND ECTS CREDITS

List of Courses and Course teachers

<table>
<thead>
<tr>
<th>Course teacher</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. Miljenko Lapaine, PhD</td>
<td>Methods of Scientific Work</td>
</tr>
<tr>
<td>Prof. Boško Pribičević, PhD</td>
<td></td>
</tr>
<tr>
<td>Prof. Tomislav Bašić, PhD</td>
<td>Mathematical and Statistical Methods in Geodesy</td>
</tr>
<tr>
<td>Prof. Nevio Rožić, PhD</td>
<td></td>
</tr>
<tr>
<td>Prof. Damir Medak, PhD</td>
<td>Formal Methods in Geoinformatics</td>
</tr>
<tr>
<td>Prof. Miodrag Roić, PhD</td>
<td></td>
</tr>
</tbody>
</table>

List of Projects and Project holders

<table>
<thead>
<tr>
<th>Project holders</th>
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</thead>
<tbody>
<tr>
<td>Prof. Miodrag Roić, PhD</td>
<td>Development of Multifunctional Land Management System (DEMLAS)</td>
</tr>
<tr>
<td>Prof. Damir Medak, PhD</td>
<td>European Network Exploring Research into Geospatial Information Crowdsourcing: Software and Methodologies for Harnessing Geographic Information from the Crowd (ENERGIC)</td>
</tr>
<tr>
<td>Prof. Tomislav Bašić, PhD</td>
<td>Research in the Field of Maritime, Satellite and Physical Geodesy</td>
</tr>
<tr>
<td>Prof. Miodrag Roić, PhD</td>
<td>Research in the Field of Applied Geodesy</td>
</tr>
<tr>
<td>Prof. Miljenko Lapaine, PhD</td>
<td>Research in the Field of Cartography, Photogrametry and Remote Sensing Imagery</td>
</tr>
</tbody>
</table>

(L – lectures, S – seminars, W – workshops)
Course name: METHODS OF SCIENTIFIC WORK

Course teacher: Prof. Miljenko Lapaine, PhD
Associate teacher: ass. prof. Ivka Kljajić, PhD

- Year/Semester: 1/I
- Status of the course (obligatory/optional): optional
- Number of hours per week: 2 (L) + 2 (S)
- ECTS credits (coefficient of student workload): 10

Description/contents of course

Developed competence (knowledge and skills)
Developing skills in using various methods of scientific research, especially those that are mostly applied in geodesy, geoinformatics and related disciplines.

Types of instruction and adoption of knowledge

<table>
<thead>
<tr>
<th>Lectures ✓</th>
<th>Exercises</th>
<th>Seminar ✓</th>
<th>Practicum</th>
</tr>
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<tbody>
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<td>Mentoring work</td>
<td>Consultation ✓</td>
</tr>
<tr>
<td>Workshops</td>
<td>Discussion ✓</td>
<td>Internet ✓</td>
<td></td>
</tr>
</tbody>
</table>

Student responsibilities

<table>
<thead>
<tr>
<th>Oral exam ✓</th>
<th>Written exam</th>
<th>Seminar essay ✓</th>
<th>Essay</th>
<th>Active participation in class ✓</th>
</tr>
</thead>
</table>

Monitoring of teaching and monitoring and evaluation of students

<table>
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<tr>
<th>Written exam</th>
<th>Oral exam ✓</th>
<th>Essay</th>
<th>Practical work</th>
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<tbody>
<tr>
<td>Project</td>
<td>Continuous knowledge test or evaluation activities ✓</td>
<td>Research</td>
<td>Seminar work ✓</td>
</tr>
</tbody>
</table>

Literature

a) Required
b) Optional

c) Internet sources
Scientific information of the REPUBLIC OF CROATIA
http://www.szi.hr/
National and University Library
http://www.nsk.hr/
Course name: METHODS OF SCIENTIFIC WORK

Course teacher: Prof. Boško Pribičević, PhD.
Associate teacher: assis. prof. Almin Đapo, PhD

- Year/Semester: 1/I
- Status of the course (obligatory/optional): optional
- Number of hours per week: 2 (L) + 2 (S)
- ECTS credits (coefficient of student workload): 10

Description/contents of course

Developed competence (knowledge and skills)
Competence in critical analysis, evaluation and synthesis of new complex ideas; competences in presenting one’s own conclusions and results of original research results to professional and wider public in clear and efficient way; continuous advancement in applied research and development of new techniques, ideas and approach.

