MASTER OF SCIENCE IN GEOGRAPHY

Course title: Environmental informatics

Credits: 1+3 credits

Course description:

The aim of this course is to make the students to understand the basics of spatial data collection and evaluation of parameters characterize and describe the natural environment and to applied GIS methodology. Students are able to use field measurement techniques.

Introduction to GIS. Introduction to spatial data acquisition, types and methods. Methods for field measurements. Remote sensing as primary data source. Using GNSS in geoinformatics. Pre-processing of collected data.

Public data sources, applied digital data sources (raster and vector), internet based datasets. Demonstration of applied geoinformatic systems, global and regional environmental monitoring programs.

Data processing and evaluation: application of tools for raster and vector data spatial analysis in different GIS environment. Processing and interpretation of remote sensing data. Analysis of environmental datasets in space and time. Environmental assessment for decision making processes using own and public data.

Literature:

ESA, 2013. GNSS Data Processing Book. Volume I: Fundamentals and Algorithms, http://www.navipedia.net/GNSS_Book/ESA_GNSS-Book_TM-23_Vol_I.pdf

Chuvieco, E.. Huete, A. 2010. Fundamentals of satellite remote sensing. CRC press, p.436

Lovett, A.. Appleton, K. 2008. GIS for environmental decision-making. CRC press, p.260

NovAtel, 2015. An Introduction to GNSS http://www.novatel.com/an-introduction-to-gnss/

O'Sullivan D., UnwinD. , 2010, Geographic information analysis, John Wiley&Sons

Course title: Geographical epistemology

Credits: 3+0 credits

Course description:

The main aim of this course is to introduce how geographical inquiry and the interpretation of geographical data have developed over time. The course has the intention of guiding students into the foundations of geography from an epistemological and methodological perspective. During the course students will learn about the history and development of the discipline, about the main shifts of paradigms during the history of the discipline.

The lecture provides students with a better understanding of the following themes: Historical development of geographical data collection and interpretation. The development of geography as a discipline. Major paradigms in geography. Determinism, possibilism, environmentalism. Positivism and critical geography. Quantitative and qualitative data and their interpretations. The role of quantitative and qualitative research methods. Abstractions in geography and construction of models. Spatial difference as geographical knowledge.

Literature:

Gomez, B. and Jones III, J.P. (eds) (2010) Research methods in geography. Oxford: Wiley-Blackwell.

Gregory, D. (1994) Geographical Imaginations. Oxford: Blackwell.

Hagett, P. (2001) Geography: A Global Synthesis. New Jersey: Prentice Hall.

Holt-Jensen, A. (1999) Geography. History and Concepts. London: Sage Publications.

Coursetitle: Research methods in earth sciences

Credits: 0+2 credits

Course description:

The aim of the course is to present the methods and approaches of geographical inquiry from the side of physical geography.

The course presents the main methods of geographical research, including:

Scale issues: resolution, analysis and synthesis in geography. The concepts, methods and scientific analysis of the landscape. Participatory research methods in geography. Content analysis, discourse analysis. Participant observation. Getting information about the past and un-measurable factors – paleo-data sources, proxy data. use of historical sources. Sampling methods and analysis in geography, numerical modelling in geography. Statistical analysis. Geographical processes in natural hazards. Scientific communication in geography – peer review system, basic structure of a journal manuscript.

Literature:

Gomez, B. and Jones III, J.P. (eds) (2010) Research methods in geography. Wiley-Blackwell, Oxford

Clifford, N., French, S. and Valentine, G. (eds.) Key methods in geography. Sage, London

Montello. D. R. and Sutton. P. C. 2006: An Introduction to Scientific Research Methods in Geography. Sage.

Course title: Modelling and simulation

Credits: 1+2 credits

Course description:

The aim of this course is that the students can get knowledge about the theoretical background and modern approach of the basic theory of modeling and simulation. Further aim is to give practical knowledge of software and databases that are used often in environmental and geo-informatics modeling.

Main topics are: Models in system architecture. System thinking approach. Theoretical background and classification: aims, roles, tests and processes. Carbon-cycle modelling equations: Euler- and Runge-Kutta integration methods. Transport models in air pollution. Spatial diffusion: space-time models. Network science. Artificial neural nets and its application in geography. GIS modelling, modelling with remote sensing data.

Literature:

Barabási A.L. Network Science. http://barabasi.com/networksciencebook/

Meadows M,, D. Meadows, J. Randers 2004: Limits to Growth: The 30-Year Update. Chelsea Green, 338 p.

Modelski G.(ed) 2008: Globalization as evolutionary process: modelling global change. Routledge, 444 p.

QGIS User Guide: http://docs.qgis.org

Simile tutorial: http://www.simulistics.com/tutorials.html

Wainwright, J., Mullingan M. (Eds) 2013: Environmental Modelling: Finding Simplicity in Complexity. Wiley, 4949 p.

Course title: Environmental risk assessment

Credits: 3+0 credits

Course description:

The course aims to explain the theoretical background (definitions, methodologies, strategies and management) related to Environmental Risk Assessment (ERA), discusses the different types of hazards and risks and evaluates the conclusions of past environmental incidences/catastrophes and management.

The course covers all the following main topics: definition and types of ERA. Classification of environmental hazards/risks (natural origin: earthquakes, volcanism, floods, aeolian processes and mass movements. anthropogenic origin: industrial, mining activities, transport, waste disposal) and spatial aspects of environmental risks. Methods for evaluating environmental risks and the process of ERA. Risk management strategies. Definition and classification of catastrophes. catastrophe management.

The course will provide a detailed knowledge on the definitions and methods used in ERA. Lectures present separately the different types of environmental hazards and demonstrate the importance of geographic knowledge in ERAs. Besides the lectures on the theoretical background, past events (catastrophes) will be also demonstrated and evaluated together with the MSc students. The students will have a comprehensive understanding of the complex approach necessary for ERAs.

Literature:

Bates, R. J. (1992): Disaster Recovery Planning Networks, Telecommunications, and Data Communications. McGraw-Hill, ISBN 0--7-004128-8

O'Brien, M. (2002): Making better environmental decisions: an alternative to risk assessment

Wisner, B, Gaillard, JC, Kelman, Ilan (2012): The Routledge Handbook of Hazards and Disaster Risk Reduction. 875 p.

