# Institute of Biology and Earth Sciences

**winter semester:**

**Module I MODERN LABORATORY TECHNIQUES IN EARTH AND ENVIRONMENTAL SCIENCES**

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|---|---|
| Laboratory analysis of fine sediments | 30 ECTS |
| Geographical information systems (QGIS) | |
| Atomic absorption spectroscopy – how to quantify metals in environmental samples | |
| Microscopy in environmental studies | |
| Protein extraction and separation | |

**Module II ECOTOURISM I**

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| Travel photography | 30 ECTS |
| National parks in the world: nature and management | |
| Outdoor navigation | |
| Tourism and culture in Latin America | |
| Ecotourism and sustainability | |

**summer semester:**

**Module I ANTHROPOCENE**

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| GIS in disaster prevention | 30 ECTS |
| Human impacts on landscape | |
| Past and contemporary climate change | |
| Living in a polluted enivironment | |
| Changing polar environments | |

**Module II ECOTOURISM II**

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|---|---|
| Weather and climate in tourism and travel | 30 ECTS |
| Iconic landscapes as tourist destinations | |
| Tatra Mts & Zakopane | |
| Bees, apitourism and apitherapy | |
| Tourism on volcanoes | |

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# Course card

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|---|---|---|---|
| Course title | **Laboratory methods of fine sediment analysis** | | |
| Semester (winter/summer) | winter | ECTS | 6 |
| Lecturer(s) | Dorota Chmielowska-Michalak, PhD | | |
| Department | Department of Physical Geography | | |

Course objectives (learning outcomes)

After completing the course, the student can characterize the protocol for laboratory analysis for measurement of particle size and particle shape of fine grained sediments (from 0.5 microns to several millimeters). The student is able to carry out analysis of grain size and shape using specialist equipment and can interpret the results.

Prerequisites

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| Knowledge | The student recognizes the interrrelationships between the elements of the geographical environment. Basic statistics. |
| Skills | The student should be able to:<br>- recognize and classify the basic types of rocks,<br>- characterize the weathering covers formed as a result of physical and chemical weathering processes from various types of rocks in various climatic conditions,<br>- characterize the most important physical and chemical properties of the major soil types,<br>- recognize the basic landforms and describe basic types of relief using cartographic materials. |
| Courses completed | |

Course organization

| Form of classes | W (Lecture) | Group type | | | | | |
|---|---|---|---|---|---|---|---|
| | | A (large group) | K (small group) | L (Lab) | S (Seminar) | P (Project) | E (Exam) |
| Contact hours | | | | 15 | | | |

Teaching methods:

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| Course is conducted as a laboratory exercises and during the course students carry out individual or group projects. The analysis of fine grained material is partially carried out using Morphologi G3SE (produced by Malvern). Discussion of analysis results based on literature. |

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | x | x | | x | | | | | |

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|---|---|
| Assessment criteria | |

| | |
|---|---|
| Comments | |

Course content (topic list)

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| 1. Research of textural features of the Quaternary sediments (selected methods)<br>2. Grain size analysis as a tool for classifying sedimentary environments<br>3. Laboratory analysis for measurement of particle size and particle shape of fine grained sediments |

**Compulsory reading**

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|---|
| Blott, S. J., Pye, K. 2001. GRADISTAT: a grain size distribution and statistics package for the analysis of unconsolidated sediments. Earth Surface Processes and Landforms, 26(11), 1237-1248.<br><br>Blott, S., Pye, K., 2008. Particle shape: a review and new methods of characterization and classification. Sedimentology 55, 31-63.<br><br>Folk RL, Ward WC. 1957. Brazos River bar: a study in the significance of grain size parameters. Journal of Sedimentary Petrology 27: 3-26.<br><br>Chmielowska, D., Woronko, B., Dorocki, S.. 2021. Applicability of automatic image analysis in quartz-grain shape discrimination for sedimentary setting reconstruction. Catena, 207, 105602.<br><br>Morphologi G3 Serise, August 2008. User Manual. Mano 410. Malvern Instruments Ltd (Issue 1.1) |

**Recommended reading**

Cailleux, A., 1942. Les actiones eoliennes periglaciaires en Europe. Mémoires de la Société géologique de France. Paléontologie 41, 1–176 (in French).

Polakowski, C., Sochan, A., Bieganowski, A., Ryżak, M., Földényi, R., Tóth, J., 2014. The influence of the sand particle shape on particle size distribution measured by laser diffraction method. International Agrophysics 28, 195-200.

Mycielska-Dowgiałło, E., 1993. Estimates of Late Glacial and Holocene aeolian activity in Belgium, Poland and Sweden. Boreas 22, 165-170.

Campaña, I., Benito-Calvo, A., Pérez-González, A., de Castro, J. B., Carbonell, E., 2016. Assessing automated image analysis of sand grain shape to identify sedimentary facies, Gran Dolina archaeological site (Burgos, Spain). Sed. Geol. 346, 72-83. doi: 10.1016/j.sedgeo.2016.09.010

Varga, G., Kovács, J., Szalai, Z., Cserháti, C., Újvári, G., 2018. Granulometric characterization of paleosols in loess series by automated static image analysis. Sed. Geol. 370, 1-14. doi:10.1016/j.sedgeo.2018.04.001

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# Course card

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|---|---|---|---|
| Course title | **Geographical Information Systems (QGIS)** | | |
| Semester (winter/summer) | winter | ECTS | 6 |
| Lecturer(s) | Rafał Kroczak PhD | | |
| Department | Department of Physical Geography | | |

Course objectives (learning outcomes)

After completing the course the student will recognize the most common types of spatial data and their extensions, as well as the methods of their acquisition. The student will be able to create digital maps, analyze them and prepare them for publication. The student will also know how to perform basic GIS analyzes.

Prerequisites

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|---|---|
| Knowledge | Basic knowledge of cartography. |
| Skills | Basic computer skills, knowledge of Microsoft or/and Libre Office package. |
| Courses completed | - |

| Course organization | | | | | | | |
|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | |
| | | A (large group) | K (small group) | L (Lab) | S (Seminar) | P (Project) | E (Exam) |
| Contact hours | | | | 15 | | | |

Teaching methods:

The course is conducted with QGIS software. It is recommended to use personal laptops.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | successful completion of all | | | | | | |

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| Assessment criteria | Pass: on the basis of successful completion of all exercises ordered by the teacher during the laboratory sessions (all partial exercises must be completed). Each student may be absent from a maximum of 2 sessions for whatever reason. |

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| Comments | Each lecturer sets the method and date of delivering the exercise for final exam |

Course content (topic list)

1. Introduction to QGIS. Functionalities and extensions.
2. Layers and their properties. Attribute table.
3. Geoprocessing and analysis tools
4. Working with the digital elevation model
5. Filtering and spatial queries
6. Spatial relations
7. Raster data and algebra maps
8. Final editing of maps (linear scale, legend, cartographic grid, descriptions, map orientation).

