



- MENDELU
- Faculty of Forestry
- and Wood
- Technology

**Academic year: 2022–2023**

**Courses in English**

**Mendel University in Brno**  
**Faculty of Forestry and Wood Technology**  
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Course taught in English for exchange students		Code	Semester	No of credits	Note
1	Acoustics of Wood	ZAW	W	5	
2	Applied Ecology of Game	AEOG	S	4	
3	Applied Genetics (foreign lecturer participation)	ZAG	W, S	5	
4	Applied Mycology	FMEF	W	4	
5	Applied Soil Science and Protection <b>NEW</b> (foreign lecturer participation)	APO	W	6	
6	Basic Principles of Game Management	ZGM	W	4	
7	Biomechanics and Tree Stability	BATS	S	4	
8	Building Physics <b>NEW</b>	ZBPH	W	5	
9	Dendrochronology <b>NEW</b>	ZDCH	W	3	
10	Dendrology and Ecology of Forest Tree Species	ZDEFT	S	4	
11	Ecophysiology of Woody Plants	ZEOW	S	4	
12	Economics of Sustainable Resource Management	ESRM	S	4	
13	Engineering Drawing with CAD System Application	ZED	W	5	
14	Environmental Geochemistry	EGEF	W	4	
15	Ergonomics and Occupational Safety	ZEOS	W,S	4	
16	Ergonomics and Space <b>NEW</b>	ZEPRS	W	4	
17	Forest Access Roads	ZFAR	W	5	
18	Forest Biometry and Modelling	BMEF	W	6	
19	Forest Botany: Plants of Various Forest Ecosystems in Europe	ZFOB	S	4	
20	Forest Ecology	FORECOL	W	6	
21	Forest Economics and Policy	EFEP	S	6	
22	Forest Ecosystems in Europe	FEEF	S	6	
23	Forest Establishment <b>NEW</b>	ZAKL	W	5	
24	Forest Management and Planning	HSUL	W	6	
25	Forest Pathology and Protection	FOPA	S	6	
26	Forest Products Marketing and Trade	MOLP	W	6	
27	Forest Technology	FORT	W	6	
28	Furniture and Design	ZFD	W	5	
29	Furniture and Interior Visualisations	ZFIV	S	5	
30	Genetics and Breeding of Forest Trees <b>NEW</b>	GSD	W,S	4	
31	Geobiocoenology	GBC	S	4	
32	Geographical Information Systems	GISEF	W	6	

33	Global Ecology <b>NEW</b>	ZGEC	W	4	
34	How to Read the Landscape <b>NEW</b>	ZHRL	W	5	
35	International Occupational Safety & Health Management		S	3	
36	Introduction to Engineering Computing	ZIEC	S	5	
37	Landscape Ecology (foreign lecturer participation)	ZLENC	S	4	
38	Landscape Planning and Regional Development	ZLPRD	S	4	
39	Landscape Recreology	ZLREC	W	4	
40	Log Yards and Sawmilling	LYEF	W, S	4	
41	Logging and Transport of Timber in European Forests	LTTEF	W	6	
42	Management <b>NEW</b> (foreign lecturer)	ZMNG	S	4	
43	Mathematics	Z-MT	W,S	5	
44	Multifunctional Forestry	MULF	S	6	
45	Nature Conservation	ZNC	S	4	
46	Non-wood Forest Products (foreign lecturer participation)	ZOPL	S	3	
47	Pathology of Woody Plants, Diseases of Trees	ZPWPN	W	5	
48	Physical and Mechanical Properties of Wood	PMEF	W	4	
49	Public Relations in Forestry	PREF	W	4	
50	Remote Sensing	Z-IRS	S	5	
51	Reveal Tree Structure and Function	PBEF	W	4	
52	Silviculture (foreign lecturer participation)	SILV	S	6	
53	Social Communication <b>NEW</b>	ZSCM	W,S	5	
54	Soil Biology and Biochemistry (foreign lecturer participation)	ZSOB	S	4	
55	Soil Science – Principles and Practices	APO	S	3	
56	Statistical Analysis in Ecology Using R	SAIEU	W	3	
57	Surveying and Land Records	ZSLR	S	5	
58	3D Printing <b>NEW</b>	ZDPR	W,S	5	
59	Tree Climbing <b>NEW</b>	ZSTML	S	4	
60	Trees and Timbers in the Mediterranean Area <b>NEW</b> (foreign lecturer)	ZTTM	S	4	
61	Tropical Timbers <b>NEW</b> (foreign lecturer)	ZTMB	W	4	
62	Urban Forestry	URF	W	4	
63	Utility Plants of Subtropics and Tropics	ZUPST	S	4	
64	Water Management and Water Quality Policy	WSS	W	5	
65	Wood Anatomy	WAEF	W	4	

66	Wood Modification	ZWM	W	4	
67	Wooden Structures – From Tradition to Sustainability <b>NEW</b>	ZDRKO	S	5	

**Notes:**

**A course runs if there are enough students registered.**

**Courses are for Erasmus bachelor and master students.**

## **Course title: Acoustics of Wood**

**Objectives and contents:** Students will be introduced to acoustics with orientation to properties and uses of wood. The course covers the following topics: theory of acoustics, wave propagation in wood, dynamic and acoustic properties of different wood species, internal friction in wood, experimental methods for the acoustic characterization of wood, sound as a non-destructive tool for wood quality assessment, influence of aging and moisture on the acoustic properties of wood, methods for improving the acoustic properties of wood, acoustic emissions, room acoustics, acoustics of musical instruments, numerical methods in vibro-acoustics, acoustic aspects of using wood in architecture, sound reproducer systems and musical instruments.