Smith K. (2013): Environmental Hazards: Assessing Risk and Reducing Disaster. 478 p.

Bobrovsky, T. (2013): Encyclopedia of Natural Hazards, 1175 p.

Course title: Environmental geography

Credits: 3+0 credits

Course description:

The aims of the course are to explore the interaction of human society with its natural environment and to highlight the major conflicts of this interaction. The above relationship is addressed primarily from the direction of the society, i.e. how humans affected and affect the environment, and what were and will be the consequences of these actions.

The course goes through the following topics in order to provide an overview on human-environment interactions concerning different environmental domains and also introducing a historical perspective. Interaction of humans and their environment in pre-historical and historical times. How humans affected their environment in the Holocene, and how environmental changes affected human society. Human impact on the living environment. Introducing the major types of human interventions on flora and fauna, being among the most sensitive elements environmental elements. Direct and indirect effects on the spreading and clearing of certain species and associations, and relevant consequences. Impacts on land cover. The global perspective of changing land-use and land cover. Major trends and their relation to climate and environmental change. Methods of assessment, indices of change, future tendencies. Human impact on soils. How intensifying agriculture changes physical and chemical soil properties. Soil erosion, salinization, acidification, compaction on a global scale. Hazards related to soil alteration. Major trends in management to reduce harmful consequences. Human impact on waters. Major ways of affecting water and sediment quantity and quality in terms of rivers, lakes, ground water bodies, and coastal systems. Hazards and conflicts related to water scarcity and flooding. Human impact on biogeochemical cycles. The basic setup, material and energy flow of most important biogeochemical cycles (carbon, nitrogen, phosphorus, oxygen), how they are altered by human activity and how does this alteration affect climatic and environmental processes. Environmental conflicts in the urban landscape. The effect of urbanization on environmental elements and the ecosystem. Urban hotspots of air and water pollution. Waste production and waste disposal related conflicts. Introduction of some major scenarios of future environmental change. The basics of scenario building. The role of scenarios in decision making and environmental politics. Environmental ethics. The environment as an ethical question. The role of technology in changing environmental attitude. The value of nature and environmental elements. The idea of ecosystem services.

By completing the course students will understand the interrelation between environmental change and past and present human impacts, and will recognize the effect of locally exerted changes on global processes. Students will also be able to outline the complex mechanisms underlying the human-environment interaction.

Literature:

Castree N., Demeritt D., Liverman D., Rhoads B. (eds): A Companion to Environmental Geography. Wiley-Blackwell, 2009.

Goudie A.: The Human Impact on the Natural Environment: Past Present and Future, 7th edition. Wiley-Blackwell, 2013. (student material at: http://bcs.wiley.com/he-bcs/Books?action=index&bcsId=8207&itemId=1118576578)

Withead M.: Environmental Transformations: the geography of the Anthropocene. Routledge, 2014.

Course title: Environmental systems

Credits: 3+1

Course description:

The aim of the course is to give an overview on the functioning of environmental systems; to analyze the interrelationships between the environmental systems and society; enables the students to adopt an informed personal response to different environmental issues, and to increase the environmental awareness and responsibility of students.

The main topics are: Basic characteristics of the environmental systems, their functioning and modelling. Examples on different environmental systems. Definition of equilibrium in the different sciences. Threshold, sensitivity, disturbing factors and responses of the environmental systems. The aggression wave. Resistance of the environmental systems. Steps of the sensitivity analysis and its practical applications. River catchments as systems, and the (de)coupling of their elements. Human impact on effective catchments, in different environments. Human impact on rivers and on the surface. Case study: sensitivity analysis on main Hungarian rivers, and ways of sustainable management.

Literature:

Walter J. Weber, Jr.2000: Environmental Systems and Processes: Principles, Modeling, and Design. Wiley, 598.

Brunsden D. 2001: A critical assessment of the sensitivity concept in geomorphology. Catena 42, 99-123.

Thomas M.F. 2001: Landscape sensitivity in time and space, an introduction. Catena 42, 83-98.

Thorn CE., Welford M.R. 1994: The equilibrium concept in Geomorphology. Annals of the Assotiation of American Geographers, 84/4, 666-696.

Usher MB. 2001: Landscape sensitivity: from theory to practice. Catena 42, 375-383.

Werritty A., Leys F. 2001: The sensitivity of Scottish rivers and upland valley floors to recent environmental change. Catena 42, 251-273.

Course title: Landscape planning

Credits: 3+0 credits

Course description:

Based on some case studies the main issues of the landscape planning, landscape protection and landscape rehabilitation will be introduced. The course will introduce some sustainable planning case studies of protected areas, agricultural areas, mining areas, and the linear infrastructure (road) network. The students will get an introduction into planning methodology based on grouped-work-based planning exercises.

Main issues and definitions of landscape planning: Hierarchy and typology of landscapes, landscape potentials, landscape functions ecosystem services and carrying capacity of landscapes. Anthropogenic pressures of landscapes. Levels of hemeroby and its evaluation. Ecological stability, landscape indicators. Landscape metrics as indicators.

Landscape analyses and evaluation: anthropogenic landscape changes, land use and land cover, landscape monitoring. Historical and cultural landscapes. Landscape character assessment.

Urban Landscapes: Urbanization, urban ecosystems and it's characteristics. Urban land-use. Urban heat islands (UHI). Green areas as regulators of UHI. Basics of green way and blue way planning. Ecosystem services in urban areas

Main aims and principles of landscape planning in different landscape types: Methodologies of landscape planning in natural or semi-natural protected areas. Methodologies of landscape planning in agricultural areas. Methodologies of landscape planning in mining areas. Methodologies of landscape planning in case of the road network planning.

Literature:

Marsh, W.M. 2005 Landscape planning :environmental applications 4th ed. New Jersey, Wiley,

Ozyavuz M. (ed) 2012 Landscape Planning 372 p. Publisher: In Tech, Chapters published ISBN 978-953-51-0654-8,

Course title: Political geography of the world economy

Credits: 3+2 credits

Course description:

The aim of the course is to present the geographical factors influencing contemporary global economic and political trends. The students will be familiar with the mechanisms influencing space and spatial processes – with a special emphasis on ideas, theories and policies.