Compulsory reading

Bryndal, T., Kroczak, R. (2019). Reconstruction and characterization of the surface drainage system functioning during extreme rainfall: the analysis with use of the ALS-LIDAR data—the case study in two small flysch catchments (Outer Carpathian, Poland). *Environmental Earth Sciences*, *78*(6), 1-16.

Fidelus-Orzechowska J., Wrońska-Wałach D., Cebulski J., Żelazny M. (2018). Effect of the construction of ski runs on changes in relief in a mountain catchment (Inner Carpathians, Southern Poland). *Science of the Total Environment* 630, 1298-1308.

Fidelus J., Kroczak R., Jucha W., Stasiak P. (2015). Interactive maps as an innovative tourist service – a comparison of cartographic websites of Polish National Parks. [w:] Managing the quality of tourism services, Lublin.

Recommended reading

Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic information science and systems*. John Wiley & Sons.

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# Course card

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|---|---|
| Course title | **Atomic absorption spectroscopy – how to quantify metals in environmental samples** |

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|---|---|---|---|
| Semester (winter/summer) | winter | ECTS | 6 |
| Lecturer(s) | Assoc. Prof. Łukasz Binkowski | | |
| Department | Institute of Biology and Earth Sciences | | |

Course objectives (learning outcomes)

The course considers modern laboratory techniques and methods for measuring metal concentrations (mercury, cadmium, lead, and others) in environmental samples. The main emphasis is put in the course on the following:

- preparation of samples for metal analyses
- flame and electrothermal atomic absorption spectroscopy
- cold vapor atomic absorption spectroscopy
- quality control system in instrumental laboratories

Students learn how the techniques work and can try themselves as analysts

Prerequisites

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|---|---|
| Knowledge | principles of chemistry, physics and mathematics |
| Skills | communicative English |
| Courses completed | - |

| Course organization | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | | | | | |
| | | A (large group) | | K (small group) | | L (Lab) | | S (Seminar) | | P (Project) | | E (Exam) | |
| Contact hours | | | | | | 15 | | | | | | | |

Teaching methods:

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| Laboratory classes with samples preparation and analysis with different atomic absorption spectroscopy techniques. Preparation of report from laboratory classes including method description and results obtained with the instrument. Individual work of students outside of the classroom (reading scientific articles, consultation with the course lecturer and working on the individual report from laboratory classes). |

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | X | X | | X | | X | | | |

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| Assessment criteria | The student graduate from the course based on active attendance at the laboratory classes. The quality of the report from the laboratory activities will be assessed |

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| Comments | Course taught in English. |

Course content (topic list)

1. Introduction to sampling methods of environmental samples.
2. Preparation of the samples collected for further analyses.
3. Method of instrument calibration.
4. Flame and electrothermal atomic absorption spectrometry.
5. Cold-vapour atomic absorption spectrometry.
6. Results recalculations.
7. A quality control system in instrumental laboratories

Compulsory reading

Binkowski Ł.J., Meissner W., Trzeciak M., Izevbekhai K., Barker J. 2016. Lead isotope ratio measurements as indicators for the source of lead poisoning in Mute swans (Cygnus olor) wintering in Puck Bay (northern Poland). Chemosphere 164, 436–442."
Binkowski Ł.J., Sawicka-Kapusta K. 2015. Lead poisoning and its in vivo biomarkers in Mallard and Coot from hunting activity areas. Chemosphere 127, 101–108
Publications by the course coordinator including a detailed descrpition of instrumental method used

Recommended reading
Skoog D., Holler F., Crouch S. 2007: Principles of Instrumental Analysis. Thomson Brooks/Cole.

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# Course card

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|---|---|---|---|
| Course title | **Microscopy in environmental studies** | | |
| Semester (winter/summer) | winter | ECTS | 6 |
| Lecturer(s) | Assoc. Prof. Gabriela Gołębiowska-Paluch | | |
| Department | Institute of Biology and Earth Sciences, | | |

Course objectives (learning outcomes)

The course presents general principles of microscopy and how it is used to study environmental samples. It contains presentation of the structure and principle of operation as well as the possibility of practical use of the light microscope, fluorescence microscope, Nomarski contrast, dark field and polarized light microscope. During the course students will exercise various methods of preparation, staining and imaging possibilities as well as they will observe environmental objects like microbial, plant and animal samples from water, soil and other environmental samples. In addition, it will be possible to observe crystalline and paracrystalline substances in polarized light.

Prerequisites

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|---|---|
| Knowledge | Principles of biology |
| Skills | English medium stage |
| Courses completed | - |

| Course organization | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | | | | | |
| | | A (large group) | | K (small group) | | L (Lab) | | S (Seminar) | | P (Project) | | E (Exam) | |
| Contact hours | | | | | | 15 | | | | | |

Teaching methods:

Laboratory classes with samples preparation and analysis under the microscope. Preparation of report from laboratory classes including method description and images taken under the microscope during classes by using digital camera. Individual work of students outside of the classroom (reading scientific articles, consultation with the course lecturer and working on the individual report from laboratory classes).

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | X | X | | X | | X | | | |

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| Assessment criteria | The student graduate from the course based on active attendance at the laboratory classes. Quality of the report from the laboratory activities will be assessed. |

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| Comments | Course taught in English. |

Course content (topic list)

1. Construction and principles of operation of light and fluorescence microscope. Types of lighting and filters. Operation of the NIKON H600L microscope, change of filters, camera settings, observation of differences, use of the NIKON Nis-elements program and documentation of the obtained images.
2. Observation in Nomarski contrast, polarized light and dark field microscopy of biological and non-biological samples.
3. Autofluorescence - what and why gives fluorescence and how to use it. Preparation of material for autofluorescence observation. Observation of autofluorescence in various biological material.
4. Non-specific and specific fluorescent dyes: principle of operation and result.
5. Cell viability tests in reaction to environmental factors.

Compulsory reading

https://www.nikoninstruments.com/en_EU/Learn-Explore/Techniques/Fluorescence
https://www.microscopyu.com/techniques/fluorescence/introduction-to-fluorescence-microscopy
The indicated web-pages give clear description of the subjects presented during the course, together with schemes and illustrations. Much more is available for those who want to deepen their understanding of fluorescence.

Recommended reading

Lembicz, M., Miszalski, Z., Kornaś, A., & Turnau, K. (2021). Cooling effect of fungal stromata in the Dactylis-Epichloë-Botanophila symbiosis. *Communicative & integrative biology*, *14*(1), 151-157.

Dubas, E., Custers, J., Kieft, H., Wędzony, M., & van Lammeren, A. A. (2014). Characterization of polarity development through 2-and 3-D imaging during the initial phase of microspore embryogenesis in *Brassica napus* L. Protoplasma, 251(1), 103-113.

Szechyńska-Hebda, M., Hebda, M., Mierzwiński, D., Kuczyńska, P., Mirek, M., Wędzony, M., ... & Karpiński, S. (2013). Effect of cold-induced changes in physical and chemical leaf properties on the

resistance of winter triticale (× *Triticosecale*) to the fungal pathogen *Microdochium nivale*. Plant Pathology, 62(4), 867-878.