Types of instruction and adoption of knowledge

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<tr>
<td>Workshops</td>
<td>Discussion ✓</td>
<td>Internet ✓</td>
<td></td>
</tr>
</tbody>
</table>

Student responsibilities

| Oral exam ✓ | Written exam | Seminar essay ✓ | Essay | Active participation in class ✓ |

Monitoring of teaching and monitoring and evaluation of students

| Written exam ✓ | Oral exam ✓ | Essay | Practical work |
| Project | Continuous knowledge test or evaluation activities | Research | Seminar work ✓ |
Literature

a) Required

b) Optional

c) Internet sources
http://www.online-baze.hr
http://bib.irb.hr/
http://zprojekti.mzos.hr/Home_hr.htm
Course name: MATHEMATICAL AND STATISTICAL METHODS IN GEODESY

Course teacher: Prof. Tomislav Bašić, PhD or Prof. Nevio Rožić, PhD
Associate teacher:

- Year/Semester: 1/I
- Status of the course (obligatory/optional): Optional
- Number of hours per week: 2 (L) + 2 (S)
- ECTS credits (coefficient of student workload): 10

Description/contents of courses

Developed competence (knowledge and skills)
Acquisition of knowledge and skills in using mathematical and statistical methods in geodesy.

Types of instruction and adoption of knowledge

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Student responsibilities

| Oral exam ✓ | Written exam | Seminar work ✓ | Essay | Active participation in class ✓ |

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<td>Continuous knowledge test or evaluation activities ✓</td>
<td>Research</td>
<td>Seminar work ✓</td>
</tr>
</tbody>
</table>

Literature

a) Required
b) Optional

c) Internet sources
Course name: FORMAL METHODS IN GEOINFORMATICS

Course teacher: Prof. Damir Medak, PhD or Prof. Miodrag Roić, PhD

Associate teachers:

- Year/Semester: 1/I
- Status of the course (obligatory/optional): optional
- Number of hours per week: 2 (L) + 2 (S)
- ECTS credits (coefficient of student workload): 10

Description/contents of courses

Developed competence (knowledge and skills)
Development of competences in understanding the scientific foundations of geoinformatics, learning about the program support needed for independent research of scientific problems related to spatial data, their semantics, interoperability, processing and visualization.

Types of instruction and adoption of knowledge

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<td>Project</td>
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<td>Research ✓</td>
<td>Seminar work ✓</td>
</tr>
</tbody>
</table>

Literature

a) Required

b) Optional

c) Internet sources
Web pages about the theory of geoinformation systems
www.haskell.org
www.opengis.org.
Course name: DEVELOPMENT OF MULTIFUNCTIONAL LAND MANAGEMENT SYSTEM (DEMLAS), Croatia Science Foundation

Course teacher: Prof. Miodrag Roić, PhD
Associates in teaching: Prof. Siniša Mastelić Ivić, PhD, Prof. dr. emeritus Zdravko Kapović, Prof. Vlado Cetl, PhD, assist.prof. Rinaldo Paar, PhD, assist. prof. Dražen Tutić, PhD, assist. prof. Hrvoje Matijević, PhD, assist. prof. Hrvoje Tomić, PhD, assist.prof. Loris Redovniković, PhD, assist. prof. Ante Marendić, PhD

- Year/Semester: 1/I
- Status of the course (obligatory/optional): Optional
- Number of hours per week: 4 (S)
- ECTS credits (coefficient of student workload): 10

- Year/Semester: 1/II
- Status of the course (obligatory/optional): Optional
- Number of hours per week: 6 (W)
- ECTS credits (coefficient of student workload): 15