**Instructor:** Ing. Jan Tippner, Ph.D., Dept. of Wood Science

**Language:** English

**Semester:** W

**Duration:** 1 semester

**Time-table:** lectures and practices –  
40 hours, lab work - 30 hours

**ECTS Credits:** 5

**Prerequisite courses:** -

Method of assessment: written examination

## **Course title: Applied Ecology of Game**

**Objectives and contents:** To deepen students' knowledge of environmental laws associated with the occurrence of game in ecosystems. Focus will be on understanding the ecological relationships between populations and between animals and their environment. An important part of the course will be study of competition for food resources, and sustainable balance between population of game and the environment.

Course contents:

1. Ecological interactions of game and their environment, focusing on the possibility of improving the sustainability of game management. The definition of environment and relationships in ecosystems will be discussed.
2. Possibilities of monitoring the environment, the concept of ecological stability in relation to the game management.
3. The most important implications of hunting for the environment, the definition of carrying capacity and the possibility of eliminating the negative impact caused by game.
4. Legislation on environmental protection related to the game management.
5. Population ecology of game, internal and external factors that affect it, the possibility for improving the welfare of game.
6. Fragmentation of the landscape and its potential effects for life of game. Possibilities of decreasing these effects and methods for their monitoring.
7. Anthropogenic landscape changes and their impact on game and its interaction with the environment.
8. Evaluation of environmental quality for game.

**Instructor:** doc. Ing. Jiří Kamler, Ph.D., Ing. Radim Píhal, Dept. of Forest Protection and Wildlife Management

**Language:** English

**Semester:** S

**Duration:** 1 semester

**Time-table:** lectures, exercises and practices

– 30 hours

**ECTS Credits:** 4

**Prerequisite courses:** -

Method of assessment: examination

## **Course title: Applied Genetics**

**Objectives and contents:** The aim of the course is to introduce possibilities of applied molecular genetics in forestry, and basics of molecular biology. The molecular genetics opens new possibilities and offers new tools usable for example in breeding, forest protection. We want to also discuss about popular topics like GMO (Genetically modified organism). During exercises we will also perform basic molecular-genetic approaches.

1. Applied genetics around us (Applications in medicine, breeding, criminalistics, and in phytopathology)
2. Introduction to laboratory work
3. Preparing of solutions and buffers for molecular experiments
4. Isolation of DNA, PCR (polymerase chain reaction), and quality and quantity control
5. Sequence databases
6. GMO - genetically modified organisms
7. Markers, restriction digestion

- 8. Sequencing
- 9. Fingerprinting and its usage in praxis

**Instructor:** Ing. Peter Mendel, Antonio Pompeiano, Ph.D., Dept. of Forest Bot., Dendrology and Geobiocoenology

**Language:** English

**Semester:** W, S

**Duration:** 1 semester

**Time-table:** lectures, exercises and practices

– 28 hours, lab work – 8 hours

ECTS Credits: 5

Prerequisite courses: -

**Method of assessment:** written and oral exam

### **Course title: Applied Mycology**

**Objectives and contents:** Definition of the fungi kingdom. A brief overview of the system of fungi, phylogenetic relations. Life cycle of fungi and fungus organisms. Sexual and asexual life forms. Ways of asexual reproduction of fungi. Application of methods of molecular biology in mycology. Physiology of nutrition and growth. Sources of carbon and nitrogen. Macroelements, microelements, vitamins in the nutrition of fungi. Ecology of fungi – fungi in forest ecosystems. Decomposition of wood mass by fungi. Cellulotic and ligninolytic enzymes. Use of enzymes in practice. Accumulation of heavy metals in fungi (mechanisms of storing, environmental applications). Fungi in symbioses. Lichenism. Mycorrhizal symbioses. Symbiosis with animals (ambrosia fungi, symbiosis with termites). Fungi in extreme conditions. Fungi in human nutrition. Nutritional substances in the fruiting body of fungi. Fungal intoxication. Growing fungi. Mushrooming and non-wood-producing forest functions. Protection of fungi.

**Instructor:** doc. RNDr. Michal Tomšovský, Ph.D., Dept. of Forest Protection and Wildlife Management

**Language:** English

**Semester:** W

**Duration:** 1 semester

**Time-table:** lectures, exercises and practices

– 30 hours

ECTS Credits: 4

Prerequisite courses: -

**Method of assessment:** examination

### **Course Title: Applied Soil Science and Protection**

**Objectives and contents:** Introduction to the issue - basic terms and definitions in soil science. Soil formation and natural soil formation processes, soil and plant. Soil taxonomy - soils of Europe. Differences between forest, agricultural and urban land. Pedosphere and its relation to other components of the environment. Deterioration of physical properties of soil (drying, wetting, structure breakdown, erosion, pedocompaction). Deterioration of chemical properties of soils (acidification, alkalization, entry of pollutants into the soil). Deterioration of biological properties of soil (accelerated mineralization of humus in soil, pests, allelopathy of soil). Soil functions. Soil protection and use. Alternative ways of working with soil. Soil monitoring. Remedial measures and legislation in soil protection. Examples of ecological studies

The course includes (1) student presentations as a partial output; (2) fieldtrip on research plots with demonstration of soil investigation. (3) soil analysis.

**Instructor:** doc. Valerie Vranová, Ph. D, Ing. Aleš Kučera, Ph.D., Ing. Rahul Datta, Ph.D., Department of Geology and Pedology

**Language:** English

**Semester:** W

**Duration:** 1 semester

**Timetable:** 1. lectures – 28 hours, 2. Practice 14h, 3. 1-day field trip –

8 hours

ECTS Credits: 6

Prerequisite courses: -

**Method of assessment:** Presentations; written test and oral exam

### **Course title: Basic Principles of Game Management**

**Objectives and contents:** To provide students with information on the history and with current knowledge and skills in game management. Interpretation of this knowledge and its specific use in the European context.

Main topics:

1. Importance of hunting and game management and its perspectives in different phases of human history.
2. Game management legislation, organization and governance in the Czech Republic and in the world.
3. Biological fundamentals of gamekeeping.
4. Influence of the external environment on game.
5. Management of game populations, selective hunting.
6. Economics of game management.
7. Methods, equipment and guns used for hunting.
8. Influence of human activity on game.
9. Care for game.
10. Assessing the age of live and killed game.