Dubas, E., Golebiowska, G., Zur, I., & Wedzony, M. (2011). *Microdochium nivale* (Fr., Samuels & Hallett): cytological analysis of the infection process in triticale (× *Triticosecale* Wittm.). Acta physiologiae plantarum, 33(2), 529-537.

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# Course card

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|---|---|---|---|
| Course title | **Protein extraction and separation** | | |
| Semester (winter/summer) | winter | ECTS | 6 |
| Lecturer(s) | Assoc. Prof. Gabriela Gołębiowska-Paluch | | |
| Department | Institute of Biology and Earth Sciences | | |

Course objectives (learning outcomes)

Knowledge on basic proteomics methods. Experience in laboratory work, experiment design, protein isolation and purification, spectrophotometry, gel electrophoresis, protein visualisation and electropherogram analysis. Western Blot preparation and immunostaining.

Prerequisites

| | |
|---|---|
| Knowledge | Principles of biology |
| Skills | English medium level |
| Courses completed | - |

| Course organization | | | | | | | |
|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | |
| | | A (large group) | K (small group) | L (Lab) | S (Seminar) | P (Project) | E (Exam) |
| Contact hours | | | | 15 | | | |

Teaching methods:

Laboratory activities including lab rules, protein isolation and purification, spectrophotometry, gel electrophoresis, protein visualisation and electropherogram analysis. Western Blot preparation and immunostaining. Individual work of students outside of the classroom (reading scientific articles, consultation with the course lecturer and working on the individual report from laboratory classes).

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | X | X | | X | | X | | | |

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|---|---|
| Assessment criteria | The student graduate from the course based on active attendance at the laboratory classes. Quality of the report from the laboratory activities will be assessed. |

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|---|---|
| Comments | Course taught in English. |

Course content (topic list)

Methods of protein isolation and purification.
Gel electrophoresis – types, principles and application.
Electropherogram – protein visualisation and analysis.
Western Blot – types, principles and application.

Compulsory reading

Jozefowicz, A. M., Döll, S., & Mock, H. P. (2020). Proteomic Approaches to Identify Proteins Responsive to Cold Stress. In *Plant Cold Acclimation* (pp. 161-170). Humana, New York, NY.

Perlan Technologies Polska Sp. z o. o. – webinars and tutorials.

Bio-Rad – webinars and tutorials.

Recommended reading

Żur I., **Gołębiowska G.**, Dubas E., Golemiec E., Matušíková I., Libantová J., Moravčiková J. **2013.** β-1,3-glucanase and chitinase activities in winter triticales during cold hardening and subsequent infection by *Microdochium nivale*. Biologia 68(2): 241-248, DOI: 10.2478/s11756-013-0001-0, ISNN: 0006-3088 (Print), 1336-9563 (Online), Wydawca: Versita.

**Gołębiowska-Pikania* G.**, Golemiec* E. **2015.** Cold-enhanced gene expression of the foliar thiol-specific antioxidant protein in triticale (x*Triticosecale* Wittm.) seedlings resistant to *Microdochium nivale* (Samuels & I.C. Hallett) infection. Acta Biologica 22: 98-117, DOI:10.18276/ab.2015.22-08.

Gawrońska* K., **Gołębiowska-Pikania* G. 2016.** The effects of cold-hardening and *Microdochium nivale* infection on oxidative stress and antioxidative protection of the two contrasting genotypes of winter triticale. European Food Research and Technology, 242(8): 1-10, DOI: 10.1007/s00217-015-2630-8, ISNN: 1438-2377 (Print) 1438-2385 (Online), Wydawca: Springer.

**Gołębiowska-Pikania* G.**, Kopeć* P., Surówka E., Krzewska M., Dubas E., Nowicka A., Rapacz M., Wójcik-Jagła M., Malaga S., Żur I. **2017.** Changes in protein abundance and activity involved in freezing tolerance acquisition in winter barley (*Hordeum vulgare* L.). Journal of Proteomics, 169: 58-72, DOI: 10.1016/j.jprot.2017.08.019, ISSN: 1874-3919, Wydawca: Elsevier.

**Gołębiowska-Pikania* G.**, Kopeć P., Surówka E., Janowiak F., Krzewska M., Dubas E., Nowicka A., Kasprzyk J., Ostrowska A., Malaga S., Hura T., Żur I. **2017.** Changes in protein abundance and activity induced by drought during generative development of winter barley (*Hordeum vulgare* L.). Journal of Proteomics, 169:73-86. 10.1016/j.jprot.2017.07.016, ISSN: 1874-3919, Wydawca: Elsevier.

Krzewska, M., **Gołębiowska-Pikania G.**, Dubas, E., Gawin, M., & Żur, I. **2017.** Identification of proteins related to microspore embryogenesis responsiveness in anther cultures of winter triticale (× *Triticosecale* Wittm.). Euphytica, 213(8), 192. Open Access, 10.1007/s10681-017-1978-1, issn: 0014-2336, Wydawca: Springer.

**Golebiowska GJ,** Bonar E, Emami K, Wędzony M. **2019**. Cold-modulated small proteins abundance in winter triticale (x *Triticosecale*, Wittm.) seedlings tolerant to the pink snow mould (*Microdochium nivale,* Samuels and Hallett) infection. *Acta biochimica Polonica*, *66*(3), 343-350.

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# Course card

| | | | |
|---|---|---|---|
| Course title | **Ecotourism and sustainability** | | |
| Semester (winter/summer) | winter | ECTS | 6 |
| Lecturer(s) | Assoc. Prof. Joanna Zawiejska | | |
| Department | Institute of Biology and Earth Sciences | | |

Course objectives (learning outcomes)

The course focuses on the relationship between ecotourism development and environmental quality. Current trends in ecotourism and nature tourism are discussed, their potential advantages and impacts, and their significance for sustainable development, biodiversity conservation and natural areas in the context of ongoing global environmental change. After completing the course, the student is able to indicate and characterise the positive and potentially negative practices in ecotourism and their effects, describe the relations and between climate change and tourism.

Prerequisites

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|---|---|
| Knowledge | The student has sufficient understanding of environmental processes and current global environmental change |
| Skills | |
| Courses completed | - |

| Course organization | | | | | | | |
|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | |
| | | A (large group) | K (small group) | L (Lab) | S (Seminar) | P (Project) | E (Exam) |
| Contact hours | | | 15 | | | | |

Teaching methods:

Mini-lectures, individual and group work, group discussion based on presentations of assignments. Field based research assignment.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | X | | X | | X | |

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|---|---|
| Assessment criteria | Final test (50%) and presentation of assignments (40%), 10% discussion |

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| Comments | - |

Course content (topic list)

Tourism and goals of sustainable development. Nature-based tourism vs. responsible and sustainable tourism.
New trends in ecotourism.
The impacts of mass and ecotourism on the environment.
Proactive tourism: can tourism improve quality of the environment?
Climate change and green tourism.
The role of science and education in shaping envronmental awareness, conservation and socio-economic development. Transboundary ecotourism initiatives.
The role of certification. Greenwashing and eco-pirates.
Food and enotourism: linking environment and local culture.

