

## Courses taught in foreign languages in academic year 2019/20

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|--------------------------|---|
| Faculty/Institute:       | Faculty of Environment  |
| Course title:            | <b>Environmental English</b>  |
| Course code:             | KSPV/OENEN  |
| ECTS:                    | 8   |
| Level of course:         | bachelor  |
| Teacher:                 | Mgr. Miloslav Kolenatý  |
| Term:                    | Winter, summer  |
| Language of instruction: | English   |
| Lectures/exercises:      | 0/2 per week  |
| Completion:              | written credit test   |
| Course goal:             | Introducing basic English environmental terms and skills  |
| Abstract:                | <p>Dealing with scientific texts in English (spoken and written). English terminology connected to the studied subject. Language items used in scientific texts. Dealing with topics covering the professional orientation. Improving communicative skills (writing and speaking, above all) focusing on the topics connected to the professional orientation.</p> <ol style="list-style-type: none"> <li>1. Ecology Basics</li> <li>2. Earth Science</li> <li>3. Wildlife</li> <li>4. Using the land</li> <li>5. Pollution</li> <li>6. Waste</li> <li>7. Energy</li> <li>8. The Environment of the Czech Republic</li> </ol> |

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|--------------------------|---|
| Faculty/Institute:       | Faculty of Environment  |
| Course title:            | <b>International Environmental Law</b>  |
| Course code:             | KSPV/OENLE  |
| ECTS:                    | 8   |
| Level of course:         | bachelor  |
| Teacher:                 | JUDr. Žáková Karolína, Ph.D.  |
| Term:                    | Winter, summer  |
| Language of instruction: | English   |
| Lectures/exercises:      | 2/0 per week  |
| Completion:              | Essay/exam  |
| Course goal:             | Introducing one of the youngest branches of international law, focusing on general aspects and specific environmental problems.   |
| Abstract:                | <p>The course is intended to introduce students to one of the youngest branches of international law that is becoming more and more important given the global character of most environmental problems. The first part of the course is general in nature dealing with development of international environmental law, its basic principles and main sources, role of various actors and institutions, implementation and enforcement of international environmental rules and international responsibility within this field. The second part focuses on specific environmental problems international law is helping to solve. Protection of individual components of the environment (air, water, soil, forests, biodiversity) is treated as well as fight against particular threats (dangerous wastes, chemicals, radiation, GMOs) and protection of international spaces (Antarctica, high seas and deep sea-bed).</p> <p>The course is terminated with a short essay followed by an oral examination.</p> |

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| Faculty/Institute:       | Faculty of Environment   |
| Course title:            | <b>Valuation and Pricing of Natural Resources</b>  |
| Course code:             | KSPV / OHOPZ   |
| ECTS:                    | 8  |
| Level of course:         | bachelor   |
| Teacher:                 | Doc. Ing. Seják Josef, CSc.  |
| Term:                    | Winter, summer   |
| Language of instruction: | English  |
| Lectures/exercises:      | 2/0 per week   |
| Completion:              | written test + spoken exam   |
| Course goal:             | Introducing the history of natural resource pricing within the economic theory development.  |
| Abstract:                | <p>History of natural resource pricing within the economic theory development. Valuation of market and non-market natural resources (ecosystems). Neoclassical methods based on the concept of willingness to pay or willingness to accept. Expert methods based on valuing the ecological functions of ecosystems. Selected case studies.</p> <ol style="list-style-type: none"> <li>1. Introduction, Importance of natural resource and ecosystem valuations. The practice of environmental expert witnesses.</li> <li>2. History of natural resource valuations, Time factor, Cost-benefit analysis.</li> <li>3. Basic estimations of natural resource price. Formulas for basic natural resource types.</li> <li>4. Land valuations (admin. and market prices, price information system, price maps)</li> <li>5. Valuation methods of ecosystem functions and services. Preferential and expert methods.</li> <li>6. Case studies in contingent valuations in environmental quality change.</li> <li>7. Biotope valuation method (BVM) in the CR.</li> <li>8. Case studies in BVM.</li> <li>9. Ecosystem services and their valuations.</li> <li>10. Externalities and public goods.</li> <li>11. Property rights and nature protection.</li> <li>12. Valuations in integrated forest functions.</li> <li>13. Pricing of water and water flows in landscape.</li> <li>14. Seminar works and their assessment.</li> </ol> |