**Instructor:** doc. Ing. Jiří Kamler, Ph.D., Ing. Radim Plhal, Dept. of Forest Protection and Wildlife Management

Language: English

Semester: W

**Duration:** 1 semester  
– 49 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 4

Prerequisite courses: -

Method of assessment: examination

### **Course title: Biomechanics and Tree Stability**

**Objectives and contents:** Mechanical disturbances are an important factor affecting forests and wood production. The course will enable students to understand the basic relationships between the mechanical influences of the environment (wind, snow, extreme habitat) and the stability of trees and forest stands. The course will deal with the basic parameters of a tree that define its stability and parameters of the environment determining the strength of disturbance. The influence of abiotic factors of the environment will be discussed in terms of the stability of both individual trees and the entire stand. The student will obtain basic competencies in identifying individual important factors of the environment and in proposing a protection plan for an individual tree as well as for a stand against abiotic effects. The breadth of knowledge will be extended with information concerning urban forestry and arboriculture, in which ability to determine the stability of a tree is one of the basic requirements.

Discussed topics:

Definition of basic terms; strategy of a tree in terms of mechanics; properties of wood and their interpretation in relation to the mechanical stability of a tree; optimisation of the structure of wood; adaptational growth; geometry of the trunk and roots; stress load, its sources; distribution of tension; calculation of arising tension, load analysis; assessment of the probability of failure.

**Instructor:** Ing. Luděk Praus, Ph.D., Dept. of Wood Science

Language: English

Semester: S

**Duration:** 1 semester  
– 30 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 4

Prerequisite courses: -

Method of assessment: examination

### **Course title: Building Physics**

**Objectives and contents:** People spend a lot of time in buildings. Healthy, comfortable and economically effective environment is necessary attribute of contemporary architecture that should strongly take building sustainability and ecology into account. The primary objective of the course is focused on fundamental aspects of building physics covering all mentioned aspects specifically from heat and moisture transfer in buildings point of view. This course briefly provides fundamental design concepts of nZEB (Nearly Zero Energy Building) architecture and renewable energy sources. Building performance aspects related to building components will be discussed with respect to the indicators of energy balance and thermal comfort. Additional subjects will be focused on the moisture transport as a key

factor of durability and lifespan of building components. It also presents theory with examples of practical application and an overview of technical codes and standards. An advanced software toolbox will be used for it to simulate heat and moisture transfer and building energy demand.

**Instructor:** Ing. Richard Slávik, Ph.D., Dept. of Wood Processing Technologies

**Language:** English

**Semester:** W

**Duration:** 1 semester

**Time-table:** lectures and practices – 40 hours, lab work - 20 hours

Prerequisite courses: -

ECTS Credits: 5

Method of assessment: written examination

### **Course title: Dendrochronology**

**Objectives and contents:** Dendrochronology, in the broadest sense, is the science of dating tree rings. It includes investigations of the information content in the structure of dated rings and applications to environmental and historical questions. Students will obtain basic information about wood anatomy, principles of dendrochronology, dendroarchaeology, dendroecology, subfossil wood and C14 dating. Practical exercises include the methodology of sampling and measurement of samples, learning to work with the dating software, using of tree-ring analysis and their interpretation, information about the latest methods of European dendrochronology and knowledge of dating historical and recent wood.

**Instructor:** Ing. Tomáš Kolář, Ph.D., doc. Ing. Michal Rybníček, Ph.D., doc. Ing. Hanuš Vavřík, Ph.D. – Dept. of Wood Science

**Language:** English

**Semester:** W

**Duration:** 1 semester

**Time-table:** lectures, exercises and practices

– 30 hours

ECTS Credits: 3

Prerequisite courses: -

**Method of assessment:** project work and test

### **Course title: Dendrology of European Forest Tree Species**

**Objectives and contents:** The course encompasses the morphology, taxonomy, chorology and ecology of trees with primary focus on trees important for European forestry, on the species most often introduced and with a possible perspective for forest management and landscape formation. In terms of shrubs, the course focuses especially on species prominent in European stands. The course provides a systematic overview and distribution of trees in various geographic areas of the globe: vegetation belts, zonality, altitudinal vegetation zones with a focus on European forest regions. Forest regions: North European region of coniferous forest, East and North-East European deciduous-coniferous forest (mixed forest), Central European oak-beech forest region, West European (Atlantic) deciduous forest region, coniferous mixed forest region of the Alps, South European deciduous mixed forest region, Mediterranean sclerophyllous forest region. The course also covers chorology of trees, territory, ecology of trees, mutual relationships of trees within the community, variability of a species (cultivars) and utilization of trees in forest management and landscape formation. An integral part of the course is the practical identification of trees according to macroscopic attributes, i.e. leaved shoots, buds, fruits (cones), seeds, bark and wood.

Course objective:

Identification of selected species of trees according to morphological features, knowledge of their scientific names, ability to assess trees as plant organisms in accordance with their biotic and abiotic environment and to assess trees with regard to the production of wood material, knowledge of the range and influence of the properties of individual species of trees for solutions of practical utilisation in forest management and landscape formation.

**Instructor:** doc. Ing. Luboš Úradníček, CSc., Ing. Martin Šenfeldr, Ph.D., Dept. of Forest Bot., Dendrology and Geobiocoenology

**Language:** English

**Semester:** S

**Duration:** 1 semester

**Time-table:** lectures, exercises and practices

– 30 hours

ECTS Credits: 4

Prerequisite courses: -



Method of assessment: examination

### **Course title: Ecophysiology of Woody Plants**

**Objectives and contents:** The objective of the course is to understand the behaviour of woody plants in the full range of external environmental factors including intentional and unintentional anthropogenic changes.