The lectures overview the analytical frameworks and theories in relation to the socio-spatial processes of global economy. Furthermore, a historical geographical overview of economic epochs in the modern era. We analyse and evaluate the economic aspects of globalisation, the operation of transnational monopoly capitalism, the geographical aspects of neoliberalism. The effects of cultural turn in geographical research will be also discussed. Some geographical aspects of path dependent development will be analysed.

Main topics of the course: The theoretical framework for analysing the world economy. The cultural turn in geography. The conceptual background of globalisation. Actors in globalisation. Explaining globalisation. Globalisation and economy. Globalisation and society. Geographical aspects of global migration. Contradictions of neoliberalism. The effects of neoliberalism on various geographical scales. Prosperous and declining regions in the world economy.

Literature:

Amin, A. (1995): Post-Fordism: A Reader. Blackwell, Oxford

Dicken, P. (2015): Global shift. Sage Publications Ltd., London

Harvey, D. (2007): A Brief History of Neoliberalism. Oxford University Press, Oxford

Knox, P., Angnew, J., Mccarthy, L. (2014): The Geography of the World Economy. Routledge, Abingdon

Lechner, F.J., Boli, J. eds (2011): The globalization reader. Blackwell, Oxford

Course title: Space and society

Credits: 3+1 credits

Course description:

The aim of this course is to give an overview about the changing relationship between society and space from different disciplinary perspectives (e.g. economic, political, environmental) and at different geographical scales (from global to local). The course discusses different theoretical and methodological perspectives within human geography, providing comprehensive knowledge on the versatile interconnections between the physical environment and the human world.

During the lectures the following topics will be introduced and discussed: The evolution of concepts on space and the development of human geographical thought. Space and place. Challenges of globalization and the weakening role of space. Flows of capital, culture and people. Place and identity. Cultural landscapes. Territoriality and power. Spatial disparities. Global environmental problems.

Literature:

Atkins, P., Simmons, I., Roberts, B. (1998) People, Land and Time. Arnold, London.

Duncan, J.S., Johnson, N.C., Schein, R.H. (eds) (2004) A Companion to Cultural Geography. Blackwell, Oxford.

Holt-Jensen, A. (1999) Geography. History and Concepts. Sage Publications, London.

Mitchell, D. (2000) Cultural Geography. A Critical Introduction. Blackwell, Oxford.

Valentine, G. (2001) Social Geographies: Space and Society. Pearson Education

Course title: Regional policy and regional development

Credits: 3 + 2

Course description:

The aim of lecture is to introduce the role of history, objective system, tools, institutes and actors in regional policy and development.

The lecture involves various aspects of regional policy and development. The main topics are: Basic principles of regional development and planning. Development of regional policy in the European Union. The most important principles of regional policy and their changes in the European Union. The most significant European documents for development. Regions of regional policy implementation. Relationship between regional policy and regional development. Main features of regional policies outside the European Union and Europe. Models of geographies of development in the Third World.

Literature:

Bachtler, J., Berkowitz, P., Hardy, S., Muravska, T. (2017): EU Cohesion Policy: Reassessing performance and direction. Routledge. 320 p. ISBN: 9781138224643

Pálné Kovács, I., Scott, J., Gál, Z. (2013): Territorial cohesion in Europe: for the 70th anniversary of the Transdanubian Research Institute. Institute for Regional Studies, Centre for Economic and Regional Studies, Hungarian Academy of Sciences. 516 p. ISBN: 9789639899698

Potter, R. B., Binns, T., Elliott, J. A., Smith, D. (2008): Geographies of development: An introduction to development studies. Pearson Education. 545 p. ISBN: 9780132228237

Storper, M. (1997): The Regional World: Territorial Development in a Global Economy. Guildford Press. 338 p. ISBN: 9781572303157

Teló, M. (2016): European Union and New Regionalism: Competing Regionalism and Global Governance in a Post-Hegemonic Era. Taylor and Francis. 506 p. ISBN: 9781317139270

Course title: Presentation skills

Credits: 0+2

Course description:

Presentation skills are crucial to almost every aspect of academic/business life, from meetings, interviews, conferences, to trade shows/job fairs, the course tries to familiarize students with public presentation and it different forms. The main objective of the course is to introduce students to presentation methods and rules in public speech, scientific presentation

The main topics of the course are: Presentation and its role in everyday life. Presentation types. Structure of presentations. Self Evaluation methods. Facts and Fears of Public Speaking. Structure. Body Language. Verbal Delivery. Common Mistakes. Introducing Topics. Structured Closing.

Literature:

Tracy B. (2008): Speak to Win: How to Present with Power in Any Situation, AMACOM, p. 208, ISBN: 978-0-8144-0157-6

Tufte E.R. (2001): The Visual Display of Quantitative Information, Graphic Press, ISBN: 0-9613921-4-2

Course title: Social geography

Credits: 3+0

Course description:

Social geography is the branch of human geography that is most closely related to social theory, sociology in particular. The aim of the course is to provide basic knowledge about social geography and its origins. The course is also dealing with the relation of social phenomena and its spatial components, the spatial nature of social networks.

Main topics are. Origin of social geography (traditional geography, quantitative, qualitative and behaviourist geographies, Origin of social geography II. (determinist, possibilist, morpholigic and functional phases of human geography). Major trends of social geography (Anglo-saxon and European social geography). The Munich-concept of social geography. Base pillars of the Munich-concept, major concepts, methods and skills in social geography. Social geography in Hungary and in Europe.

Literature:

Jackson, P., Smith, S. J. (2014): Exploring Social Geography, Routledge, London ISBN 978-0-415-74972-5

Del Casino V. J. (2009): Social Geography: A Critical Introduction. Wiley-Blackwell, Oxford ISBN: 9781405154994

Course title: Environmental protection in practice

Credits: 0+3 credits

Course description:

The aim of the course is to give an introduction to the theory, background and various fields of environmental protection and nature conservation, and to show examples on good practices.

Institutional background of environmental protection and nature conservation. Role of NGOs and local stakeholders. Regional environmental protection.

The role and influence of mining. Soil conservation in practice. Flood protection and hydrological questions in environmental protection and nature conservation. Waste management. Transportation and environmental protection. Nature conservation and national parks. Environmental protection programs of various regional levels. Environmental changes and their effects on environmental protection and nature conservation.