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|--------------------------|---|
| Faculty/Institute:       | Faculty of Environment  |
| Course title:            | <b>Ecological Economics</b>   |
| Course code:             | KSPV / OEKEK  |
| ECTS:                    | 8   |
| Level of course:         | bachelor  |
| Teacher:                 | Doc. Ing. Seják Josef, CSc.   |
| Term:                    | Winter, summer  |
| Language of instruction: | English   |
| Lectures/exercises:      | 2/0 per week  |
| Completion:              | Exam/written test   |
| Course goal:             | This transdisciplinary course introduces students into the general interactions among economics, economy and natural environment, brings students to the interface of natural sciences and social sciences. Gives basic knowledge about the decision-making processes in frame of the environmental dimension with help of economic instruments and environmental values.   |
| Abstract:                | <ol style="list-style-type: none"> <li>1. Earth and Life history; Energy Flows, Thermodynamics and Life</li> <li>2. A Short History of Economic Thinking and Doing</li> <li>3. Ecological Economics as an Integration of Economic System into Ecological System of Biosphere</li> <li>4. Sustainable Development Principles and Philosophy</li> <li>5. Valuing Natural Resources and Ecosystem Services</li> <li>6. Market Failure and Internalization of Externalities</li> <li>7. Human Behaviour and Economics</li> <li>8. Macroeconomic Concepts: GNP, GDI, ISEW</li> <li>9. Economic Instruments and Environm. Adjusted Cost Benefit Analyses</li> <li>10. Green Taxes, Limits and Commands, Tradable Permits</li> <li>11. Sustainable Scale, Just Distribution, Efficient Allocation</li> <li>12. Environmental Dimension of Global Economy</li> <li>13. Short Essay and Its Discussion.</li> </ol> |

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|--------------------------|--|
| Faculty/Institute:       | Faculty of Environment   |
| Course title:            | <b>Environmental Drainage Systems</b>  |
| Course code:             | KPV/OEDSY  |
| ECTS:                    | 8  |
| Level of course:         | Bachelor   |
| Teacher:                 | Štibinger Jakub, doc., Ing., CSc.  |
| Term:                    | Winter, summer   |
| Language of instruction: | English  |
| Lectures/exercises:      | 2/0 per week   |
| Completion:              | Exam   |
| Course goal:             | To introduce the basic principles of drainage processes and environmental drainage policy, with focusing on land, structures and water regime protection.  |
| Abstract:                | Subject “Environmental Drainage Systems” is focused to present to the students the basic principles and applications of drainage policy. Also environmental or sustainable drainage processes will be presented and explained. The students will be explained with modified hydraulics methods with Darcy’s Law and equation of continuity, which are necessary for design, verifications and estimations drainage and environmental drainage systems, especially to determining of the basic design parameters of drainage. Rural Sustainable Drainage System (RSuDS) with Sustainable Urban Drainage System (SUDS) for mitigation of negative impact of climate dynamics (heavy rains, floods, long term droughts) in the landscape (RSuDS) and in urban areas (SUDS) will be introduced. The findings from the soil hydrology area will be fully used. Exemplary case studies from Czech Republic, Netherlands, Egypt and Taiwan will be discussed. |

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|--------------------------|--|
| Faculty/Institute:       | Faculty of Environment   |
| Course title:            | <b>Water in Landscape</b>  |
| Course code:             | KPV/OWATE  |
| ECTS:                    | 8  |
| Level of course:         | Bachelor (undergraduate), Master (graduate)  |
| Teacher:                 | Ing. Martin Neruda, Ph.D.  |
| Term:                    | Winter, summer   |
| Language of instruction: | English  |
| Lectures/exercises:      | 2/0 per week and terrain work  |
| Completion:              | exam   |
| Course goal:             | Introducing the basics of environmental hydrology and environmental water management.  |
| Abstract:                | Information about water management in the Czech Republic.<br>Hydrology: catchments description, hydrological cycle, hydrological balance, flow measurements, groundwater, runoff prediction, water quality in rivers and lakes. Methods of streams restoration (principles, techniques, fish pass types) and flood management. Good practise examples. Hydrological measurements in stream or river. |

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|--------------------------|---|
| Faculty/Institute:       | Faculty of Environment  |
| Course title:            | <b>Environmental Geology</b>  |
| Course code:             | KPV/OENGE   |
| ECTS:                    | 8   |
| Level of course:         | bachelor  |
| Teacher:                 | Blažková Miroslava, doc. RNDr., Ph.D.   |
| Term:                    | Winter, summer  |
| Language of instruction: | English   |
| Lectures/exercises:      | 2/0 per week  |
| Completion:              | terrain work 8 h (total), seminar work, exam  |
| Course goal:             | Relating Earth Science and Environmental science, introducing the basics of Environmental Geology.  |
| Abstract:                | <p>This course relates the science of Earth to activities of human beings. It's a survey of relationship between Earth science and environmental science. Environmental science is the study of total human environment on the present Earth. The course includes the following topics:</p> <p>Environmental geology (Geological Environment, Conditions and Preservation, The Anatomy of the Earth, The Dynamic of Earth – (endodynamic and exodynamic),</p> <p>Geological hazards (earthquakes, volcanoes, landslides, erosion, floods, subsidence, geomedical hazards),</p> <p>Geothermal energy (alternative source of energy)</p> <p>Human impacts on the Earth (resource extraction, ground subsidence, engineering and agriculture, solid and liquid waste, groundwater pollution etc.)</p> <p>Earth resources for society (land and soil, subsurface water, construction materials, industrial and metallic materials, coal and petroleum etc. Geological influence on society (control on landscape and human geomorphology)</p> |