Compulsory reading

Balmford A, Beresford J, Green J, Naidoo R, Walpole M, et al. (2009) A Global Perspective on Trends in Nature-Based Tourism. PLoS Biol 7(6):

Bardolet-Puigdollers M, Fusté-Forné F. (2023) A Sustainable Future for Food Tourism: Promoting the Territory through Cooking Classes" *Gastronomy* 1: 32-43. https://doi.org/10.3390/gastronomy1010004

Macdonald C, Turffs D., McEntee K, Elliot J, Wester J, (2023) The relationship between tourism and the environment in Florida, USA: A media content analysis, Annals of Tourism Research Empirical Insights, 4,1 https://doi.org/10.1016/j.annale.2023.100092

Recommended reading
A selection of thematic papers and websites.

**Course card**

| | | | |
|---|---|---|---|
| Course title | **National parks in the world: nature and management** | | |
| Semester (winter/summer) | winter | ECTS | 6 |
| Lecturer(s) | Joanna Fidelus-Orzechowska, PhD | | |
| Department | Institute of Biology and Earth Sciences | | |

Course objectives (learning outcomes)

Upon completion of the course, the student has knowledge of the variation in natural conditions, tourist infrastructure as well as management and conservation strategies in national parks (NP) in the world. The participant understands the specificity of selected NP and the need and challenges for their sustainable development.

Prerequisites

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|---|---|
| Knowledge | General knowledge of the natural environment. |
| Skills | Ability to work with cartographic data, geoportals. Data acquisition from geoportals |
| Courses completed | - |

| Course organization | | | | | | | |
|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | |
| | | A (large group) | K (small group) | L (Lab) | S (Seminar) | P (Project) | E (Exam) |
| Contact hours | | | 15 (K) | | | | |

Teaching methods:

Analysis of websites, geoportals of individual national parks: natural conditions, use and management methods. Discussion of the functioning of selected national parks - limitations, challenges, management approaches.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | x | x | | x | | | | | | | |

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| Assessment criteria | Attendance in class, active participation in discussions, project work. |

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| Comments | As part of the course, depending on the size of the group, a visit to one of the national parks in southern Poland is possible. |

Course content (topic list)

1. What is a national park? Types of protected areas: regional comparison.
2. Environmental diversity of selected national parks in the world
3. Accessibility and park management strategies and policies around the world.
4. Infrastructure in the national parks.
5. Management of tourist traffic in popular national parks.
6. Challenges of conservation efforts in areas of high natural value.
7. Role of national parks in environmental education.

Compulsory reading

Staiff, R., Bushell, R., & Kennedy, P. (2002). Interpretation in national parks: Some critical questions. *Journal of sustainable tourism*, *10*(2), 97-113.

Davis, C. R., & Hansen, A. J. (2011). Trajectories in land use change around US National Parks and challenges and opportunities for management. *Ecological Applications*, *21*(8), 3299-3316.

Delekta, A., Fidelus-Orzechowska, J., & Chrobak, A. (2020). Expert's Perceptions towards Management of Tourist Traffic in Protected Areas Based on the Tatra Mountains. *Journal of Environmental Management & Tourism*, *11*(2 (42)), 443-459.

Fidelus-Orzechowska, J., Gorczyca, E., Bukowski, M., & Krzemień, K. (2021). Degradation of a protected mountain area by tourist traffic: case study of the Tatra National Park, Poland. *Journal of Mountain Science*, *18*(10), 2503-2519.

Recommended reading

Manning, R. E. (2002). How much is too much? Carrying capacity of national parks and protected areas. In *Monitoring and management of visitor flows in recreational and protected areas. Proceedings of the Conference held at Bodenkultur University Vienna, Austria* (pp. 306-313).

Nepal, S. K. (2002). Mountain ecotourism and sustainable development. *Mountain research and development*, *22*(2), 104-109.

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Erasmus+

# Course card

| | | | |
|---|---|---|---|
| Course title | **Outdoor navigation** | | |
| Semester (winter/summer) | winter | ECTS | 6 |
| Lecturer(s) | Paweł Kroh, Ph.D. | | |
| Department | Institute of Biology and Earth Sciences | | |

Course objectives (learning outcomes)

After the course student will be able (i) to carry out outdoor positioning and navigation with use of map, compass and local topography; (ii) make topographical sketches, (iii) use an outdoor GPS (mark positions, navigating to waypoints and use of tracks); (iv) prepare tracks in PC and download to receiver.

Prerequisites

| | |
|---|---|
| Knowledge | n/a |
| Skills | n/a |
| Courses completed | n/a |

| Course organization | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | | | | | |
| | | A (large group) | | K (small group) | | L (Lab) | | S (Seminar) | | P (Project) | | E (Exam) | |
| Contact hours | | | | | | 15 | | | | | |

Teaching methods:

Introductory training and 2-day field classes with practical tasks.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | x | | | | | | x | | | |

| | |
|---|---|
| Assessment criteria | Execution of given tasks, essay |

| | |
|---|---|
| Comments | |

Course content (topic list)

1. Map types and possibilities of their use outdoor.
2. Basic compass theory and use of compass together with maps
3. Azimuth determining and its use for self-positioning on map and in field
4. Methods of making basic sketches and maps of locations and walk trails
5. GPS receiver functions
6. Navigation with GPS receiver – marking positions, saving tracks
7. Use of PC for planning and downloading waypoints and tracks to digital maps.

Compulsory reading

'How to read a map', wikihow, http://wikihow.com/Read-a-Map

Recommended reading

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# Course card

| | | | |
|---|---|---|---|
| Course title | **Tourism and culture in Latin America** | | |
| Semester (winter/summer) | winter | ECTS | 6 |
| Lecturer(s) | Anna Winiarczyk-Raźniak, PhD | | |
| Department | Department of Socio-economic Geography | | |

Course objectives (learning outcomes)

Student associates the presence of attractions and tourist values of Latin American countries with issues related to the social and natural diversity of the region and its history. The student identifies the most important tourist attractions in each country and the preparation of tourism products corresponding to their specificity. The student understands the causes of the region's cultural diversity of Latin America and the need to preserve its heritage.

Prerequisites

| | |
|---|---|
| Knowledge | - |
| Skills | - |
| Courses completed | - |

| Course organization | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | | | | | |
| | | A (large group) | | K (small group) | | L (Lab) | | S (Seminar) | | P (Project) | | E (Exam) | |
| Contact hours | | | | | | 7 | | 8 | | | | | |

Teaching methods:

Classes are in the form of seminars and exercises, the student must consult, perform and present an individual project.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | X | | | X | | X | X | | | | |

| | |
|---|---|
| Assessment criteria | Completion of the course obtained student, who has made correctly individual project and received a positive assessment of project presentation. |

| | |
|---|---|
| Comments | - |

Course content (topic list)

1. What is the region of Latin America?
2. Environmental conditions of the development of tourism in Latin America
3. Social, economic and cultural conditions of the development of tourism in Latin America and its regional differentiation
4. Characteristic of tourist attractions in selected Latin American Countries.
5. Mexico as an example of the diversity of the tourist offer.
6. Andean countries and their specific tourist conditions and possibilities.