Literature:

Andrew Farmer (2012) Handbook of Environmental Protection and Enforcement: Principles and Practice. Earthscan, 296 p.

National Research Council (U.S.) 2012. Science for Environmental Protection: The Road Ahead. National Academies Press. Washington, D.C. 233 p.

European Commission 2014. General Union environment action programme to 2020. Living well, within the limits of our planet. Luxembourg: Publications Office of the European Union, 87 p.

Course title: Sectorial planning

Credits: 3+2 credits

Course description:

The aim of the course to give introduction on planning and development, discussing its theoretical background, basics in regional analytical methods and their application in the interpretation of economic and social processes. During the course, the students will get adequate information about the indicators of territorial imbalances and concentrations. Moreover, this course provides an overview of the advantages and disadvantages of the statistical indicators and their practical exploits are also interpreted. Detailed knowledge of the usability and limitations of correlation, regression and cluster analysis based on some statistical programs.

The course covers the following main topics: Basic descriptive statistics, mean values, standard deviation, variance, normalization, spatial mean values, determination of the center of gravity. Herfindahl-Hirschman index, Dual index, Hoover index, Gini index, Lorenz curve. Shift-share analysis, entropy, correlations, partial correlations and linear regression, and their limitations: for instance hetero-dynamics, multi-collinearity. Hierarchical and K-middle cluster analysis and its limitations.

Literature:

Friedmann, J. (2011). Insurgencies: essays in planning theory. London. New York: Routledge. 272 p.

Glasson, J., Marshall, T. (2007). Regional planning. London. New York: Routledge. 316 p.

Hall, P. Tewdwr-Jones, M. (2011). Urban and Regional Planning. London. Routledge. 304 p.

Knieling, J. Othengrafen, F. (eds., 2009): Planning Cultures in Europe. Decoding Cultural Phenomena in Urban and Regional Planning. Farnham. Burlington, VT: Ashgate. 368 p.

Davis, C. (2013): SPSS for Applied Sciences : Basic Statistical Testing, Collingwood, Vic : CSIRO PUBLISHING. 175 p. ISBN: 9780643107106. 9780643107113

Walter Isard et al. (1998): Methods of interregional and regional analysis, Ashgate, Aldershot, Hants, England. Brookfield, Vt. 490 p. ISBN: 1 85972 410 8

Course title: Project management

Credits: 4+0

Course description:

This course will cover the basic tools, skills, and knowledge necessary to successfully manage a project through its inception, design, planning, construction, and transition phases. Project Management focuses on the management and implementation of projects. The course relies on a basic project management framework in which the project life-cycle is broken into organizing, planning, monitoring, controlling and learning from old and current projects. Within the framework the course aim is to make students learn the methodologies and tools necessary for each aspect of the process as well as the theories upon which these are built.

The course covers three important aspects of project management: The theory, methods and quantitative tools used to effectively plan, organize, and control construction projects. Efficient management methods revealed through practice and research. Hands-on, practical project management knowledge.

Literature:

Berkun S., (2005): Art of Project Management. Cambridge, MA: O'Reilly Media,

Lewis J., (2002): Fundamentals of Project Management, 2nd ed., American Management Association.

Heerkens G., (2001): Project Management (The Brief case Book Series). McGraw-Hill,

Course title: Project work

Credits: 0+3

Course description:

The purpose of the project work is to give practical knowledge what student have learned in theory. Preparation of project work is an independent research activity. The examinee independently - through consultations - researches a topic, and has to demonstrate within a chosen topic that the concepts, theory and practice is combined

The recommended consultation stages are as follows: Discussion on the topic. The selection of literature and materials related to the subject. A timetable and evaluation plan. Draft submission of the concept with the literature used. First version, "rawcopy". Submission of completed project work. Correction and final product compilation.

Literature:

Gomez, B. and Jones III, J.P. (eds) (2010) Research methods in geography. Oxford: Wiley-Blackwell.

Gregory, D. (1994) Geographical Imaginations. Oxford: Blackwell.

Hagett, P. (2001) Geography: A Global Synthesis. New Jersey: Prentice Hall.

Holt-Jensen, A. (1999) Geography. History and Concepts. London: Sage Publications.

Clifford, N., French, S. and Valentine, G. (eds.) Key methods in geography. Sage, London

Montello. D. R. and Sutton. P. C. 2006: An Introduction to Scientific Research Methodsin Geography. Sage.

Course title: Environmental planning models

Credits: 2+3 credits

Course description:

Within the frame of the course students can get knowledge on the theoretical background of the environmental planning and modern approaches of the basic theory of modeling. Further aim is to give practical knowledge about several software often used in modeling during environmental planning processes.

Environmental planning models in general, their aims, roles and processes. Theoretical background and classification. Problems of the scale. From point based models via watershed based models to regional models. Transport models in hydrogeology and air pollution. Questions of interpolation. 3D models in environmental planning.

Examples of good-practices: Modelling infiltration and contamination in unsaturated soil and sediment. Hydro-geological modelling with PMWIN in order to plan and harmonize water uses. Runoff modelling to forecast and prevent floods. Immission and air pollution models. Interpolation with Surfer software. Spatial modeling and visualization using GIS software.

Literature:

Grayson, R. B. – Moore, I. D. – McMahon, T. A. 1992: Physically Based Hydrologic Modeling 1-2. Water Resources Research 26-28,.No. 10, 2639-2666.

Dragun, J. 1998: The Soil Chemistry of Hazardous Materials. Amherst, Massachusetts. 311-359.

http://www.cadfamily.com

http://trials.swstechnology.com/archive/Software/UnSatSuite/UnSat2203/Tutorials/VS2DT_Lab.pdf

http://www.waterloohydrogeologic.com/products/groundwater-modeling/unsat-suite-plus

http://soilerosion.net/doc/models_menu.html

http://www.hec.usace.army.mil/software/hec-ras/

Course title: Hydrological planning

Credits: 3+2 credits

Course description:

The course aims to explain the theoretical background (definitions, methodologies, relations, legal background) related to hydrological planning and its application in practice. Highlighted aim is to understand the water-related risks and hazards (e.g. floods, flash floods, inland-excess water, drought), especially in urban and rural environments.