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|--------------------------|---|
| Faculty/Institute:       | Faculty of Environment  |
| Course title:            | <b>Subterranean Habitats</b>  |
| Course code:             | KPV/OCAEC   |
| ECTS:                    | 6   |
| Level of course:         | bachelor  |
| Teacher:                 | Pokorný Richard, Ing., DIS.   |
| Term:                    | Winter, summer  |
| Language of instruction: | English   |
| Lectures/exercises:      | 0/2 per week  |
| Completion:              | Two field trips - Seminar work  |
| Course goal:             | Introducing the definition and classification of caves and organisms occupied this ecosystem.   |
| Abstract:                | Course covering definition and classification of caves and organisms occupying cave habitats. Caves as a unique ecosystem. Providing basic information about other important underground ecosystems (e.g. debris stones, artificial mining galleries). The course includes visits of caves, artificial mining galleries and debris stones and examples of cave investigation methods. The course is focused on the caves in Northern Bohemia. |

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|--------------------------|---|
| Faculty/Institute:       | Faculty of Environment  |
| Course title:            | <b>Advanced Separation Methods in Environmental Analysis: a practical course</b>  |
| Course code:             | KTEV/OEPME  |
| ECTS:                    | 10  |
| Level of course:         | bachelor  |
| Teacher:                 | Prof. Ing. Pavel Janoš, CSc., Doc. Dr. Ing. Pavel Kuráň, Ing. Sylvie Kříženecká, Ph.D.  |
| Term:                    | Winter, summer  |
| Language of instruction: | English   |
| Lectures/exercises:      | 0/2 per week, limit 10 students – first come, first served  |
| Completion:              | Laboratory work - Seminar paper   |
| Course goal:             | Managing the practical application of chromatographic techniques (GC, HPLC) for the determination of pollutants in the environment.   |
| Abstract:                | Practical training in application of chromatographic techniques (GC, HPLC) for the determination of selected organic pollutants in environmental samples, including methods of preconcentration and sample pretreatment (extraction, etc.). Special requirements: basic knowledge of principles of analytical chemistry and laboratory skill are presupposed. |

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| Faculty/Institute:       | Faculty of Environment   |
| Course title:            | <b>Advanced Separation Methods in Environmental Analysis: Theoretical part</b>   |
| Course code:             | KTEV/OEPMT   |
| ECTS:                    | 8  |
| Level of course:         | bachelor   |
| Teacher:                 | Prof. Ing. Pavel Janoš, CSc., Doc. Dr. Ing. Pavel Kuráň  |
| Term:                    | Winter, summer   |
| Language of instruction: | English  |
| Lectures/exercises:      | 2/0 per week , limit 10 students – first come, first served  |
| Completion:              | exam   |
| Course goal:             | Introducing theoretical principles and instrumentation of separation methods (GC,  |
| Abstract:                | Principles and theory of separation methods. Classification of separation methods frequently used in environmental analysis. Chromatographic methods – principles and classification. Liquid chromatography – instrumentation and environmental application. Gas Chromatography – instrumentation and environmental application. |