The course lectures cover: Architecture and growth of trees, shrubs and creepers. Phases of ontogenetic development of an individual tree, aging. Buds, shoot growth and types of shoots. Growth and development of leaves. Roots, root growth, rhizosphere of woody plants, types and extent of root systems. Management of growth of shoot and root systems. External and internal conditions for the growth of woody plants. Intake and distribution of radiation in the crown, effects (including stress) of radiation of various wavelengths, adaptation of trees to radiation climate, energy balance of leaves (photosynthesis, production of biomass and intake of radiation, light and the development of a plant, photoperiodicity). Temperature and physiological processes – influence of low and high temperatures, thermo-periodicity. Water stress – causes and effects of water stress, the function of water in woody plants, tolerance to drought. Aeration, compaction and salinisation of soil. Trees in cities – response of woody plants to stress factors of the environment, silvicultural interventions and faulty interventions.

**Instructor:** Ing. Zuzana Špinlerová, Ph.D., Dept. of Forest Bot., Dendrology and Geobiocoenology

Language: English

Semester: S

**Duration:** 1 semester

**Time-table:** lectures – 30 hours

**ECTS Credits:** 4

**Prerequisite courses:** -

**Method of assessment:** examination

### **Course title: Economics of Sustainable Resource Management**

**Objectives and contents:** This course covers the theory of natural resource economics, both in the context of the microeconomics of decision-making as well as its role in the larger economy and society. The focus will primarily be on the forest management and management of natural resources. How can we manage finite natural resources? What is the relationship between resources, trade and economic growth? This course will examine the conditions for market performance, market failure, elementary capital theory and application for investment decision-making in forest resources. It will also cover some topics that lie at the interface between resource and environmental economics. Attention will be paid to resource allocation issues which involve both market and non-market environmental values. The course will focus on bioeconomy and principles of a circular economy.

**Instructor:** Ing. Jitka Meňházová, Ph.D., Dept. of Forest and Wood Products Economics and Policy

Language: English

Semester: S

**Duration:** 1 semester

**Time-table:** lectures and seminars

**ECTS Credits:** 4

**Prerequisite courses:** -

**Method of assessment:** seminars, project work, written/oral examination

### **Course title: Engineering Drawing with CAD System Application**

**Objectives and contents:** Essential knowledge of engineering drawing, basics of design including CAD application for 2D drawings, graphical elements – entities and their attributes, object creation and edition, control functions in CAD applications, dimensioning of drawing, notes and labels, analysis of created objects. Basics of 3D objects, transfer processes, display functions, solid modelling including Boolean operations with solid objects and finally 3D rendering and visualization of designed objects. Drawings are generated from 3D objects. Means of data export to various graphical environments. Essential and useful knowledge of design art in CAD systems to create and display various objects and/or assemblies not only in wood-working industry.

**Instructor:** Ing. Pavla Mocová, Ph.D., Dept. of Wood Processing Technologies

Language: English

Semester: W

**Duration:** 1 semester

**Time-table:** lectures and practices –  
40 hours, lab work - 20 hours

**ECTS Credits:** 5

**Prerequisite courses:** -

Method of assessment: test on PC

## **Course title: Ergonomics and Occupational Safety**

**Objectives and contents:** This course offers an introduction into the basics of Ergonomics in a wide sense but also with respect to forestry, wood technology and other related disciplines. The topics covered: working environment, methods and findings of anthropology and biomechanics, physiology of work and work hygiene, occupational diseases and injuries, workplace safety culture and health protection, risk prevention, social ergonomics, work aesthetics, efficiency and work evaluation, remuneration, workplace stress and psychosocial risk management system, the quality of working environment. Sociology and psychology of work. Basic ergonomic characteristics of forest workplaces, application of ergonomic findings.

**Instructor:** Mgr. Eva Abramuszkinová Pavlíková, Ph.D., M.A., Dept. of Engineering

Language: English

Semester: S or W

**Duration:** 1 semester

**Time-table:** lectures and practices –  
30 hours, lab work - 15 hours

**ECTS Credits:** 4

**Prerequisite courses:** -

**Method of assessment:** project work, seminars, written/oral examination

## **Course title: Environmental Geochemistry**

**Objectives and contents:** The basic plan for the course is divided into 4 main thematic areas:

### 1. Composition of the Earth

- Geochemistry of the Earth's crust, model of the Earth, brief overview of historical geology
- Plate tectonics, volcanicity, earthquakes and their influence on people
- Weathering, creation of soil, soil – erosion – degradation – food policy

### 2. Atmosphere

- Composition and stratification, sources of substances in the atmosphere and their transport
- Anthropogenic influences – climate change (greenhouse gases, ozone hole) – development scenarios
- Types of anthropogenic pollution (sources and causes)

### 3. Hydrosphere

- Composition of oceans, large hydrologic cycle, types of pollution, possibilities for utilization
- Freshwater reservoirs, hydrologic cycle, types of pollution, sources of drinking water

### 4. Man on the Earth

- Outline of development of human civilization and its interaction with environment
- Exploitation of mineral resources, technological processes and influences on the environment
- Non-renewable energy sources (coal, natural gas, oil), main energy strategies
- Nuclear energy, alternative sources of energy, possibilities and limits
- Global climate changes, viewpoints and opinions from various perspectives
- EIA, policy solutions (Rio de Janeiro, Kyoto Protocol)

**Instructor:** doc. Mgr. Aleš Bajer, Ph.D., Dept. of Geology and Soil Sciences

Language: English

Semester: W

**Duration:** 1 semester

– 30 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 4

Prerequisite courses: -

Method of assessment: examination

## **Course title: Ergonomics and Space**

**Objectives and contents:** To familiarize students with the issue of ergonomics. Content of study is mainly the understanding of the fundamental principles in the solution of space and furniture for appropriate conditions both for work, and other human activities.