The course covers all the following main topics: relations of the hydrological processes, definitions in the fields of hydrology and hydrogeology, hydrology of rivers, sediment transport, groundwater, extreme events, climate change and human adjustment to the hydrological processes. The Water Framework Directive of the EU, typology of water bodies, sustainable water management. Legal background of HP, administrative arrangements.

The course will provide a detailed knowledge on the definitions and methods used in HP. Lectures present the relations of the different water resources, the water management possibilities. The practical exercises help site allocations in industry and agriculture considering the aspects of water management (resources, contaminants, legal background). As a result, students will be able to participate actively in different phases of regional and local planning considering the approaches of environmental protection and water management.

Literature:

Directive 2000/60/EC of the European Parliament and of the Council

Hendriks, Martin R. (2010). Introduction to Physical Hydrology. Oxford University Press.

Maidment, David R. ed. (1993). Handbook of Hydrology. New York: McGraw-Hill

Pokrajac, Howard ed. (2010): Advanced Simulation & Modeling for Urban Groundwater Management.

GWP (2000): Integrated Water Management

Course title: Visualization

Credits: 0+2 credits

Course description:

The aim of this course is to understand the basics of digital visualization of spatial data using desktop and online applications.

The topics include: Introduction to spatial objects, co-ordinate systems and projections, scale and generalization. Data and map types. Map elements. Methods for digital thematic mapping. 3D visualization. Dynamic maps, animation of spatial data. Output formats. Methods for online spatial data publishing. Map Design for Interactive and Mobile Devices.

Literature:

Pinde, F., Sun J. 2010, Web GIS: principles and applications. Esri Press.

Gretchen, N.P. 2009: GIS Cartography - A Guide to Effective Map Design.ISBN: 978-1-4200-8213-5, CRC Press, Boca Raton, 215 p.

Muehlenhaus I, 2013: Web Cartography: Map Design for Interactive and Mobile Devices, . ISBN: 9781439876220, CRC Press, 262 p.

Kraak, M.J., F.J. Ormeling 2010: Cartography: Visualization of Spatial Data, 3rd edition. ISBN: 978-0-273-72279-3, Pearson, Harlow, 236 p.

Cartwright, W., M.P. Peterson, G. Gartner 2007: Multimedia Cartography. ISBN 978-3-540-36651-5, Springer Berlin Heidelberg, 546 p.

Perez, A.S. 2012, Open Layers Cookbook. ISBN: 978-1849517843, Packt Publishing, Birmingham, 284 p.

Course title: Environmental monitoring

Credits: 3+0 credits

Course description:

The aim of this course is to give an introduction on the elements and structure of monitoring systems, and to give a general description on planning monitoring works. It introduces various data bases and methods to store large amount of data.

International monitoring databases. Aims of the EU's water framework directive, its main principles and parts. Monitoring systems connected to the water framework directive.

Monitoring of the quality and quantity of surface and subsurface waters. Planning a monitoring network.

Monitoring of soils. Monitoring systems of soil protection, remediation. Sampling strategies, at-a-site sampling and measurements. Errors occurring during sampling and chemical analysis.

Monitoring systems around waste disposal sites: planning, construction and maintenance. Environmental impact assessments within the frame of monitoring. Remote sensed data in environmental impact assessment, theoretical background of the method. Satellite images and monitoring possibilities.

Literature:

Janick F. Artiola, Ian L. Pepper and Mark L. Brusseau (edts): Environmental Monitoring and Characterization. Elsevier Science &Technology Books, ISBN: 978-0-12-064477-3

Gertz E. 2012: Environmental Monitoring with Arduino: Building Simple Devices to Collect Data About the World Around Us. Maker Press, ISBN-13: 978-1449310561

Kim, Young, Platt, Ulrich (Eds.) 2008: Advanced Environmental Monitoring. Springer

Course title: Vegetation analysis and evaluation

Credits: 3+2 credits

Course description:

The aim of the course is to give a basic knowledge on evaluation and mapping of vegetation and green infrastructure, which are necessary parts of planning and impact assessment procedures. The students have to be able to carry out different types of analyses on various vegetation types (protected areas, green corridors, urban trees, etc.) on different spatial scales, as a part of an integrated spatial assessment (field survey, building GIS databases, basic GIS analysis methods, and critical evaluation of these types of assessments). The course will also cover the complex evaluation methodologies of multifunctional green infrastructure (ecosystem services, nature-based solutions), and their use in spatial planning. For that, the knowledge of GIS, statistical and model-based assessment methods are needed, which are comprised in the practical part of the course.

Theoretical background of the analysis of vegetation (elements and structure of green infrastructure, condition assessment, raster- and vector-based mapping, etc.). Evaluation methods in planning processes, with special regard on urban green spaces as core elements in spatial planning. Assessment methods of multifunctional characteristics of green infrastructure (ecosystem services, nature-based solutions) and main elements of their assessment methods (cascade model, matrix approach, mapping methods, etc.). Topics of the practice: GIS, statistical and model-based evaluation methods of green infrastructure planning and assessment. Planning task in an exact study area.

Literature:

Takács G., MolnárZs. (2009): Habitat mapping (National Biodiversity Monitoring System)

http://novenyzetiterkep.hu/sites/novenyzetiterkep.hu/files/Takacs_Molnar_2009_Habitat_Mapping_2nd_edition.pdf

Townend J.: Statistics for environmental and biological scientists (2002) Wiley

Martin Kent: Vegetation Description and Data Analysis (2011) Wiley

Burkhard B., Maes J. (2017): Mapping Ecosystem Services. Pensoft Publishers

Course title: Urban geography and urban planning

Credits: 3+1 credits

Course description:

The main aim of this course is to give an overview about contemporary concepts of urban geography with special attention to relevant social processes and urban economic restructuring. During the course students will also learn about the history and current practice of urban planning. The lecture provides students with a better understanding of the global and local processes that shape cities today.

Special attention will be paid on the following themes: Key concepts in urban geography. Historical forms of cities. Changing morphology of cities. Urban social movements. Urban inequalities and social justice. Socio-spatial dynamics of the city. Urban geographies of housing and workplaces. Foundation of urban planning. Studying urban agglomerations.

These themes are explored in cities around the world and in East Central Europe, highlighting similarities and differences in the transformation of urban spaces and places.

Literature:

Bridge, G., Watson, S. (eds.) (2013) The New Blackwell Companion to the City. Wiley-Blackwell.