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|--------------------------|---|
| Faculty/Institute:       | Faculty of Environment  |
| Course title:            | <b>Management of Protected Areas</b>  |
| Course code:             | KSPV/ONPO1  |
| ECTS:                    | 8   |
| Level of course:         | bachelor  |
| Teacher:                 | Ing. Jiří Moravec, Ph.D.  |
| Term:                    | Winter, summer  |
| Language of instruction: | English   |
| Lectures/exercises:      | 1/1 per week and/or terrain work  |
| Completion:              | exam and/or term paper submission   |
| Course goal:             | Gaining knowledge of basic issues of protected area management  |
| Abstract:                | <p>The aim of the course is to introduce students to the basic issues of management of protected natural areas (such as national parks, nature reserves, etc). System of protected areas is a cornerstone of a healthy landscape in modern societies. Formal declaration of protected areas is not sufficient, since protected areas need to be properly managed and organized, usually by governmental institutions.</p> <p>Protected areas (PA) contribute to water and soil protection. Protected areas preserve biodiversity and ecosystem functions, which has important economic and ecological implications. Ecosystem functions, such as natural water purification, natural water regulation, pollination, carbon recycling, photosynthesis, etc., have a major significance for human economy and society. Comparison of ecosystem services with technological solutions and fixes is a part of the subject.</p> <p>University graduates will need knowledge of management of PA when working as public administration employees, or as public policy makers. Also private sector employees should understand the purpose and limitations of PA. Tourism in protected areas requires educated visitors for its sustainability. Therefore, sound knowledge of significance and operation of protected areas will improve the educational profile of any student.</p> <p>The course offers to round-up the academic curriculum. It takes an integrated approach, applying both social and natural sciences, and explaining the role of technology. The course is offered to foreign students, as well as to Czech students with sufficient knowledge of English. The course is open to students of all study programs and levels of study. There is an English textbook for the course, written by the lecturer, both in printed version and in PDF format.</p> |

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| Faculty/Institute:       | Faculty of Environment   |
| Course title:            | <b>Transportation and Environment</b>  |
| Course code:             | KSPV/OTRE1   |
| ECTS:                    | 8  |
| Level of course:         | bachelor   |
| Teacher:                 | Ing. Jiří Moravec, Ph.D.   |
| Term:                    | Winter, summer   |
| Language of instruction: | English  |
| Lectures/exercises:      | 1/1 per week and/or terrain work   |
| Completion:              | exam and/or term paper submission  |
| Course goal:             | Gaining knowledge of basic environmental issues of transport   |
| Abstract:                | <p>The aim of the course is to introduce students to basic environmental issues of transport (air and water pollution, soil sealing, landscape and biodiversity impact). Proper transport planning and management is essential for well-organized cities, regions and countries. Governments, private businesses and individuals have to look for solutions, both organizational and technological, in order to counter negative environmental impacts, including traffic congestion.</p> <p>The students will inquire into measures attempting to eliminate or reduce the negative environmental effects of transport. Topics covered will include land-use planning, reduction of traffic flows, technical anti-noise measures, technological adjustments of road pavements, cars and fuels, and construction of eco-ducts. The issue of transport-disadvantaged groups (handicapped) will be addressed, both organizational and technological measures. Public policies supporting environmentally sustainable modes of transport, and energy issues will be explained and discussed.</p> <p>The course is offered to foreign students, as well as to Czech students with sufficient knowledge of English. The course is open to students of all study programs and levels of study. There is an English textbook for the course, written by the lecturer, both in printed version and in PDF format.</p> |

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|--------------------------|--|
| Faculty/Institute:       | Faculty of Environment   |
| Course title:            | <b>Transportation and Environment II – Selected Topics (in German) / Verkehr und Umwelt – ausgewählte Themen (in deutscher Sprache)</b>  |
| Course code:             | KSPV/OTRE2   |
| ECTS:                    | 8  |
| Level of course:         | bachelor   |
| Teacher:                 | Ing. Jiří Moravec, Ph.D.   |
| Term:                    | Winter, summer   |
| Language of instruction: | German (Deutsch)   |
| Lectures/exercises:      | 1/1 per week and/or terrain work (1/1 pro Woche und/oder Exkursion)  |
| Completion:              | exam and/or term paper submission ( Prüfung und/oder schriftlich Semesterarbeit)   |
| Course goal:             | Gaining knowledge of basic environmental issues of transport. ( Die Umweltwirkungen des Verkehrs und die Maßnahmen zur Reduktion der verkehrlichen Umweltbelastungen kennenlernen. )   |
| Abstract:                | <p>The aim of the course is to introduce students to basic environmental issues of transport (air and water pollution, soil sealing, landscape and biodiversity impact). Proper transport planning and management is essential for well-organized cities, regions and countries. Governments, private businesses and individuals have to look for solutions, both organizational and technological, in order to counter negative environmental impacts, including traffic congestion.</p> <p>The students will inquire into measures attempting to eliminate or reduce the negative environmental effects of transport. Topics covered will include land-use planning, reduction of traffic flows, technical anti-noise measures, technological adjustments of road pavements, cars and fuels, and construction of eco-ducts. The issue of transport-disadvantaged groups (handicapped) will be addressed, both organizational and technological measures. Public policies supporting environmentally sustainable modes of transport, and energy issues will be explained and discussed.</p> <ul style="list-style-type: none"> <li>• Mobilität und Verkehr</li> <li>• Verkehrspolitik und nachhaltige Entwicklung</li> <li>• Externe Effekte u. Barrierefreie Mobilität</li> <li>• Fläche, Boden, Wasser</li> <li>• Energieverbrauch, Kraftstoffe</li> <li>• Lärm</li> <li>• Klassische Abgasemissionen: CO, HC, NOx</li> <li>• Kohlendioxid, Klimaänderung u. Klimaschutz</li> <li>• Induzierter Verkehr</li> <li>• Alternative Antriebe</li> <li>• Verkehr u. Biodiversität, Biotopfragmentierung</li> <li>• Nachhaltigkeitsindikatoren im Verkehr</li> </ul> |