Ergonomics is an interdisciplinary science that combines the knowledge of technical sciences, physiology, anthropometry, anthropology, psychology and hygiene.

The aim of the course is the knowledge of all these components for the understanding of the relationship of man and his environment, including a typology of the furniture.

Ergonomics is the science that deals with the relationship of man and his environment. He gets into awareness with the development of working activities, while studying the physical and mental abilities of the person, applied techniques of work, its organisation, material environment and the socio-psychological ratios.

Course contents:

1. Introduction to ergonomics, history and development
2. Theoretical insights from anthropology – the basic dimensions of the person, the relationship man – machine, the furniture. Ranges of movements.
3. Working position and their principles - the standing position, sitting position, lying down
4. Factors of noise and their effect on the human body in active or passive activities.
5. Light and its use in interior design.
6. Thermal aspects of their regulation for streamlining work activities
7. Color and its influence on the perception of space
8. Psychological and social aspects
9. Practical experience and examples
10. Excursion

**Instructor:** Ing. arch. Ivana Boulaz, Ph.D., Dept. of Furniture, Design and Habitat

Language: English

Semester: W

**Duration:** 1 semester

**Time-table:** lectures and practices –  
30 hours, lab work - 15 hours

**ECTS Credits:** 4

**Prerequisite courses:** -

**Method of assessment:** written and oral examination

### **Course title: Forest Access Roads**

**Objectives and contents:** The objective is to teach the students the practical works needed for planning, design, construction and maintenance of forest road network aimed at private owners of small woodlots.

Content: the long term view, factors affecting road planning and location, surveying in road systems, harvesting road layout, project documentation of the forest roads.

Materials and machines: soils, crushed stone and culverting materials.

Design and construction: road construction, formation, curves and gradients, culverts, bridges, quarrying, road surfacing, geotextiles.

Maintenance: causes of wear and tear, maintenance maps, maintenance of formation, maintenance of the road surface, maintenance of drainage.

Special situation involving protecting fish habitat, recommendations for wetland forest roads, dealing with beavers.

**Instructor:** doc. Ing. Petr Hruža, Ph.D., Dept. of Landscape Management

**Language:** English

Semester: W

**Duration:** 1 semester

**Time-table:** lectures and practices –  
40 hours, lab work - 20 hours

**ECTS Credits:** 5

**Prerequisite courses:** -

**Method of assessment:** written and oral examination

### **Course title: Forest Biometry and Modelling**

Objectives and contents:

1. Introduction to open source statistical and modelling language R.
2. Graphical methods of exploratory data analysis.
3. Biometrical and statistical analysis of measured quantities with R.
4. Estimation of parameters of non-normal data.
5. Linear and non-linear regression models.
6. Parameterization and calibration of models with R.

**Instructor:** doc. Ing. Karel Drápela, CSc., Dept. of Forest Management and Applied Geoinformatics

Language: English

Semester: W

**Duration:** 1 semester  
– 56 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 6

Prerequisite courses: -

Method of assessment: personal project

## **Course title: Forest Botany: Plants of Various Forest Ecosystems in Europe**

**Objectives and contents:** The objective of the course is to obtain an overview of the classification system of vascular plants, including the importance of individual groups within ecosystems. The practical instruction focuses on ca 280 indicator species of vascular plants and knowledge of ecological requirements of the most important plants.

Lectures:

1. Introduction, ecologic aspects – soils and climates of Europe, history of vegetation development in Europe.
  2. Phylogenetic system of non-vascular and especially vascular plants
  3. Bryophytes and ferns with a focus on indicator species
  4. Gymnosperms
  5. Angiosperms, characteristics of the most important angiosperm families
  6. Indicator ferns, bryophytes, lichens and spermatophytes:
    - a/ arctic vegetation
    - b/ boreal vegetation
    - c/ Atlantic vegetation
    - d/ Central European vegetation
    - e/ Mediterranean vegetation
    - f/ Pannonian vegetation
    - g/ Alpine plant communities
    - h/ Fresh-water communities
    - i/ Coastal plant communities, floodplain forest communities
  7. Principles of classifying vegetation, protection of plant communities
- Practices: Practical demonstration of most important indicator plants

**Instructor:** Ing. Hana Habrová, Ph.D., Ing. Tomáš Koutecký, Ph.D., Mgr. Samuel Lvončík Dept. of Forest Botany, Dendrology and Geobiocoenology

Language: English

Semester: S

**Duration:** 1 semester  
– 30 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 4

Prerequisite courses: -

Method of assessment: examination

## **Course title: Forest Ecology**

**Objectives and contents:** Knowledge of the structure, processes and functioning of the natural and managed forests, ecosystem analysis in the holistic conception, hierarchy and behaviour of systems, evaluation of ecological impacts of human activities on forest ecosystems, evaluation of biotic interactions and trophic relations, primary and secondary production, biodiversity, stress behaviour, principles of ecological stability and landscape and global aspects of forest protection. Intensifying the possibility of an analytical approach to the evaluation of information and the possibility of synthetic evaluation of information obtained.

Contents of the course:

1. Introduction to Forest Ecology
2. Analyses of Changes in Forest Structure and Function at Multiple Time and Space Scales
3. Primary production
4. Water cycle in forest ecosystems
5. Biogeochemical cycles of nutrients
6. Biotic interactions and biodiversity
7. Ecological stability and ecosystem interaction
8. The Role of Forests in Global Ecology

## 9. Field excursion

**Instructor:** doc. Ing. Luboš Purchart, Ph.D., Ing. Jan Světlík, Ph.D., Mgr. Marian Pavelka, Ph.D., Mgr. Pavel Rotter, Ph.D., Ing. Jan Krejza, Ph.D., Dept. of Forest Ecology

**Language:** English

Semester: W

**Duration:** 1 semester

**Time-table:** lectures, exercises and practices

– 56 hours

ECTS Credits: 6

Prerequisite courses: -

Method of assessment: examination

## **Course title: Forest Economics and Policy**

Objectives and contents:

1. Definition of Forest Policy and Forest Economics. Political definition of Europe and the European Union countries. Description of European Union – importance, foundation and history, structure, institutions, the law of the EU, environmental law of the EU. Importance of natural conditions for Forest policy and Economics and Policymaking. Basic description of forestry in Europe. Historical development of forest economics and policy. Definition of Forestry as a career and main forest products.
2. Review of the Common Agricultural Policy of EU. The forest policy of the European Union. Main themes and objectives of forest policy in the EU. EU targets on renewable energy sources. EU FLEGT Action Plan and EU Timber Regulation. EU Biodiversity Strategy. Communication on “innovative and sustainable forest-based industries”. Green Paper on forest protection and information. International forest-related processes (UNFF, REDD+, LULUCF).
3. A new EU Forest Strategy: for forests and the forest-based sector.
4. Important institutions in EU forestry. Key conferences on EU forestry. Criteria and indicators of sustainable forest management. FAO and Forest Policy. International Forestry organizations (governmental and nongovernmental). Forest Europe.
5. Informational instruments. Advisory Services. Forest Reports. Public Relations in Forestry. Forest Reports from UN.
6. Economics Instruments. Self-regulation of the market economy. State compensation and subsidies.
7. Forest Management Inventory and Forest Management Planning. Need for Forest Management Planning for owners. Land-use planning and Regional Forest Management Plans.
8. Important trends in forest legislation. Position of forestry in the state economy. National Forest Programmes (NFP) and main principles.
9. Ownership structure of forest estates of EU countries. Representation of forest owners and influence of government. State forests management institutions. Forest stakeholders: owners, workers and employees, and the general population.
10. Certification of forest estates. PEFC. FSC. C-o-C certification. Legal Source.
11. Forest Function as a part of ecosystems services. Forest products (wood and no-wood forest products). Natural resource evaluation.
12. Sustainable development processes. Sustainable development principles. Climate changes and European forests. System of protected areas in the EU (Natura 2000), IUCN. Environmental agreements and protection of the forest ecosystems. International conventions and action plans.
13. Timber supply and demand. Pricing of forest products and trends in timber prices. Forest valuation. EU Timber Regulation. Carbon Forestry.
14. Basic principles of macroeconomics. Macroeconomic impacts of environmental policies. Global and local environmental assessments. Positive externalities. Negative externalities. Basic terms of business economics. Capital structure of a forest enterprise. Profit, revenue, forest benefits. Principles of forest taxation. Subsidies, subvention and grants in forestry. Economic damage from environmental degradation. Economic aspects of negative impacts on the environment. Methods of quantification of economic damage from environmental degradation. Environmental degradation and economic instruments. Economic instruments of environmental policy.
15. Basic data and forestry description of European countries. Description of its forest-based sector and wood industry.

**Instructor:** Ing. Kateřina Holušová, Ph.D. et Ph.D., Dept. of Forest and Wood Products Economics and Policy

**Language:** English

**Semester:** S

**Duration:** 1 semester  
– 56 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 6

Prerequisite courses: -

**Method of assessment:** a project work and presentation, a credit test, written and oral examination

## **Course title: Forest Ecosystems in Europe**

**Objectives and contents:** The objective of the course is to become familiar with types of forest ecosystems within biomes of Mediterranean, temperate and boreal climatic zones existing on the European continent, including the main vegetation species determining the ecosystems and, last but not least, certain animal species typical of the given ecosystems.

On the basis of extensive photographic materials, students will be taught about the majority of zonal and azonal forest ecosystems in Europe. Attention will be given to the altitudinal zones in individual European mountain ranges, including the altitude and nature of the upper border of the forest. Special attention will be devoted to the specifics of ecosystems on individual islands and groups of islands with regard to endemism and biogeography.

The practices will provide information on the most important species of plants and animals in the individual types of ecosystems discussed by means of publications, slides and herbarium items. The individual practices will follow up the ecosystems presented in lectures.

The last two practices will be designated for collecting materials to prepare a seminar paper. Each of the students will select, or will be given, one of the ecosystems discussed (in a certain geographically determined variant), prepare its description in the form of a seminar paper with a focus on a concrete taxa of plants and animals that are typical of the given ecosystem.

**Instructor:** doc. Ing. Luboš Úradníček, CSc., Ing. Martin Šrámek, Ph.D., Dept. of Forest Botany, Dendrology and Geobiocoenology

**Language:** English

Semester: S

**Duration:** 1 semester  
– 56 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 6                      Prerequisite courses: for non European students Dendrology of European Forest Tree Species

Method of assessment: examination

## **Course title: Forest Establishment**

**Objectives and contents:** Aims of the course are theory and practical training of technological procedures used in the artificial regeneration of forest stands. Students will learn about forest seed management, forest nurseries and forest artificial regeneration and afforestation. They will gain knowledge in the determination of seeds, type and age of planting stock, planting stock quality, substrate quality, seed quality and in working out a clear-cut reforestation project.