Hall, P. (2012) Urban and Regional Planning. Routledge

Hall, T., Barrett, H. (2012) Urban Geography (4th edition).Routledge.

Course title: Regional analysis

Credits: 0+2 credits

Course description:

The aim of the course is to acquaint students with the basics regional analytical methods and their application in the interpretation of economic and social processes. During the course, the students will get adequate information about the indicators of territorial imbalances and concentrations. Moreover, this course provides an overview of the advantages and disadvantages of the statistical indicators and their practical exploits are also interpreted. Detailed knowledge of the usability and limitations of correlation, regression and cluster analysis based on some statistical programs.

The course covers the following main topics: Basic descriptive statistics, mean values, standard deviation, variance, normalization, spatial mean values, determination of the center of gravity. Furthermore, the following concentrations and interpretations are: Herfindahl-Hirschman index, Dual index, Hoover index, Gini index, Lorenz curve. Shift-share analysis, entropy, correlations, partial correlations and linear regression, and their limitations: for instance hetero-dynamics, multi-collinearity. Furthermore hierarchical and K-middle cluster analysis and its limitations.

Literature:

Friedmann, J. (2011). Insurgencies: essays in planning theory. London. New York: Routledge. 272 p.

Glasson, J., Marshall, T. (2007). Regional planning. London. New York: Routledge. 316 p.

Hall, P., Tewdwr-Jones, M. (2011). Urban and Regional Planning. London. New York: Routledge. 304 p.

Knieling, J., Othengrafen, F. (eds., 2009): Planning Cultures in Europe. Decoding Cultural Phenomena in Urban and Regional Planning. Farnham. Burlington, VT: Ashgate. 368 p.

Davis, C. (2013): SPSS for Applied Sciences : Basic Statistical Testing, Collingwood, Vic : CSIRO PUBLISHING. 175 p. ISBN: 9780643107106. 9780643107113

Isard W., et al. (1998): Methods of interregional and regional analysis, Ashgate, Aldershot, Hants, England. Brookfield, Vt. 490 p. ISBN: 1 85972 410 8

Course title: Regional planning

Credits: 3+0 credits

Course description:

The main objective of the course is to introduce students to regional planning and governance, including theoretical bases, historical background, planning regimes and approaches, plan types and their contents, and the stages and methods of planning process, using international examples but with a strong focus on the European Union.

The main topics covered by the course are as follows: Planning theories (main concepts, spatial approach in planning, planning approaches, principles of regional planning, regional and land-use planning). History of European regional planning. Regional planning in the EU today. Stages of strategic and community-led planning (community coordination, strategy, programming, monitoring). Planning at various spatial scales (national, regional, local).

Literature:

Friedmann, J. (2011). Insurgencies: essays in planning theory. London. New York: Routledge. 272 p.

Glasson, J., Marshall, T. (2007). Regional planning. London. New York: Routledge. 316 p.

Hall, P. Tewdwr-Jones, M. (2011). Urban and Regional Planning. London. New York: Routledge. 304 p.

Knieling, J. Othengrafen, F. (eds., 2009): Planning Cultures in Europe. Decoding Cultural Phenomena in Urban and Regional Planning. Farnham. Burlington, VT: Ashgate. 368 p.

Course title: Project management

Credits: 4+0 credits

Course description:

This course will cover the basic tools, skills, and knowledge necessary to successfully manage a project through its inception, design, planning, construction, and transition phases. Project Management focuses on the management and implementation of projects. The course relies on a basic project management framework in which the project life-cycle is broken into organizing, planning, monitoring, controlling and learning from old and current projects. Within the framework the course aim is to make students learn the methodologies and tools necessary for each aspect of the process as well as the theories upon which these are built.

The course covers three important aspects of project management: The theory, methods and quantitative tools used to effectively plan, organize, and control construction projects. Efficient management methods revealed through practice and research. Hands-on, practical project management knowledge.

Literature:

Berkun S., (2005): Art of Project Management. Cambridge, MA: O'Reilly Media,

Lewis J., (2002): Fundamentals of Project Management, 2nd ed., American Management Association.

Heerkens G., (2001): Project Management (The Brief case Book Series). McGraw-Hill,

Course title: Project work

Credits: 0+3 credits

Course description:

The purpose of the project work is to give practical knowledge what student have learned in theory. Preparation of project work is an independent research activity. The examinee independently - through consultations - researches a topic, and has to demonstrate within a chosen topic that the concepts, theory and practice is combined

The recommended consultation stages are as follows: Discussion on the topic. The selection of literature and materials related to the subject. A timetable and evaluation plan. Draft submission of the concept with the literature used. First version, "rawcopy". Submission of completed project work. Correction and final product compilation.

Literature:

Gomez, b. and Jones III, J.P. (eds) (2010) Research methods in geography. Oxford: Wiley-Blackwell.

Gregory, D. (1994) Geographical Imaginations. Oxford: Blackwell.

Hagett, P. (2001) Geography: A Global Synthesis. New Jersey: Prentice Hall.

Holt-Jensen, A. (1999) Geography. History and Concepts. London: Sage Publications.

Clifford, N., French, S. and Valentine, G. (eds.) Key methods in geography. Sage, London

Montello. D. R. and Sutton. P. C. 2006: An Introduction to Scientific Research Methods in Geography. Sage.

Course title: Rural geography and rural development

Credits: 3+1 credits

Course description:

Topics:

The aims of lecture: to introduce the following issues: main features of classical geographical knowledge linked to rural geography, the basic knowledge on modern rural development and skills of programmed modern rural development interventions.

The lecture involves: Definitions of rural settlements, forms and functions of rural settlements. Urban-rural dichotomy and definitions, types of rural settlements (towns, villages, scattered settlements). Roles of rural areas played in rural development policies. Networks and spatial movements of rural areas. The accessibility as a main rural challenge. Rural development functions of micro-regions/rural districts. Social, economic, ecologic and cultural and social elements of integrated modern and postmodern rural development. Features and challenges of integrated rural development policies in Europe and in the World.