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|--------------------------|--|
| Faculty/Institute:       | Faculty of Environment   |
| Course title:            | <b>Environmental Issues of Turkey and Middle East</b>  |
| Course code:             | KSPV/OETMD   |
| ECTS:                    | 8  |
| Level of course:         | bachelor   |
| Teacher:                 | Ing. Jiří Moravec, Ph.D.   |
| Term:                    | Winter, summer   |
| Language of instruction: | English  |
| Lectures/exercises:      | 1/1 per week   |
| Completion:              | exam and/or term paper submission  |
| Course goal:             | Developing knowledge of environmental issues of Turkey and Middle East   |
| Abstract:                | <p>The aim of the course is to analyze selected environmental issues of Turkey and countries of the Middle East. The topics include air pollution, water pollution, water scarcity and management, soil degradation, erosion and desertification, forestry and biodiversity maintenance. The emphasis of the course may change from semester to semester, according to actual environmental events and developments.</p> <p>The students will inquire into measures and policies attempting to reduce selected environmental problems. Various approaches will be inspected (technologies, legislation, economic incentives, education and information). A participation in the course presumes basic general knowledge of environmental issues. Independent study and desk research will be encouraged.</p> <p>Topics covered will include land-use planning, reduction of traffic flows, technical anti-noise measures, technological adjustments of road pavements, cars and fuels, and construction of eco-ducts. The issue of transport-disadvantaged groups (handicapped) will be addressed, both organisational and technological measures. Public policies supporting environmentally sustainable modes of transport, and energy issues will be explained and discussed.</p> |

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|--------------------------|--|
| Faculty/Institute:       | Faculty of Environment   |
| Course title:            | <b>General Economics</b>   |
| Course code:             | KSPV/OECNE   |
| ECTS:                    | 8  |
| Level of course:         | bachelor   |
| Teacher:                 | Ing. Jakub Vosátka, Ph.D.  |
| Term:                    | Winter, summer   |
| Language of instruction: | English  |
| Lectures/exercises:      | 2 per week   |
| Completion:              | exam   |
| Course goal:             | Introducing the basics of economic science.  |
| Abstract:                | The General economics course is a first-level introduction to the economic science. Students learn to understand causes and impacts of basic economic phenomena on economic reality. The course consists of the two parts. The first part is focused at microeconomics, where students get acquainted with the behaviour of basic market agents, i.e. households and firms. The second part of the course is focused on the macroeconomic issues, considering the economic role of the state from viewpoints of different economic schools when facing such economic phenomena as inflation, unemployment, international trade, and so on. |



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| Faculty/Institute:       | Faculty of Environment  |
| Course title:            | <b>Soil Science</b>   |
| Course code:             | KPV/OSOSI   |
| ECTS:                    | 8   |
| Level of course:         | bachelor  |
| Teacher:                 | Ing. Jiří Šefl, Ph.D.   |
| Term:                    | Winter, summer  |
| Language of instruction: | English   |
| Lectures/exercises:      | 2/1/8 per week  |
| Completion:              | exam  |
| Course goal:             | Introducing the basics of soil science and its importance within other natural sciences. Laboratory training connected with sampling in terrain.  |
| Abstract:                | <p>The course deals with basic knowledge of soil forming processes, soil classification, physical, chemical and microbiological soil conditions and problems of soil degradation in different parts of the world. Soil legislation in the Czech Republic will be mentioned as well.</p> <p>The main aim of the laboratory training is to give the principle of particular methods relating to physical, chemical and microbiological soil analyses.</p> <p>Laboratory training will be completed by short field excursion which will aim on methods of soil sampling and basic soil types' determination.</p> |