Compulsory reading

Wilson T.D., 2008, The Impacts of Tourism in Latin America, Latin American Perspectives, 35; 3
Cabezas A., 2008, Tropical Blues: Tourism and Social Exclusion in the Dominican Republic, Latin American Perspectives, 35; 3
Wilson T.D., 2008, Economic and Social Impacts of Tourism in Mexico, Latin American Perspectives, 35; 3

Recommended reading

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**Course card**

| | | | |
|---|---|---|---|
| Course title | **Travel Photography** | | |
| Semester (winter/summer) | Summer | ECTS | 6 |
| Lecturer(s) | Tomasz Padło, PhD | | |
| Department | Department of Art Research | | |

Course objectives (learning outcomes)

The aim of the course is to familiarize students with the basics of photographic composition and the use of photography in travel and in the promotion of tourist destinations.

Prerequisites

| | |
|---|---|
| Knowledge | - |
| Skills | Basics of using a camera |
| Courses completed | - |

| Course organization | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | | | | | |
| | | A (large group) | | K (small group) | | L (Lab) | | S (Seminar) | | P (Project) | | E (Exam) | |
| Contact hours | | | | 15 | | | | | | | |

Teaching methods:

Discussion, photography workshop in Krakow, preparation of tourist brochure.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | x | x | | x | | x | x | | | | |

| | |
|---|---|
| Assessment criteria | Students are obliged to actively participate in classes and complete the final project |

| | |
|---|---|
| Comments | - |

Course content (topic list)

1. Rules of composition in photography
2. Basics of using the camera
3. The importance of photography in tourism
4. What is and what makes a good travel photograph?
5. Creating a tourist folder based on photos

Compulsory reading

Sontag, S. 1978, On Photography, Penguin Books, London
Rakić, T., Chambers, D. (Eds.). 2011, An introduction to visual research methods in tourism (Vol. 9). Routledge.

Recommended reading

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# Course card

| Course title | **Changing polar regions** | | |
|---|---|---|---|
| Semester (winter/summer) | summer | ECTS | 6 |
| Lecturer(s) | Dorota Chmielowska-Michalak, PhD | | |
| Department | Institute of Biology and Earth Sciences | | |

Course objectives (learning outcomes)

After completing the course, the student has general knowledge of the natural environment of the polar regions (including the Arctic and Antarctica), and of the ongoing change and processes in the polar region as a result of climate change and human activity. They recognize the global significance of environmental change in the polar regions.

Prerequisites

| | |
|---|---|
| Knowledge | The student should know and understand general characteristics and patterns of processes in the natural environment |
| Skills | The student should be able to:<br>- characterize exogenous processes<br>- explain the relationships between the main elements of the geographical environment. |
| Courses completed | - |

| Course organization | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | | | | | |
| | | A (large group) | | K (small group) | | L (Lab) | | S (Seminar) | | P (Project) | | E (Exam) | |
| Contact hours | | | | 15 | | | | | | | |

Teaching methods:

During the course students prepare presentation on a selected topic and after that discussion is conducted.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | X | | | | X | |

| Assessment criteria | Final test (50%) and presentation evaluation (50%) |
|---|---|

| Comments | - |
|---|---|

Course content (topic list)

The natural environment of Antarctica and the Arctic.
Climate change in the high latitudes.
Glaciers and permafrost: change and hazards.
Geomorphological processes in the periglacial zone.
Transformation of the polar landscape.
Tourism in Polar Regions.
Future of the polar regions.

Compulsory reading


1. Benninghoff, W. S. (1987). The Antarctic ecosystem. Environment International, 13(1), 9–14. doi:10.1016/0160-4120(87)90037-7
2. Bargagli R. 2005. Antarctic Ecosystems. Environmental contamination, climate change, and human impact. – Ecological Studies 175, Springer-Verlag, Berlin – Heidelberg
3. https://www.grida.no/publications/998
4. https://nsidc.org/home
5. Thematic articles


Recommended reading

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# Course card

| | | | |
|---|---|---|---|
| Course title | **GIS in natural disaster prevention** | | |
| Semester (winter/summer) | summer | ECTS | 6 |
| Lecturer(s) | Ph.D. Paweł Kroh | | |
| Department | Institute of Biology and Earth Sciences | | |

Course objectives (learning outcomes)

Course presents the use of Geographical Information Systems in prevention of landslides and floods. During classes students will learn (i) how to use raster and vector data to identify flood hazard areas; (ii) how to use digital elevation models for landslide mapping. Use of GIS in mountain rescue and avalanche prediction will also be presented.

Prerequisites

| | |
|---|---|
| Knowledge | |
| Skills | Basic GIS skills |
| Courses completed | |

| Course organization | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | | | | | |
| | | A (large group) | | K (small group) | | L (Lab) | | S (Seminar) | | P (Project) | | E (Exam) | |
| Contact hours | | | | | | 15 | | | | | |

Teaching methods:

At the beginning of the course short lecture will be presented. Then, after a brief introduction and intstructions to each topic students will proceed with laboratory tasks realized in GIS software.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | x | | | | | x | | | |

| Assessment criteria | Proper execution of given tasks, essay. |
|---|---|

| Comments | |
|---|---|

Course content (topic list)

1. Flood prevention project:
a) Presentation of national Polish data: flood risks maps and cartographic databases (BDOT10k)
b) Downloading data and their conversion to required formats
c) Georeferencing flood hazard maps
d) Vectorization areas with flood hazard
e) Selection of objects (residential buildings, hospitals, schools etc.) that are at risk
2. Landslides prevention project:
a) Presentation of digital elevation models (DEM) based on LIDAR
b) DEM conversion
c) Landslides mapping and vectorization
d) Selection of buildings which are localized on landslides areas

Compulsory reading

Salata, T., & Prus, B. (2017). Geodata Modelling Applied to the Planning and Land Use of Rural Areas in Conjunction with the Polish Spatial Information Infrastructure. *Land Ownership and Land Use Development: he Integration of Past, Present, and Future in Spatial Planning and Land Management Policies*, 195.
Jaboyedoff, M., Oppikofer, T., Abellán, A., Derron, M. H., Loye, A., Metzger, R., & Pedrazzini, A. (2012). Use of LIDAR in landslide investigations: a review. *Natural hazards*, *61*(1), 5-28.

Recommended reading

Kroh, P., Struś, P., Wrońska-Wałach, D., & Gorczyca, E. (2019). Map of landslides on the commune scale based on spatial data from airborne laser scanning. Carpathian Journal of Earth and Environmental Sciences, 14(1).