Description/contents of courses
The basic purpose of land administration system is to register legal and other formal relationships between people and land. Apart from its primary purpose, the system of land administration can and should also serve as the basis for land management. Unlike land administration, the land management presents a series of processes that provide efficient and sustainable land usage. Unfortunately, land administration systems are rarely equipped to fulfill such additional demands, even in highly developed countries. The aim of this project is to research what should be done to transform the traditional land administration system into modern Multipurpose Land Administration System that can efficiently support the land management system. Our hypothesis is that such transformation can be done by improving two aspects of land administration system, its efficiency and its usability. The efficiency implies the ability of the land administration system to update the data quickly providing at the same time their consistency and accuracy. Within the frame of the project, we shall research the possibilities for more efficient capturing of field data needed for the improvement of the process of updating the data in the land administration system. The usability of the land administration system is even more important than the efficiency itself. This is another aspect that we try to improve within the scope of this project. Apart from registering the land, the multipurpose land administration system should support the processes of land evaluation, urban planning and of various interventions on the land for the purpose of developing the agricultural productivity. Within the scope of the project, we shall also research the range of additional data needed to be captured, processed and stored in the land administration system in order to provide efficient support in the processes of land management system. Our previous research will be used as the initial point for the current research that are closely related to the topic of land administration and management, as well as the Land Administration Domain Model that has recently become an ISO standard.
Developed competence (knowledge and skills)
Theoretical research, definition of high-level concepts and the conceptual data model, studying the best practices in the domain of spatial modeling and their performance, testing of hypotheses and processing of obtained results.

Types of instruction and adoption of knowledge

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<td>Research ✓</td>
<td>Seminar work ✓</td>
</tr>
</tbody>
</table>

Literature

a) Required


b) Optional

Mader, Mario; Matijević, Hrvoje; Roić, Miodrag: Linking Land Registers and Other Official Registers in the Republic of Croatia based on LADM // 5th Land Administration Domain Model Workshop / Oosterom, Peter van; Lemmen, Christiaan; Fendel, Elfriede, editor(s). Copenhagen: International Federation of Surveyors (FIG), 2013. 81-94.


Pavasović, Marko; Roić, Miodrag; Mader, Mario: Transformation from Engineering to Global Coordinate Reference Systems // Proceedings of the 5th International Conference on Engineering Surveying INGEO 2011 / Kopáčik, Alojz ; Kyrinovič, Peter ; Roić, Miodrag, editor(s). Zagreb: University of Zagreb, Faculty of Geodesy, 2011. 153-162.


c) Internet sources
Course name: EUROPEAN NETWORK EXPLORING RESEARCH INTO GEOSPATIAL INFORMATION CROWDSOURCING: SOFTWARE AND METHODOLOGIES FOR HARNESSING THE GEOGRAPHIC INFORMATION FROM THE CROWD (ENERGIC), COST project

Course teacher: Prof. Damir Medak, PhD

Associate teachers:

- Year/Semester: 1/I
- Status of the course (obligatory/optional): optional
- Number of hours per week: 4 (S)
- ECTS credits (coefficient of student workload): 10

- Year/Semester: 1/II
- Status of the course (obligatory/optional): Optional
- Number of hours per week: 6 (W)
- ECTS credits (coefficient of student workload): 15

Description/contents of courses

New and unprecedented sources of geographic information have recently become available in the form of user-generated Web content. The integration and application of these sources, often termed volunteered geographic information (VGI), offers multidisciplinary scientists an unprecedented opportunity to conduct research on a variety of topics at multiple spatial and temporal scales. Since applications generating VGI are not often designed specifically for data production or analytical purposes, the Action aims at the following to fill this gap, recognizing the potential value of these sources to the EU in citizen-based decision-making by: 1) define VGI sources, share and develop data retrieval software, assess VGI quality, 2) define standardization criteria for interoperability with other datasets, 3) identify applications and transfer these applications to business implementation (market analysis, risk management, advertising, etc.). The Action targets fundamental scientific and technological advances by establishing a European network of excellence on GeoWeb technologies. The Action will focus on VGI and gather efforts carried out in an innovative and under-exploited field of Web research and knowledge production. VGI is particularly relevant as it provides information of citizens’ preferences and concerns and is an alternative source of knowledge in a context where governments are putting fewer resources in data collection.

Developed competence (knowledge and skills)

Students are going to research various aspects of VGI, especially in the context of interdisciplinary application of crowdsourcing. Participation in conferences and workshops organized by the COST Action will be encouraged.