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|--------------------------|---|
| Faculty/Institute:       | Faculty of Environment  |
| Course title:            | <b>Environmental Microbiology</b>   |
| Course code:             | KTEV/OENMI  |
| ECTS:                    | 8   |
| Level of course:         | bachelor  |
| Teacher:                 | doc. Ing. Josef Trögl, Ph.D.  |
| Term:                    | Winter, summer  |
| Language of instruction: | English   |
| Lectures/exercises:      | 2/0 per week  |
| Completion:              | written credit test   |
| Course goal:             | Introduction to microbiology with focus on the roles of microorganisms in the environment and their application   |
| Abstract:                | <p>The first part of the course presents introduction into general microbiology (evolution and taxonomy, cell structure, proliferation, metabolism, genetics, physiology). The second part is focused on microorganisms in the environment, their relation to other organisms (competition, important symbioses), ecological factors affecting their distribution and their main roles in the environmental processes. The third part is focused on environmental applications of microorganisms (waste-water treatment, bioremediation, waste decomposition, biosensing...).</p> <ol style="list-style-type: none"> <li>1. Introduction to general microbiology, evolution and taxonomy</li> <li>2. Cytology and morphology of microorganisms</li> <li>3. Proliferation of microorganism, growth curve</li> <li>4. Introduction to microbial metabolism</li> <li>5. Introduction to microbial genetics</li> <li>6. Introduction to microbial physiology</li> <li>7. Environmental microbiology 1 – ecology, strategies, roles, competition</li> <li>8. Environmental microbiology 2 – microorganisms in soil and air</li> <li>9. Environmental microbiology 3 – microorganisms in water</li> <li>10. Environmental biotechnology 1 – biodegradation and bioremediation of pollutants, biosensing</li> <li>11. Environmental biotechnology 2 – waste-water treatment, waste decomposition</li> <li>12. Environmental biotechnology 3 – alternatives to chemical technologies (biofuels, bioplastics)</li> <li>13. Research and development in the field, future perspectives</li> </ol> |

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|--------------------------|---|
| Faculty/Institute:       | Faculty of Environment  |
| Course title:            | <b>Laboratories in Environmental Microbiology</b>   |
| Course code:             | KTEV/OLENM  |
| ECTS:                    | 8   |
| Level of course:         | bachelor  |
| Teacher:                 | doc. Ing. Josef Trögl, Ph.D., Mgr. Diana Holcová, Ph.D.   |
| Term:                    | Winter, summer  |
| Language of instruction: | English   |
| Lectures/exercises:      | 3 blocks of 4 hours   |
| Completion:              | written credit test   |
| Course goal:             | Introduction to laboratory techniques in environmental microbiology   |
| Abstract:                | <p>The course introduces into basic laboratory techniques in general and environmental microbiology. No previous laboratory experience is required. Students shall bring their own sample of natural water (1 L) and soil (~50 g).</p> <p>Block 1 – Introduction to safety in laboratory, introduction to sterile work, preparation of used media, and sterilization of used material.</p> <p>Block 2 – Basic cultivation techniques, culture determination of bacteria in water sample, effect of UV on bacteria, bacterial growth-inhibition assay.</p> <p>Block 3 – Introduction to microscopy, Gram staining of bacteria, microscopy of water microorganisms, determination of phosphatase activity in soil, evaluation of data</p> |

|                          |   |
|--------------------------|---|
| Faculty/Institute:       | Faculty of Environment  |
| Course title:            | <b>Geographic Information Systems and 3D modeling</b>   |
| Course code:             | KIG/OGIMD   |
| ECTS:                    | 8   |
| Level of course:         | Bachelor/master   |
| Teacher:                 | Ing. Jan Pacina, Ph.D.  |
| Term:                    | Winter, summer  |
| Language of instruction: | English   |
| Lectures/exercises:      | 0/2 per week  |
| Completion:              | practical exam / written credit test  |
| Course goal:             | Introducing GIS and image-based 3D modeling   |
| Abstract:                | <p>GIS has a leading role in analyzing the environment based on spatial data, maps and aerial images. This course will introduce basics of GIS (data collection, visualization and analysis), web-mapping applications, aerial image processing and 3D models creation.</p> <ol style="list-style-type: none"> <li>1. Basics of GIS – data visualization</li> <li>2. Map compositions</li> <li>3. Data going online – web mapping applications</li> <li>4. How to collect data with your smart-phone?</li> <li>5. Data collection using precise GPS</li> <li>6. Image based 3D modeling – create your house, car or head in 3D</li> <li>7. Aerial image processing (images from aircrafts and drones)</li> <li>8. Let's fly it up – data collection with UAVs (drones)</li> </ol> |