Kroh, P. (2020). Identification of landing sites for rescue helicopters in mountains with use of Geographic Information Systems. Journal of Mountain Science, 17(2), 261-270.

Kroh, P. (2017). Analysis of land use in landslide affected areas along the Łososina Dolna Commune, the Outer Carp

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# Course card

| | | | |
|---|---|---|---|
| Course title | **Human impacts on landscape** | | |
| Semester (winter/summer) | summer | ECTS | 6 |
| Lecturer(s) | dr hab. Joanna Zawiejska, prof. UKEN | | |
| Department | Department of Physical Geography | | |

Course objectives (learning outcomes)

The course explores human agency in transforming various geomorphological landscapes as well as the causes and effects of the modification of the operation of geomorphic processes. Interactions between natural and anthropogenic conditions for development of landforms are discussed based on case studies from different environments.

Prerequisites

| | |
|---|---|
| Knowledge | Basic geomorphology, geology, climate, hydrology. |
| Skills | - |
| Courses completed | - |

| Course organization | | | | | | | |
|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | |
| | | A (large group) | K (small group) | L (Lab) | S (Seminar) | P (Project) | E (Exam) |
| Contact hours | | | 15 | | | | |

Teaching methods:

Following introductory lectures students prepare preseentations and discuss assigned topics.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | x | | x | x | | | x | |

| | |
|---|---|
| Assessment criteria | Presentations (30%) and final test (70%) |

| | |
|---|---|
| Comments | |

Course content (topic list)

1. Human agency in geomorphology over time. Natural and anthropogenic drivers of change in geomorphic processes and creation of landforms.
2. Indirect human impact on the operation of geomorphic processes in different climates
3. Man-made landforms and their development.
4. Complexity of impacts and consequences: cases studies.
5. Landscape change in the context of ongoing and projected climate change.

Compulsory reading

Goudie A., 2018, The Human Impact on the Natural Environment, Wiley- Blackwell
Gregory K.J., 2006, The human role in changing river channels, Geomorphology 79(3):172-191

Recommended reading

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# Course card

| | | | |
|---|---|---|---|
| Course title | **Living in a polluted environment** | | |
| Semester | summer | ECTS* | 6 |
| Lecturer(s) | Assoc. Prof. Łukasz Binkowski | | |
| Department | Institute of Biology and Earth Sciences | | |

Course objectives (learning outcomes)

Heavy metals, pesticides, smog, PAHs and dioxins – every day we hear about the different elements and chemicals that threaten the biosphere, including man. What is the real risk? How to defend against them? Are these threats real or just catchy slogans? And why all of this combines ecology? The course is going to answer these questions. Participants will discuss the major threats to the environment, the mechanisms of circulation and detoxification as well as the impact of toxic substances on populations and ecosystems. They will also participate in the scientific project in the field of ecotoxicology.

Prerequisites

| | |
|---|---|
| Knowledge | - |
| Skills | English: speaking, reading and writing |
| Courses completed | - |

| Course organization | | | | | | | |
|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | |
| | | A (large group) | K (small group) | L (Lab) | S (Seminar) | P (Project) | E (Exam) |
| Contact hours | | | 10 | 5 | | | |

Teaching methods:

Lab classes and tutoring discussions accompanied with multimedia presentations, scientific movies, publications and e-learning platform activities.
Individual work of students outside of the classroom (scientific research – individual project, reading popular-scientific and scientific articles).

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X | | | | X | X | | X | | | | | |

| Assessment criteria | Points from the test done on the e-learning platform, quality of the project. |
|---|---|

| Comments | Course taught in English. |
|---|---|

Course content (topic list)

1. What is the ecotoxicology (short description of ecology and toxicology)?
2. The tragic story of the development of ecotoxicology.
3. Why everyone should be interested in ecotoxicology?
4. The main mechanisms studied by ecotoxicology.
5. Fundamentals of environmental monitoring.
6. The impact of pollutants on organisms and detoxification mechanisms.
7. Overview of key toxic substances (heavy metals, pesticides, pharmaceuticals, smog, etc.).
8. Interactions between toxic substances and environmental factors.
9. The impact of pollution on populations and aquatic and terrestrial ecosystems.
10. The latest trends in ecotoxicology and the applied ecotoxicology.

Compulsory reading


1. Walker C.H., Hopkin S.P., Sibly R.M., Peakall D.B. (2001). Principles of ecotoxicology. Taylor & Francis, New York.
2. Newman M.C. (2010). Fundamentals of ecotoxicology. CRC Press, Boca Raton.


Recommended reading


1. Carlson R. (1962). Silent Spring. Penguin Classic, London.
2. Colborn T., Dumanoski D., Myers J.P. (1996). Our stolen future. Plume Book, New York.
3. Murray B. (1962). Our synthetic environment. Knopf, New York.
4. Smith R., Lourie B. (2011). Slow death by rubber duck: the secret sanger of everyday things. Counterpoint, Berkeley.

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**Course card**

| | | | |
|---|---|---|---|
| Course title | **Past and current climate change** | | |
| semester | summer | ECTS | 6 |
| Lecturer(s) | Bartłomiej Pietras, PhD | | |
| Department | Institute of Biology and Earth Sciences | | |

Course objectives (learning outcomes)

| |
|---|
| This course focuses on past and ongoing climate change, its drivers and consequences. Natural and anthropogenic signals in observed climate change. The students also explore discuss the fact-based and fallacious information on climate change and its effects present in the media and popular belief. |

Prerequisites

| | |
|---|---|
| Knowledge | Basic knowledge about climate. |
| Skills | The ability to obtain basic information about climate |
| Courses completed | |

| Course organization | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | | | | | |
| | | A (large group) | | K (small group) | | L (Lab) | | S (Seminar) | | P (Project) | | E (Exam) | |
| Contact hours | | | | | | 15 | | | | | |

Teaching methods:

| |
|---|
| Introductory seminars, participatory discussion, individual projects |

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | X | | X | | X | | | |

| Assessment criteria | Students prepare and present a project, final test. |
|---|---|

| Comments | |
|---|---|

Course content (topic list)

1. Past and ongoing climate change
2. Proxy data
3. Regional aspects of climate change
4. Regional climate models
5. Myths and facts on global warming.

Compulsory reading


1. Burroughs W.J., 2001: *Climate Change*. Cambridge University Press.
2. Desonie D., 2008: *Climate: causes and effects of climate change*. Chelsea House, USA.
3. IPCC, 2013: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp, doi:10.1017/CBO9781107415324.
4. Jonathan Cowie, 2007. *Climate Change: Biological and Human Aspects*, Cambridge University Press, Cambridge, UK. ISBN 978-0-521-87399-4. XVI + 487 pp
5. McGuffie K., Henderson-Sellers A., 2005: *A Climate Modelling Primer, 3rd Edition*. University of Technology, Sydney, Australia.