Types of instruction and adoption of knowledge

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<tr>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

Project ✔️ Continuous knowledge test or evaluation activities Research ✔️ Seminar work ✔️

**Literature**

**a) Required**

Bernasocchi, m., Coltekin a., Gruber s., (2012), "An open source geovisual analytics toolbox for multivariate spatio-temporal data for environmental change modeling", ISPRS, 2012, Melbourne, Australia


Kuhn, w. (2007), "Volunteered geographic information and GIScience", In Workshop he Volunteered Geographic Information, University of California, Santa Barbara, the National Center for Geographic Information and Analysis (NCGIA), 86-97.

**b) Optional**


**c) Internet sources**

[http://www.cost.eu/COST_Actions/ict/Actions/IC1203](http://www.cost.eu/COST_Actions/ict/Actions/IC1203)

**Course name:** RESEARCH IN THE FIELD OF MARITIME, SATELLITE AND PHYSICAL GEODESY, Faculty of Geodesy Zagreb

**Course teacher:** Prof. Tomislav Bašić, PhD  
**Associate teachers:** Prof. Nevio Roţić, PhD, Prof. Damir Medak, PhD, Prof. Željko Bačić, PhD, Prof. Boško Pribićević, PhD, Prof. Drago Špoljarić, PhD, Prof. Mario Brkić, PhD, assist.prof. Jelka Beban Brkić, PhD, assist. prof. Almin Đapo, PhD, Branko Kordić, PhD, Mario Miler, PhD, Marko Pavasović, PhD, Ivan Razumović, PhD, Danijel Šugar, PhD, Olga Bjelotomić, PhD

- **Year/Semester:** 1/I  
- **Status of the course (obligatory/optional):** Optional  
- **Number of hours per week:** 4 (S)  
- **ECTS credits (coefficient of student workload):** 10

- **Year/Semester:** 1/II  
- **Status of the course (obligatory/optional):** Optional  
- **Number of hours per week:** 6 (W)  
- **ECTS credits (coefficient of student workload):** 15

**Description/contents of courses**

The course is interdisciplinary oriented and covers fundamental and applied research in the field of maritime, satellite and physical geodesy and geomatics. The research relies mostly and is continued to the previous research funded by the Ministry of Science and Technology within the frame of the following scientific projects:

In the period between 2002-2006:  
- Geomatica Croatica (0007012), head of the project Prof. dr. sc. Tomislav Bašić,  
- Compatibility of Heights in the Republic of Croatia (0007013), head of the project Prof. dr. sc. Ladislav Feil,  
- Geodetic and Geodynamic GPS-Projects in the Republic of Croatia (0007018), head of the project Prof. dr. sc. Damir Medak, and

In the period between 2007-2013:  
- Height Kinematics and Dynamics of the Continental Croatia (007-0000000-2554), head of the project Prof. dr. sc. Nevio Rožić,  
- Geopotential and Geodynamics of the Adriatic Sea (Geo++Adria) (007-0072284-2287), head of the project Prof. dr. sc. Tomislav Bašić,  
- Geoinformatic and Geomatic Engineering in the Environmental Protection (007-0072974-1599), head of the project Prof. dr. sc. Damir Medak,  
- Modern Geodetic Ultrasound Methods in the Sustainable Development of the Karst Areas (007-0072974-2281), head of the project Prof. dr. sc. Boško Pribićević.

**Developed competence (knowledge and skills)**

Acquisition of knowledge and competences for independent solving of the problems appearing within the frame of scientific research work and the participation at the gatherings at home and abroad, as well as presentation and publishing of the results in the proceedings of the conferences and in scientific journals.
Types of instruction and adoption of knowledge

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Student responsibilities

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</tr>
</tbody>
</table>

Literature

Required, Optional, Internet sources

URL: [http://bib.irb.hr/pregledi](http://bib.irb.hr/pregledi) (Geomatica Croatica 0007012, Geopotencijal i geodinamika Jadrana - Geo++Adria 007-0072284-2287) (Geopotential and Geodynamics of the Adriatic Sea)

URL: [http://bib.irb.hr/pregledi](http://bib.irb.hr/pregledi) (Kompatibilnost visina u Republici Hrvatskoj 0007013, Visinska kinematika i dinamika kontinentalne Hrvatske 007-0000000-2554) (Height Compatibility and Dynamics of Continental Croatia 007-0000000-2554)