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| Faculty/Institute:       | Faculty of Environment  |
| Course title:            | <b>Forest Oecology</b>  |
| Course code:             | KPV/OFOEC   |
| ECTS:                    | 8   |
| Level of course:         | bachelor  |
| Teacher:                 | Ing. Jiří Šefl, PhD.  |
| Term:                    | Winter, summer  |
| Language of instruction: | English   |
| Lectures/exercises:      | 2/1/0 per week  |
| Completion:              | written exam  |
| Course goal:             | Description of the forest oecosystem, principles of oecological stability and natural forest dynamics. Introduction into ways of forest sustainable management.   |
| Abstract:                | <p>Presenting oecology, natural dynamics, environmental impact and management of Central European forests. Discussing fytogeographical and socio-economic determinants of forest management. Approaching the basic management rules and certification schemes in forests of the Czech Republic.</p> <p>Accounting forest environmental effects and the methods of its valuation.</p> <p>Introducing the main abiotic and biotic agens which form forest management and protection. Mentioning is the impact of industrial pollution on forests of the Erzgebirge Mountains.</p> |

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| Faculty/Institute        | Faculty of the Environment   |
| Course title:            | <b>Fundamentals of Sustainability</b>  |
| Course code:             | KTEV/OFUST   |
| ECTS:                    | 8  |
| Level of course:         | bachelor / master  |
| Teacher:                 | Professor Valentina Pidlisnyuk, Dr.Sc.   |
| Term:                    | Winter / summer  |
| Language of instruction: | English  |
| Lectures/exercises:      | 2/0 per week   |
| Completion:              | 7 lectures and one skype lecture from K-State,USA ; Home reading, conflict resolution exercise, final presentation and test  |
| Course goal:             | The course focuses on environmental issues in a globalize contest within the framework of sustainability. Through an interdisciplinary perspective, the course will provide students with key competences and instruments for the analysis of natural and environmental resources in a sustainable perspective and development of policies oriented towards the promotion and implementing sustainability at the local, national and international levels.   |
| Abstract:                | The course covers the following themes: sustainable development concept, global events, 2030 sustainable development goals. The ecological, economic and social threats such as water, air and soil contamination, biodiversity loss, ozone layer depletion, waste accumulation, poverty and population growth are deeply overviewed. The course studies policies in climate change, energy implications with the focus at alternative energy - biomass. Through ecological, economic, social and institutional indicators it is shown how to address sustainability at the regional and local levels. The practical aspects of sustainable water use, sustainable agriculture, and greening of economy, education for sustainable development, and approaches for selection and monitoring of sustainability indicators are discussed. The case studies from Central and Eastern European countries and USA are considered as examples of interconnection between economic development, environmental and social aspects, and institutional transformation. Students are supposed to select environmentally coloured problem raised the conflict locally or globally, to discussed it from the prospective of different stakeholders involved and to find an appropriated solution. Lecture from K-State,USA is on Sustainability of Waste Management and provided by faculty member of that university Dr. Larry Erickson. |

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| Faculty/Institute        | Faculty of the Environment   |
| Course title:            | <b>Global Environmental Change</b>   |
| Course code:             | KTEV/OGECH   |
| ECTS:                    | 8  |
| Level of course:         | bachelor / master  |
| Teacher:                 | Professor Valentina Pidlisnyuk, Dr.Sc.   |
| Term:                    | Winter / summer  |
| Language of instruction: | English  |
| Lectures/exercises:      | 2/0 per week   |
| Completion:              | 6 Lectures and one skype-lecture, home-reading, essay, final presentation, test  |
| Course goal:             | Course is highly interdisciplinary, seamlessly crossing disciplinary boundaries and offer a “front-loaded” approach. It is introducing students to the science of the Earth and its living and non-living systems as well as how humans interact with Earth and its natural systems and how humans can use powerful tools, such as policy and communication to harm or help those systems. It provides a broad understanding of complex issues involved in global change and global sustainability and enables students to use quantitative tools in approaching global change issues. The main expectations are to advance awareness of the magnitude and consequences of global changes and to train the next generation of problem-solvers who will adequately address the phenomena.   |
| Abstract:                | <p>Course consists of two main parts:</p> <p>Part 1. Issues and Driving Forces<br/> Growth and nature of environmental awareness, values and perceptions. Critical issues in current and future environmental change in terrestrial, atmospheric, aquatic and marine systems. Climate change and its impact. The forces driving change including population growth and consumption, resource scarcity, climate, patterns of energy use, ecosystem changes, thresholds and sustainability.</p> <p>Part 2: Managing the Global Environmental Changes<br/> The nature of environmental changes at various levels, the business perspective, special interest groups, national and international action and co-operation. The formal legal framework. How the above are mediated by crosscutting dimensions of a legal, economic, cultural and ecological nature.</p> <p>Case-studies on mitigation and adaptation measures in CC are presented.</p> <p>Students have to be prepared for a stimulating and challenging journey filled with new concepts, theories, problems, and experiences.</p> <p>Skype-lecture is provided by K-State, USA faculty member Dr. Blasé Level, Centre for Hazardous Substances Research, Environmental Engineering and is about service to communities in environmental matters and adaptation/mitigations measures.</p> |