Literature:

Bosworth, G., Sommerville, P. 2016: Interpreting rurality: multidisciplinary approaches. Routledge. 304 p. ISBN: 9781138687158

Potter, R.B., Binns, T., Elliott, J. A. – Smith, D. (2008): Geographies of development: An introduction to development studies. Pearson Education. 545 p. ISBN: 9780132228237

Shucksmith, M., Brown, D. L. (eds.) 2016: Routledge International Handbook of Rural Studies. Routledge. 698 p. ISBN: 9781138804371

Woods, M. 2011: Rural. Routledge. 336 p. ISBN: 9780415442404

Course title: Applied Geoinformatics

Credits: 2+3 credits

Course description:

The aims of the course are that the students can get knowledge about the theoretical background of the spatial planning, and modern approaches of the basic theory of modeling. Further aim is to give practical knowledge about several software that are often used in modeling during spatial planning processes.

Local and regional environmental planning models in general, their aims, roles and processes. Theoretical background and classification. Problems of the scale. From point based models via watershed based models to regional models. Transport models in water supply and air pollution. Questions of interpolation. 3D models in spatial planning.

Examples of good-practices: Modelling infiltration and contamination in unsaturated soil and sediment. Spatial modelling with PMWIN in order to plan and harmonize water uses. Runoff modelling to forecast and prevent floods. Immission and air pollution models. Interpolation. Water quality models to minimalize environmental loading. Spatial modelling and visualization using GIS software.

Literature:

Grayson, R. B., Moore, I. D., McMahon, T. A. 1992: Physically Based Hydrologic Modeling 1-2. Water Resources Research 26-28,.No. 10, 2639-2666.

Dragun, J. 1998: The Soil Chemistry of Hazardous Materials. Amherst, Massachusetts. 311-359.

Hengl, T., Reuter, H.I. (eds) 2009: Geo-morphometry: Concepts, Software, Applications. Elsevier, 3-140.

Jolánkai, G. 1997: Basic river water quality models. UNESCO, Paris (http://unesdoc.unesco.org/images/0012/001213/121363eo.pdf)

Wainwright, J. –Mulligan, M. 2004: Environmental Modelling: Finding Simplicity in Complexity. John Wiley&Sons, 225-253.

http://www.cadfamily.com

http://trials.swstechnology.com/archive/Software/UnSatSuite/UnSat2203/Tutorials/VS2DT_Lab.pdf

http://www.waterloohydrogeologic.com/products/groundwater-modeling/unsat-suite-plus

http://soilerosion.net/doc/models_menu.html

http://www.hec.usace.army.mil/software/hec-ras/

Course title: Sustainable water management

Credits: 3+2 credits

Course description:

The course aims to explain the theoretical background (definitions, methodologies, relations, legal background) related to hydrological planning and its application in practice. Highlighted aim is to understand the water-related risks and hazards (e.g. floods, flash floods, inland-excess water, drought), especially in urban and rural environments.

The course covers all the following main topics: relations of the hydrological processes, definitions in the fields of hydrology and hydrogeology, hydrology of rivers, sediment transport, groundwater, extreme events, climate change and human adjustment to the hydrological processes. the Water Framework Directive of the EU, typology of water bodies, sustainable water management. legal background of HP, administrative arrangements.

The course will provide a detailed knowledge on the definitions and methods used in HP. Lectures present the relations of the different water resources, the water management possibilities. The practical exercises help site allocations in industry and agriculture considering the aspects of water management (resources, contaminants, legal background). As a result, students will be able to participate actively in different phases of regional and local planning considering the approaches of environmental protection and water management.

Literature:

Directive 2000/60/EC of the European Parliament and of theCouncil

Hendriks, Martin R. (2010). Introduction to Physical Hydrology.OxfordUniversity Press.

Maidment, David R. ed. (1993).Handbook of Hydrology. New York: McGraw-Hill

Pokrajac, Howard ed. (2010): Advanced Simulation &Modeling for Urban Groundwater Management.

GWP (2000): Integrated Water Management

Course title: Urban green infrastructure

Credits: 3+2 credits

Course description:

The aim of the course is to give a knowledge base on evaluation and mapping of green infrastructure, which are necessary parts of planning and impact assessment procedures. The students have to be able to carry out different types of analyses of green infrastructure (protected areas, green corridors, urban trees, etc.) on different spatial scales, as a part of an integrated spatial assessment (field survey, building GIS databases, basic GIS analysis methods, and critical evaluation of these types of assessments). The course will also cover the complex evaluation methodologies of multifunctional green infrastructure (ecosystem services, nature-based solutions), and their use in spatial planning. For that, the knowledge of GIS, statistical and model-based assessment methods are needed, which are comprised in the practical part of the course.

Topics of the lectures: Theoretical background of the analysis of green infrastructure (elements and systems of green infrastructure, condition assessment, raster- and vector-based mapping, etc.). Evaluation methods in planning processes, with special regard on urban green spaces as core elements in spatial planning. Assessment methods of multifunctional characteristics of green infrastructure (ecosystem services, nature-based solutions) and main elements of their assessment methods (cascade model, matrix approach, mapping methods, etc.)

Topics of the practice: GIS, statistical and model-based evaluation methods of green infrastructure planning and assessment. Planning task in an exact study area.

Literature:

Takács G., MolnárZs. (2009): Habitat mapping (National Biodiversity Monitoring System). http://novenyzetiterkep.hu/sites/novenyzetiterkep.hu/files/Takacs_Molnar_2009_Habitat_Mapping_2nd_edition.pdf

Townend J.: Statistics for environmental and biological scientists (2002) Wiley

Martin Kent: Vegetation Description and Data Analysis (2011) Wiley

Burkhard B., Maes J. (2017): Mapping Ecosystem Services. Pensoft Publishers

Course title: Geophysical hazards and risks

Credits: 3+0 credits

Course description:

The course aims to explain the theoretical background of plate tectonic related geophysical events (e.g. earthquake, volcanism) and to evaluate the risk of these events. The course will provide a detailed knowledge on the definitions and methods used in evaluation of the risks related to the geophysical hazards.

Main topics of the course: Scientific background of geophysical hazards. Theory of global plate tectonics. Theoretical background of earthquakes, classification, measurements, scales. Areas of earthquake hazard on Earth, large earthquake events. Causes and consequences of earthquakes. Basics of volcanology, processes and phenomena, hazard classification. Areas of volcanic activity, and the related hazards and risks. Direct and indirect effects and impacts of volcanism (e.g. lahar, tsunami).