Recommended reading


1. IPCC, 2007: Climate Change 2007: *The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.
2. Wang J., Oppenheimer M. *The Latest Myths and Facts on Global Warming* - 2005 - pp. 2-7

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# Course card

| Course title | Weather and climate in tourism and travel | | |
|---|---|---|---|
| Semester (winter/summer) | summer | ECTS | 6 |
| Lecturer(s) | Bartłomiej Pietras, PhD | | |
| Department | Institute of Biology and Earth Sciences | | |

Course objectives (learning outcomes)

The aim of the course is to expand knowledge about weather and climate conditions in different parts of the world. The student acquires the ability to effectively look for and practically use meteorological knowledge, and interpret available weather information in planning travel and tourist events.

Prerequisites

| | |
|---|---|
| Knowledge | To participate in the course, the student should know basic terms in the field of meteorology and climatology |
| Skills | The ability to link cause and effect, analyze and synthesize and select thematic information from scientific publications and media sources. |
| Courses completed | not applicable |

| Course organization | | | | | | | |
|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | |
| | | A (large group) | K (small group) | L (Lab) | S (Seminar) | P (Project) | E (Exam) |
| Contact hours | | | 15 | | | | |

Teaching methods:

Conversation classes, analysis and discussion. The course is conducted in English with the use of literature, websites and other sources.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | x | x | | x | x | | | | |

| | |
|---|---|
| Assessment criteria | Preparation and presentation of the issue (60%). Participation in the discussion (30%) Preparation for classes (10%) |

| | |
|---|---|
| Comments | The course is passed by the student who participated in the classes and completed the projects. |

Course content (topic list)

1. Basic sources of meteorological and climatic knowledge used in tourism and travel.
2. From jetlag to mountain sickness: bioclimatology and adaptation of human body to different weather conditions.
3. Extreme weather: hazards and risks for tourists and tourist infrastructure.
4. Tourism and climate change.

Compulsory reading

Auliciems A., 1998, Human Bioclimatology: An Introduction, Advances in Bioclimatology, 5, 1-6

Scott D., Gossling S., Hall M., 2012, International toursim and climate change, WIREs Climate Change, Vol 3, 213-295.

Scott D., Lemieux C., 2010, Weather and Climate Information in Tourism, Procedia Environmental Sciences 1, 146-183;

Recommended reading

https://library.wmo.int/records/item/28148-the-assessment-of-human-bioclimate

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# Course card

| | | | |
|---|---|---|---|
| Course title | **Bees, apitourism and apitherapy** | | |
| Semester (winter/summer) | summer | ECTS | 6 |
| Lecturer(s) | Anna Chrobak-Žuffová, PhD | | |
| Department | Institute of Biology and Earth Sciences | | |

Course objectives (learning outcomes)

After completing the course, the student has knowledge about honey bees - their characteristics, lifestyle and importance for the natural environment. The student can recognize authentic bee products and benefits (their purpose in the natural supplementation of the human body). The student is aware of the significance of protection of honey bees for their continued existence on Earth by planting honey plants and supporting local beekeepers. The student recognizes the specifics of apitourism and analyses its potential for sustainable tourism.

Prerequisites

| | |
|---|---|
| Knowledge | General knowledge of natural environment on the world |
| Skills | |
| Courses completed | - |

| Course organization | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | | | | | |
| | | A (large group) | | K (small group) | | L (Lab) | | S (Seminar) | | P (Project) | | E (Exam) | |
| Contact hours | | | | | | 15 (L) | | | | | |

Teaching methods:

Analysis of source materials regarding honey bee specifications. A field visit to educational apiary. Analysis of bee products combined with their tasting. Discussion on various ways to help honey bees survive.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | x | x | | | x | x | | | | | |

| | |
|---|---|
| Assessment criteria | Attendance in class, active participation in discussions, preparation of group work as directed by the instructor. |

| | |
|---|---|
| Comments | Field classes will take place in close contact with bees. A tasting of bee products is also planned. People allergic to bee venom or other bee products are obliged to report it to the lecturer **before** starting the course. The class is taught by a professional beekeeper and educator. |

Course content (topic list)

1. Bee as species
2. Significance of bees to the environment, bee diseases and other threats to bees.
3. Visit to educational apiary
4. Speciifcs of authentic and fraudulent bee products. Benefits and nutrition values of bee products.
5. Apitourism and apitherapy and its potential for development of sustainable tourism.
6. Apitourism in Lesser Poland region – local examples.

Compulsory reading

Genersch, E. (2010). Honey bee pathology: current threats to honey bees and beekeeping. *Applied microbiology and biotechnology*, *87*, 87-97.
Majewski, J. (2017). Beekeeping support in the European Union countries. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, *17*(4), 193-198.
Topal, E., Adamchuk, L., Negri, I., Kösoğlu, M., Papa, G., Dârjan, M. S., ... & Mărgăoan, R. (2021). Traces of honeybees, api-tourism and beekeeping: From past to present. *Sustainability*, *13*(21), 11659.

Recommended reading

Brodschneider, R., & Crailsheim, K. (2010). Nutrition and health in honey bees. Apidologie, 41(3), 278-294.

Weis, W. A., Ripari, N., Conte, F. L., da Silva Honorio, M., Sartori, A. A., Matucci, R. H., & Sforcin, J. M. (2022). An overview about apitherapy and its clinical applications. *Phytomedicine plus*, *2*(2), 100239.

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# Course card

| | | | |
|---|---|---|---|
| Course title | **Iconic landscapes as tourist destinations** | | |
| Semester (winter/summer) | summer | ECTS | 6 |
| Lecturer(s) | Assoc. Prof. Joanna Zawiejska | | |
| Department | Department of Physical Geography | | |

Course objectives (learning outcomes)

Understanding of the reasons for the diversity of landscapes in the world. Understanding of the origin and characteristics of the most visited and iconic landscapes of the world. Understanding of impacts and hazards posed by potential and ongoing processes (e.g. avalanches, rockfalls) to tourism development and the effects of (over)tourism on these landscapes. Significance of landscapes to local native cultures.

Prerequisites

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|---|---|
| Knowledge | Basic knowledge about environment. |
| Skills | Understanding the basic interrelationships between elements of the environment, origin of the basic types of landscapes. |
| Courses completed | Physical Geography or Tourism Regions (recommended) |

| Course organization | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | | | | | |
| | | A (large group) | | K (small group) | | L (Lab) | | S (Seminar) | | P (Project) | | E (Exam) | |
| Contact hours | | | | 15 | | | | | | | |

Teaching methods:

The course will consists of 5 thematic blocks, each block will have a theoretical background followed by student-prepared presentations based on literature and discussion of the main theme of the lesson.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | x | | x | x | x | | | |

| | |
|---|---|
| Assessment criteria | literature research and presentation of assigned topics (30%)<br>class-based discussion (20%)<br>submission of a written assigment on the assigned topic (50%) |

| | |
|---|---|
| Comments | |

Course content (topic list)

Iconic and most visited landscapes of the world: what makes a landscape a popular tourist destination?
Interaction of rivers and geology (e.g.Niagra Falls, Iguazu Falls, Victoria Falls).
Sandstone, granite and karst landscapes of the world.
Diversity of active volcanic landforms.
Iconic landscapes of the world (e,g. Grand Canyon, Karst of Ha Long Bay, the Dolomites…).
Natural hazards and tourism.
Native cultures and landscapes.
The curse of popularity: challenges and management of overtourism at iconic landscape destinations.