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| Faculty/Institute        | Faculty of the Environment  |
| Course title:            | <b>Sustainable Management of Contaminated Sites</b>   |
| Course code:             | KTEV/OSMCS  |
| ECTS:                    | 8   |
| Level of course:         | bachelor / master   |
| Teacher:                 | Professor Valentina Pidlisnyuk, Dr.Sc.& Associate Professor Josef Trögl   |
| Term:                    | Winter / summer   |
| Language of instruction: | English   |
| Lectures/exercises:      | 2/0 per week  |
| Completion:              | 3 lectures and 1 skype-lecture, internet search, informal discussions, participation at the Design project presentations at K-State, USA, final presentation and test   |
| Course goal:             | Course introduces an integrative project-oriented capstone “bringing” opportunity and is based on international experiences in sustainable management of diverse contaminated land: military, mining and abandoned. Graduates of the course will be well poised to successfully lead in developing and implementation multifaceted solutions to environmental, societal and other cross-sectors problems connected with sustainable approaches in land management.  |
| Abstract:                | <p>Sustainable management takes the concepts from sustainability and synthesizes them with the concepts of management having 3 branches: the environment, the needs of present and future generations, and the economy. Sustainable management of contaminated land implies application of sustainable practices to the contaminated lands by operation them in a way that well build current and future generation needs.</p> <p>Course consists of lectures on targeted topics and case-studies from around the Europe and USA. Lectures cover the following topics: “Principles of environmental sustainability”, “Biotechnology for contaminated land treatment”; “Phytoremediation of nonorganic pollutants”.</p> <p>Practical exercises imply: a) observation of internet resources related to the topics b) group informal discussion.</p> <p>Additional course includes introduction of scientific &amp; outreach projects in the region of Central and Eastern Europe and USA: NATO project “New phytotechnology with biomass production for military contaminated sites”, REMKO project “ Remediation of comprehensively polluted soils”, Interreg project “Remediation of military past pollution in Baltic region, EPA USA Superfund site project in Arizona, USA.</p> <p>1 skype lecture on management of USA tribes’ contaminated lands is delivered by professor Octaviana Trujillo, University of Arizona, USA.</p> <p>Students actively participate in the final presentations of Design projects of Chemical Engineering students at K-State, USA being connected by skype. The K-State Design class is led by Dr.Erickson and prof. Schlup, faculty members at K-State, USA.</p> |



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| Faculty/Institute        | Faculty of the Environment   |
| Course title:            | <b>Project Lesson</b>  |
| Course code:             | KPV/OPROJ  |
| ECTS:                    | 6  |
| Level of course:         | bachelor / master  |
| Teacher:                 | Ing. Martin Neruda, Ph.D.  |
| Term:                    | Winter / summer  |
| Language of instruction: | English  |
| Lectures/exercises:      | 2/0 per week   |
| Completion:              | students' presentation and report  |
| Course goal:             | Cooperation between international students and local academics within students' bachelor or diploma thesis, projects.  |
| Abstract:                | Students work on their project or bachelor/master thesis and have regular meetings with supervisor. Supervisor is an expert in the field of a project. Students will write a report about a project, which can be part of bachelor/master thesis and have a detailed presentation. |

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| Faculty/Institute        | Faculty of the Environment  |
| Course title:            | <b>Environmental Humanities</b>   |
| Course code:             | KSPV/ OENHU   |
| ECTS:                    | 8   |
| Level of course:         | bachelor  |
| Teacher:                 | Mgr. at Mgr. Kateřina Marková, Ph.D.  |
| Term:                    | Winter, summer  |
| Language of instruction: | English   |
| Lectures/exercises:      | 0/2 per week  |
| Completion:              | essay/oral exam   |
| Course goal:             | Introducing basic English environmental humanities terms and skills, focusing on general aspects and specific environmental problems.   |
| Abstract:                | <p>The course is terminated with a short essay followed by an oral examination. Dealing with scientific texts in English (spoken and written). English terminology connected to the studied subject. Language items used in scientific texts. Dealing with topics covering the professional orientation. Improving communicative skills (writing and speaking, above all) focusing on the topics connected to the professional orientation in environmental humanities.</p> <ol style="list-style-type: none"> <li>1. Welcome to the Czech Republic</li> <li>2. Environment and Ecology - Sustainable development</li> <li>3. Earth Sciences and Humanities (sciences) – (philosophy, psychology, cultural anthropology...).</li> <li>4. Wildlife (Natura) X Culture</li> <li>5. Using the land – culture (using the land)</li> <li>6. Philosophy of environmental education</li> </ol> |