Course contents:

1. Sources of reproduction material
2. Forest seed management
3. Cultivation of planting stock
4. Handling with planting stock
5. Nutrition and irrigation in forest nurseries
6. Protective and defensive measures in forest nurseries
7. Reforestation of the main types of clear-felled areas
8. Care of young plantations

**Instructor:** Ing. Kateřina Houšková, Ph.D., Dept. of Silviculture

Language: English

Semester: W

**Duration:** 1 semester  
works, field work, excursion – 64 hours

**Time-table:** lectures, practices, laboratory

ECTS Credits: 5

Prerequisite courses: -

Method of assessment: examination

## **Course title: Forest Management and Planning**

Objectives and contents:

1. Forest management – its main goal, contents and history
  - 1.1 Classic forest management plan (conventional)
  - 1.2 Planning based on statistic inventory and control methods.
2. Methods of description and segmentation of forest ecosystems.
  - 2.1 Construction of management sets and forest development types.
3. Methods of volume assessment of whole stands I.
  - 3.1 Angle sampling method
4. Methods of volume assessment of whole stands II.
  - 4.1 Unified volume curves method
5. Scales of forest management planning (frame and detailed planning)
  - 5.1 Method of forest stands assessment
6. Temporal and spatial arrangement of the forest
  - 6.1 Forest maps
7. Sampling inventory method
8. Control method
9. Planning of fellings
10. Local volume equations
11. Classic control method
12. Method of frequency curves
13. Diameter class shift method
14. Czech national forest inventory

**Instructor:** Ing. Michal Kneifl, Ph.D., Dept. of Forest Management and Applied Geoinformatics

Semester: W

**Duration:** 1 semester

– 56 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 6

Prerequisite courses: -

**Method of assessment:** Student has to pass the final exam. All staff presented and discussed during lectures and exercises is necessary for the exam.

## **Course title: Forest Pathology and Protection**

Objectives and contents:

1. Stress ecology and theoretical background of Forest Pathology.
  - a. Stress ecology, forest decline
  - b. Wildlife management and game damage
  - c. Injury o trees and forest stands
2. Pests and harmful organisms in forestry
  - a. Background to forest entomology
  - b. Pests and their control in coniferous stands
  - c. Pests and their control in broadleaved stands
  - d. Main pests and harmful organisms in European forests
3. Diseases of trees
  - a. Diseases of roots, stems, shoots and foliage
  - b. Main diseases of coniferous trees
  - c. Main diseases of broadleaved tress
  - d. Main diseases in European forests
  - e. Alien, invasive a quarantine diseases and pests, Phytosanitary regulations

**Instructor:** prof. Dr. Ing. Libor Jankovský, doc. Ing. Petr Čermák, Ph.D., prof. Ing. Otakar Holuša, Ph.D. et Ph.D., Dept.of Forest Protection and Wildlife Management

**Language:** English

Semester: S

**Duration:** 1 semester

– 56 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 6

Prerequisite courses: -

Method of assessment: examination

## **Course title: Forest Products Marketing and Trade**

Objectives and contents:

1. Forestry, basic terms from economics, economics sectors, Renewable resources and non-renewable resources.
2. Basic principles of macroeconomics. Macroeconomic influences of environmental policies. Description of current situation in Europe from forestry view. GDP, Value Added Approach explanation. Gross value added from forestry
3. Management. Functions of management. Organizational structures. Goals, development and function of the business (enterprise), organization and forms of organization, business entities. Personal management, motivation, leadership, communication, personnel management.
4. Basic functions of marketing, strategy and objectives, marketing management system, marketing mix. Renewable sources and wood products marketing. Marketing in forestry.
5. Management from the economic view – history of management, management function, roles of management, planning process in management, organisational structure, control process, etc.
6. Forest Management – importance, attitude, forest management planning (types, components), Economics of Forest Management Decision Making.
7. Essential of wood market – timber-selling process. Timber supply and demand. Wood market description (plywood, raw materials, logs, pellets, etc.).
8. Overview of forest and wood markets and policies, policies shaping forest products markets. EU Timber regulation, FLEGT, VPA.
9. Business planning, success factors, a positive rating, information systems.
10. The essential of Public Relations – definition, history, crisis communication, public, different target groups, basic communication models, using in forestry, etc.
11. Marketing – simple marketing system, The 4 Ps & 4Cs, core concepts of marketing, customer, marketing plan, products, Public relations in Forestry and Wood Industry.
12. Forest economics – rotation period, Economics of Forest Management Decision Making in Today's World, specification of forest economics.
13. Current situation on the timber market (UNECE Reports) from Europe perspective.
14. Corporate social responsibility, social business, cost-benefit analysis, cooperation in forestry.

**Instructor:** Ing. Dalibor Šafařík, Ph.D., Dept. of Forest and Wood Products Economics and Policy

**Language:** English

**Semester:** W

**Duration:** 1 semester

– 56 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 6

Prerequisite courses: -

**Method of assessment:** presentation of seminar work, a credit test, written and oral examination

## **Course title: Forest Technology**

**Objectives and contents:** Structure of the basic types of machines used in forest management in the Czech Republic and around the world, especially in the EU countries Characteristics of machines for: preparation of soil, sowing, planting care of forest cultures and agricultural products during vegetation, cultivation of stands, logging and transportation of wood, wood storage, irrigation and drainage of areas.

Basic tools, machines and machine systems for manual, semi-mechanized, mechanized and highly mechanized works used in the Czech Republic and in the countries of Eastern Europe and their comparison with the situation in Scandinavia, Western Europe, the Alpine countries and in the Mediterranean, depending on the natural and economic conditions and on the size of properties (from large scale, to small scale).

Requirements for forest machines with a view to their impacts on the forest and natural environment, economic efficiency, work safety and hygiene and methods of resolving these requirements in the past, present and near future, including the specifics of certain regions in Europe as well as examples from select other parts of the world.

Furthermore, students will learn the principles of caring for these technologies and select mathematic models and methods used in designing these technologies and production lines, including their practical use in solving specific problems.



**Instructor:** Ing. Tomáš Zemánek, Ph.D., Dept. of Engineering

**Language:** English

**Semester:** W

**Duration:** 1 semester  
– 56 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 6

Prerequisite courses: -

Method of assessment: examination

## **Course title: Furniture & Design**

**Objectives and contents:** The aim of this course is to teach students about furniture design with regard to its specific objects (chairs, tables, beds, upholstered furniture, cabinets, etc.), as well as furniture development and creation techniques from the product design viewpoint. Lectures will consist of these topics: Classification and characteristics of furniture objects; Process of furniture creation; Contemporary and historical furniture design development; Czech furniture industry and design; Current situation of the global furniture market; Furniture materials and technologies; Ecological viewpoints on furniture production and design; Furniture and human living culture.