Compulsory reading

Migoń P. (Ed.) 2010, Geomorphological Landscapes of the World, Springer.

Recommended reading

A selection of up-to-date scientific papers. Internet research.

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**Course card**

| Course title | **The Tatra Mountains and Zakopane** | | |
|---|---|---|---|
| Semester (winter/summer) | summer | ECTS | 6 |
| Lecturer(s) | Ph.D. Paweł Kroh | | |
| Department | Institute of Biology and Earth Sciences | | |

Course objectives (learning outcomes)

Course presents environmental, cultural and historical factors which shaped the region of the highest mountains in Poland. After the course student will know most important elements of the Tatra's environment, history of Tatra National Park and development of idea of nature conservation in region. History of Zakopane and local culture also will be presented.

Prerequisites

| | |
|---|---|
| Knowledge | None |
| Skills | None |
| Courses completed | None |

| Course organization | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | | | | | |
| | | A (large group) | | K (small group) | | L (Lab) | | S (Seminar) | | P (Project) | | E (Exam) | |
| Contact hours | | | | x | | | | | | | |

Teaching methods:

Introduction lecture and field classes in Tatra Mountains and Zakopane.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | x | | | | | | x | | | |

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| Assessment criteria | Active presence during classes, short essay about assigned topic. |

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| Comments | Students with severe health conditions are advised to consult with the course teacher **before** the field trips.<br>The course is taught by a certified mountain guide and rescuer.<br>Adequate clothing and footwear are recommended for the visit in the Tatra National Park. |

Course content (topic list)

Natural history of the Tatra Mountains.
Environment of the Tatra Mountains.
Environmental functioning in montane, sub-alpine and alpine belt.
History of the Tatra region and the emergence of Zakopane as a major tourist resort.
Nature protection, its history and current problems.
Most recognizable elements of local folklore.

Compulsory reading

Balon, J. (2005). Spatial order in the natural environment of the Polish Tatra Mts. *Prace Geograficzne IGiGP UJ*, *115*, 19-29.
Taczanowska, K., Brandenburg, C., Muhar, A., Hat-Pawlikowska, K., Ziobrowski, S., Chlipała, B., ... & Witkowski, Z. (2014, August). Who is hiking in the Tatra National Park, Poland? A socio-demographic portrait of visitors. In *The 7th International Conference on Monitoring and Management of Visitors in Recreational and Protected Areas (MMV). Tallinn, Estonia* (pp. 27-29).

Recommended reading

Kotarba, A., Kaszowski, L., & Krzemień, K. (1987). High-mountain denudational system of the Polish Tatra Mountains= Wysokogórski system denudacyjny Tatr Polskich. *Geographical Studies. Special Issue*.
Cooley, T. J. (1999). Folk Festival as Modern Ritual in the Polish Tatra Mountains. *The World of Music*, 31-55.

Rączkowska, Z (2006). Recent geomorphic hazards in the Tatra Mountains. *Studia Geomorphologica Carpatho-Balcanica*, *40*, 45-60.
Zwoliński, Z., & Stachowiak, J. (2012). Geodiversity map of the Tatra National Park for geotourism. *Quaestiones geographicae*, *31*(1), 99-107.
Balon, J., & Jodłowski, M. (2012). Landscape organization in the non-glaciated high-mountain ranges in Europe.
Buchwał, A, & Fidelus, J. (2008). The development of erosive and denudational landforms on footpaths sections in the Babia Góra Massif and the Western Tatras. *Geomorphologia Slovaca et Bohemica*, *2*, 14-24.

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# Course card

| | | | |
|---|---|---|---|
| Course title | **Tourism on volcanoes** | | |
| Semester (winter/summer) | summer | ECTS | 6 |
| Lecturer(s) | Dorota Chmielowska-Michalak, PhD | | |
| Department | Institute of Biology and Earth Science | | |

Course objectives (learning outcomes)

After completing the course, the student has general knowledge of the global distributions and types of volcanic landscapes, volcanic phenomena and processes. The student recognizes the drivers of high popularity of destinations with ongoing volcanic activity and the coexisting the hazards and potential risks to tourism inherent in such natural environments. Student can characterize the volcanic landscape in the context of tourism potential (Volcanic National Parks, Geoparks, and World Heritage Sites).

Prerequisites

| | |
|---|---|
| Knowledge | Understanding of basic geology and basic patterns in tourist traffic and motivations. |
| Skills | n/a |
| Courses completed | - |

| Course organization | | | | | | | |
|---|---|---|---|---|---|---|---|
| Form of classes | W (Lecture) | Group type | | | | | |
| | | A (large group) | K (small group) | L (Lab) | S (Seminar) | P (Project) | E (Exam) |
| Contact hours | | | X | | | | |

Teaching methods:

Group discussion of based on case studies and assigned projects. During the course students prepare presentation on a selected topic. Films, maps and onlinr resources are used during the class.

Assessment methods:

| | E – learning | Didactic games | Classes in schools | Field classes | Laboratory tasks | Individual project | Group project | Discussion participation | Student's presentation | Written assignment (essay) | Oral exam | Written exam | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | X | | X | | X | |

| | |
|---|---|
| Assessment criteria | Final test (50%) and presentation evaluation (50%) |

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| Comments | Interest and enthusiasm are welcome prerequisites. |

Course content (topic list)

1. Why do we want to we travel to hazardous zones? Volcanic phenomena (eruptions, lava, geysers, craters, fumaroles etc.) as drivers for tourist traffic and destination popularity.
2. The main volcanic regions on the world.
3. Volcanic National Parks, Geoparks, and World Heritage Sites – case studies.
4. Volcanic hazards. Warning systems and risk management in popular tourist volcanic destinations.
5. Past volcanic eruption sites as tourist destinations (Pompei, Heruclanum, Paricutin, Mt. St Helens etc.)
6. Tourist infrastructure in volcanic areas.
7. Activities in volcanic environments

Compulsory reading


6. Erfurt-Cooper, P., Sigurdsson, H., & Lopes, R. M. (2015). Volcanoes and tourism. In *The encyclopedia of volcanoes* (pp. 1295-1311). Academic Press.
7. Erfurt-Cooper, P., & Cooper, M. (Eds.). (2010). *Volcano and geothermal tourism: sustainable geo-resources for leisure and recreation*. Earthscan.
8. Liu, J., Liu, J., Chen, X., & Guo, W. (2012). *Volcanic natural resources and volcanic landscape protection: An overview*. IntechOpen.
9. Erfurt-Cooper, P. (Ed.). (2014). Volcanic Tourist Destinations. Geoheritage, Geoparks and Geotourism. doi:10.1007/978-3-642-16191-9
10. Thematic articles


Recommended reading