Literature:

Anderson, D.L. (2013): New theory of the Earth. Cambridge University Press, 400 p.

de Boer, J.Z., Sanders, D.T. (2002): Volcanoes in human history: The far-reaching effects of major eruptions. Princeton University Press, 320 p.

Heiken, G. (2013): Dangerous neighbors: volcanoes and cities. Cambridge University Press, 196 p.

Marti, J., Ernst, G.J. (2008): Volcanoes and environment. Cambridge University Press, 488 p.

Plumer, C., Mcgeary, D., Carlson, D. (1999):Physical Geology. WCB McGraw, New York.

Prichard, H.M., Alabaster, T., Harris, N.B.W., Neary, C.R. ed. (1993): Magmatic processes and plate tectonics. London, The Geological Society.

Thompson, G. R., Turk, J. (1998): Introduction to physical geology. Saunders College Publishing, Orlando

Wicander, R., Monroe, J.S. (1999): Essentials of geology. Wadswort Publishing Company, Belmont.

Course title: Meteorological hazards, their forecast and prediction, warning systems

Credits: 3+0 credits

Course description:

Within the course the students will learn about the theoretical background of meteorology related hazards (e.g. thunderstorm, supercell, intensive rainfall events) and to evaluate the risk of these events. The course will provide a detailed knowledge on the definitions and methods used in evaluation of the risks related to the meteorological hazards. Theoretical background of meteorological hazards: Genesis and meteorological hazards of synoptic scale weather phenomena (tropical cyclon, cyclone storm). Genesis and meteorological hazards of meso-scale weather phenomena (thunderstorm, supercell, intensive rainfall events). Climate change in global, regional, urban and micro scales

Measurements of the necessary/typical parameters (used in the model later), mapping elements at risk: Measurement and monitoring the weather, forecast and now casting methods, weather warning systems. Climate monitoring systems in global, regional and urban scale

Modelling: Correction of the outputs of climate models using climate measurement data. Application of micro scale climate model

Private work: data acquisition, modelling, evaluation and risk analysis based on real/fictive dataset: Analysis of the effect of the climate change using climate model data in an arbitrary study area. Analysis of the climate modification effect of urban areas using the urban climate monitoring system

Management of the hazards and risks: Risk of the severe weather events for aviation, transportation infrastructure and industrial production. Risk analysis of the severe weather, techniques for the prevention and mitigation. Hazardous effects of the climate change, climate mitigation and adaptation strategies

Literature:

Moran JM, Moran MD, 1996: Meteorology: The Atmosphere and Science of Weather. New York, MacMillan, 1996

Lamb HH, 2013: Weather, Climate and Human Affairs (Routledge Revivals): A Book of Essays and Other Papers. Routledge

Carlson TN, 1991: Mid-latitude weather systems. New York, Routledge

Oke TR, 2002: Boundary layer climates. Routledge

Foken T, Nappo CJ, 2008: Micrometeorology. Springer Science & Business Media

Course title: Social aspects of environmental risks, hazards and justice

Credits: 3+0 credits

Course description:

The course aim is to introduce students the social aspects of natural and environmental risks. The course describes various justice concepts which can be adapted in policy making. Students also will be able to measure risk, hazard and the degree of environmental injustices.

Approaches and perspectives of environment and society systems: The social construction of nature and environment definitions which are related to space, time and place. Political ecology, differences and its geographical aspects will be defined.

Understanding social connections to environment: Introduction to intertwined society and nature. Living with perils in the 21st century and the meaning of risk society. Describes the representations of risks in urban and rural regions via individually and team processed case studies.

Perceptions of climate change caused disasters, civilizational catastrophes and coping strategies: What climate variability and vulnerability means in social context, what are the most common strategies to perceive risks and hazards. How can risks and hazard be measured in inhabited urban and rural areas using GIS technologies? What are the most debated social reactions and conflicts following environmental disasters or industrial catastrophes? GIS methods are presented via different case studies.

Environmental justice, concepts, evidences and politics: Introduction to the definition and the three main elements of the claim-making of environmental justice. Environmental inequalities and their measurement processes in urban areas including air pollution, flood, waste sites, inland excess water, earthquake and hurricane. Environmental justice analyses in team work using theoretical frameworks and GIS.

Environmental management and urban planning: How planning can reduce risks and hazards in urban regions. How environmental justice can be reached by clear, fair and just environmental management and urban planning via introducing best and worst practices.

Literature:

Harvey D. 1996. Justice, Nature and the Geography of Difference, Wiley-Blackwell,480 p.,

Holifield, R., Porter, M., Walker, G. 2010.Spaces of Environmental Justice, Wiley-Blackwell, 272 p., R.

Joffe, H., Rossetto, T., Adams, J. : Cities at Risk - Living with Perils in the 21st Century, Springer, 194 p.,

Steiner, F., Butler, K. 2007. Planning and Urban Design Standards, American Planning Association, 448 p.,

Walker, G. 2012. Environmental Justice: Concepts, Evidence and Politics, 248 p., ISBN: 978-0-41558-974-1

Course title: Research methods in physical geography

Credits: 3+0 credits

Course description:

Topics:

The aim of the course is to introduce the basics of designing physical geographic research projects, field and laboratory data collection methods that can be used to study physical geographical forms and processes, application of the research results.A scientific approach to environmental risk and hazard studies. Fundamental research concepts.

Data collection and errors. Measurements in the physical environment. Behavioural observations and archives. Explicit reports: surveys, interviews and tests. Experimental and non-experimental research designs. Sampling and its strategies. Statistical data analysis. Data display. Reliability and validity. Ethics in scientific research.

Literature:

Clifford N., French S., Valentine G. 2010: Key Methods in Geography. SAGE Publications, 568.

Gomez B., Jones J.P. (eds) 2010: Research Methods in Geography: A Critical Introduction. Wiley, 480.

Goudie A. (ed) 2006: Geomorphological techniques. George Allen & Unwin, 395.

Montello D., Sutton P. 2013: An Introduction to Scientific Research Methods in Geography and Environmental Studies. SAGE Publications, 328.

Proctor J.P. 1998: Ethics in geography: giving moral form to the geographical imagination. Area 30/1, 8-18.

Spence N., Owens A. 2011: Methods of geographical analysis. University of London