URL: [http://bib.irb.hr/pregledi](http://bib.irb.hr/pregledi) (Geodetsko-geodamički GPS-projekti u Republici Hrvatskoj 0007018, Geoinformatika i geomatičko inženjerstvo u zaštiti okliša 007-0072974-1599) (Geodetic and Geodynamic GPS Projects in the Republic of Croatia 00707018, Geoinformatics and Geomatic Engineering in the Environmental Protection 007-0072974-1599)

URL: [http://bib.irb.hr/pregledi](http://bib.irb.hr/pregledi) (Suvremene geodetske ultrazvučne metode u održivom razvoju krških područja 007-0072974-2281) (Modern Geodetic Ultrasound Methods in the Sustainable Development of Karst Areas 007-0072974-2281)
Course name: RESEARCH IN THE FIELD OF APPLIED GEODESY, Faculty of Geodesy, Zagreb

Course teacher: Prof. Miodrag Roić, PhD
Associate teachers: Prof. Vlado Cetl, PhD, Prof. Đuro Barković, PhD, Prof. Brankica Cigrovski-Detelić, PhD, Prof. Sinisa Mastelic – Ivić, PhD, Prof. Gorana Novaković, PhD, assist. prof. Rinaldo Paar, PhD, assist. prof. Mladen Zrinski, PhD, Mario Mader, PhD, assist. prof. Ante Marendić, PhD, assist. prof. Loris Redovniković, PhD, Baldo Stančić, PhD, assist. prof. Hrvoje Tomić, PhD

- Year/Semester: 1/I
- Status of the course (obligatory/optional): Optional
- Number of hours per week: 4 (S)
- ECTS credits (coefficient of student workload): 10

- Year/Semester: 1/II
- Status of the course (obligatory/optional): Optional
- Number of hours per week: 6 (W)
- ECTS credits (coefficient of student workload): 15

Description/contents of courses
The course is interdisciplinary oriented and covers the fundamental and applied research in the field of applied geodesy. The research relies mostly and is continued to the previous research funded by the Ministry of Science and Technology within the frame of the following scientific projects:

Land Consolidation in New Conditions (2-12-149), head of the project: Prof. Vjenceslav Medić, PhD

Cadastre, the Basis of Spatial Data Infrastructure (0007015), head of the project: Prof. Miodrag Roić, PhD

Geodetic Management and Monitoring of Large Construction Objects (007-0072283-1584), head of the project: Prof. Zdravko Kapović, PhD

Development of Scientific Measurement Laboratory for Geodetic Instruments (007-1201785-3539), head of the project Prof. Nikola Solarić, PhD

Developed competence (knowledge and skills)
Acquisition of knowledge and competences for independent solving of the problems appearing within the frame of scientific research work and the participation at the gatherings at home and abroad, as well as presentation and publishing of the results in the proceedings of the conferences and in scientific journals.

Types of instruction and adoption of knowledge

<table>
<thead>
<tr>
<th>Type of Instruction</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>🟢</td>
</tr>
<tr>
<td>Exercises</td>
<td>🟢</td>
</tr>
<tr>
<td>Seminar</td>
<td>🟢</td>
</tr>
<tr>
<td>Practicum</td>
<td></td>
</tr>
<tr>
<td>Independent research ✓</td>
<td>Field work</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Workshops ✓</td>
<td>Discussion ✓</td>
</tr>
</tbody>
</table>

**Student responsibilities**

<table>
<thead>
<tr>
<th>Oral exam</th>
<th>Written exam</th>
<th>Seminar work ✓</th>
<th>Essay</th>
<th>Active participation in class ✓</th>
</tr>
</thead>
</table>

**Monitoring of teaching and monitoring and evaluation of students**

<table>
<thead>
<tr>
<th>Written exam</th>
<th>Oral exam</th>
<th>Essay</th>
<th>Practical work ✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project ✓</td>
<td>Continuous knowledge test or evaluation activities</td>
<td>Research ✓</td>
<td>Seminar work ✓</td>
</tr>
</tbody>
</table>

**Literature**

**Required, Optional, Internet sources**

URL: [http://bib.irb.hr/pregledi](http://bib.irb.hr/pregledi): Komasacija zemljišta u novim uvjetima (2-12-149) (Land consolidation in New Conditions)

URL: [http://bib.irb.hr/pregledi](http://bib.irb.hr/pregledi): Katastar, temelj infrastrukture prostornih podataka (0007015) (Cadastre, the Foundation of Spatial Data Infrastructure)

URL: [http://bib.irb.hr/pregledi](http://bib.irb.hr/pregledi): Geodetsko upravljanje i praćenje velikih građevinskih objekata (007-0072283-1584) (Geodetic Management and Monitoring of Large Construction Objects)

URL: [http://bib.irb.hr/pregledi](http://bib.irb.hr/pregledi): Razvoj znanstvenog mjeriteljskog laboratorija za geodetske instrumente (007-1201785-3539) (Development of Scientific Measurement Laboratory for Geodetic Instruments)
Course name: RESEARCH IN THE FIELD OF CARTOGRAPHY, PHOTOGRAMETRY AND REMOTE SENSING IMAGERY, Faculty of Geodesy Zagreb

Course teacher: Prof. Miljenko Lapaine, PhD
Associate teachers: Prof. Nada Vučetić, PhD, Prof. Stanislav Frangeš, PhD, assist.prof. Ivka Kljajić, PhD, assist. prof. Dubravko Gajski, PhD, assist. prof. Dražen Tutić, PhD, assist. prof. Robert Župan, PhD, assist. prof. Andrija Krtalić, PhD, assist. prof. Vesna Poslončec Petrić, PhD, Ana Kuveždić Divjak, PhD, Sanja Šamanović, PhD, Martina Triplat Horvat, PhD, Mateo Gašparović, PhD

- Year/Semester: 1/I
- Status of the course (obligatory/optional): Optional
- Number of hours per week: 4 (S)
- ECTS credits (coefficient of student workload): 10

- Year/Semester: 1/II
- Status of the course (obligatory/optional): Optional
- Number of hours per week: 6 (W)
- ECTS credits (coefficient of student workload): 15
Description/contents of courses
The course is interdisciplinary oriented and cover the fundamental and applied research in the field of cartography, photogrammetry and remote sensing, and geoinformatics. The research relies mostly on and is continued to the previous research funded by the Ministry of Science and Technology, i.e. by the Ministry of Science, Education and Sports, the National Foundation for Science, Higher Education and Technological Development of the Republic of Croatia, and by the European Commission within the frame of the following projects:

In the period between 2002–2006:
Cartography and New Technologies (007011), head of the project Prof. Miljenko Lapaine, PhD

In the period between 2009–2010:
Dictionary of Cartography and Geoinformation, head of the project Prof. Miljenko Lapaine, PhD

In the period between 2007–2013:
Modern Maritime Cartography (221-0071588-3038), head of the project Nenad Leder, PhD

In the period between 2007–2013:
Cartography of the Adriatic Sea (007-0071588-1593), head of the project Prof. Miljenko Lapaine, PhD

In the period between 2012–2015:
In the period between 2015-2016:
International Research Project GIS Database of Protected Areas on the Example of Geoheritage Objects, head of the project Prof. Miljenko Lapaine, PhD

Developed competence (knowledge and skills)
Acquisition of knowledge and competences for independent solving of the problems appearing within the frame of scientific research work and the participation at the gatherings at home and abroad, as well as presentation and publishing of the results in the proceedings of the conferences and in scientific journals.

Types of instruction and adoption of knowledge

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<th>Practicum</th>
</tr>
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<tbody>
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<td>Independent research ✓</td>
<td>Field work</td>
<td>Mentoring work ✓</td>
<td>Consultation ✓</td>
</tr>
<tr>
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<td>Discussion ✓</td>
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</table>

Student responsibilities

| Oral exam | Written exam | Seminar work ✓ | Essay | Active participation in class ✓ |

Monitoring of teaching and monitoring and evaluation of students

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</tr>
</tbody>
</table>
Literature

List of all published works on projects Kartografija i nove tehnologije (0007011), Suvremena pomorska kartografija (221-0071588-3038) i Kartografija Jadrana (007-0071588-1593) dostupan je u Hrvatskoj znanstvenoj bibliografiji na adresi http://bib.irb.hr

The result of the project Cartographic and Geoinformatics Dictionary is available on the web page http://struna.ihjj.hr/