A personal project will be focused on the student's own interest within the scope of the course. Student projects will be guided by a teacher and presented together by students at the end of the course.

**Instructor:** Ing. Milan Šimek, Ph.D., Dept. of Furniture, Design and Habitation

**Language:** English

**Semester:** W

**Duration:** 1 semester  
project preparation and excursions – 30 hours

**Time-table:** lectures – 40 hours,

ECTS Credits: 5

Prerequisite courses: -

**Method of assessment:** personal project + oral examination

## **Course title: Furniture and Interior Visualisations**

**Objectives and contents:** The lessons offer an introduction to CAD visualisation software. This will include how to work with 3D via lecturing tutorials. Each lesson guides the students through the basic tasks of 3D modelling and visualization methods via operating with 3D basic primitives, introduction with main viewports and interface, mapping and textures modification, modelling and scene modifiers, setting scene lights and cameras to the proper rendering, and final customization. Lessons are mainly based on active interaction between the lecturer and the student in processing the relevant tasks. In their final work, students should demonstrate their abilities to design interior in the house -- such as a kitchen, living room or other space -- and they must present their own 3D tutorials thru the glasses for virtual reality.

Course contents:

1. General Overview
2. Modeling I
3. The basic model operations
4. Materials I
5. Materials II
6. Repetition, examples
7. Modeling II
8. Modeling III
9. Materials III
10. Repetition, examples
11. Visualization via special software for virtual reality
12. Visualization via special software for virtual reality
13. Visualization via special software for virtual reality

**Instructor:** Ing. Pavla Mocová, Ph.D. (80%), Ing. Tomáš Mansbart (20%), Dept. of Wood Processing Technologies

**Language:** English

**Semester:** S

**Duration:** 1 semester

**Time-table:** lectures and practices –  
40 hours, lab work - 20 hours

**ECTS Credits:** 5

Method of assessment: test on PC

**Prerequisite courses:** -

## **Course title: Geobiocoenology**

**Objectives and contents:** To gain an understanding of the composition, mutual relationships, processes, and classification of plants as a determining component of terrestrial ecosystems and to gain knowledge on the typological system and geobiocoenological method of differentiating vegetation. To obtain practical skills for describing and analysing the composition of a phytocenosis, including mapping, by means of a seminar paper.

Contents of the course:

1. Introduction. Importance, content, development and current trends in forest phytocoenology and geobiocoenology.
2. Methods of studying vegetation (test areas, mapping, analytic and synthetic features).
3. Interaction between vegetation and the environment (topography, climate, soil, water, fire, fauna, phytoindication).
4. Plant populations and communities.
5. Dynamics of vegetation (growth and distribution of plant populations, relationships between individual plants and plant populations, plant population strategies, succession, dynamics of a natural forest, stability and incidence of stress factors, principles and mechanisms of regeneration).
6. Distribution and development of vegetation (vegetation zoning and altitudinal zones and their variants, ranges, floral regions, floroelements, development of vegetation particularly in the postglacial period, human impact on vegetation).
7. Classification and ordination of vegetation (theory of forest type, systems of forest typology).
8. Geobiocoenological regionalisation (variants of altitudinal vegetation zones, natural forest areas).
9. Outline of the concept of economic sets of forest types, their uses.
10. Vegetation in a landscape from a geobiocoenologic perspective.

Key words:

Forest phytocenology, phytocenosis, geobiocoenology, geobiocoenosis, forest type, geobiocene, ecology of plants, forest typology, ecosystem, plant community, typology.

**Instructor:** Ing. Jan Šebesta, Ph.D., Dept. of Forest Botany, Dendrology and Geobiocoenology

Language: English

Semester: S

**Duration:** 1 semester

– 30 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 4

Prerequisite courses: -

Method of assessment: examination

## **Course title: Geographical Information Systems**

**Objectives and contents:** Introduction to geoinformation technologies (GIT), principles of geoinformation systems (GIS), main GIS terminology; Geospatial data - location, attributes, spatial relations (topology), time, metadata; Spatial data models; Geospatial database (geodatabase) - terminology of geospatial information, input and output of data, data quality; Spatial operations - queries by location, queries by attribute, Boolean algebra, measurement - distances, areas and perimeters, buffering, Spatial overlays - raster overlays, vector overlays, influence of scale and level of detail; Spatial Decision Support - Multi-Criteria and Multi-Objective Evaluation - decision rules, constraints and factors; Map algebra and Cartographic modeling - transformation of attribute data, local, zonal, focal and global operations; Neighbourhood operations - contiguity analysis (filtering), connectivity analysis (spread functions - frictions) and network analysis; Digital terrain modelling - data models, interpolation methods, topographic calculations; Database systems - Relational and Object oriented database model, domains, structure, manipulation and integrity elements, Structured Query Language; Cartographic projections and coordinate systems - geodetic datum, reference surfaces, main global and local coordinate systems; Desktop GIS applications - commercial and free software; Web GIS applications - web mapping services (servers); Thematic applications of GIS - forestry, agriculture and landscape application; GIS worldwide - main trends and legislation in EU (mobile GIS, augmented reality, cloud computing).

**Instructor:** doc. Ing. Martin Klimánek, Ph.D., Ing. Petr Vahalík, Ph.D., Dept. of Forest Management and Applied Geoinformatics

Language: English

Semester: W

**Duration:** 1 semester  
– 56 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 6

Prerequisite courses: -

**Method of assessment:** exercise practical exam and examination (test and written examination)

### **Course title: Global Ecology**

**Objectives and contents:** Definition and description of global environment. The global climate. Biomes of the Earth. Aquatic biomes. Oceans. Mountains ecology. History of the Earth. Extinction of species and causes of extinction in Holocene. Exploitation of raw materials, forestry, agriculture, urbanization. Air, water and soil pollution. Global climate changes. Carbon and ecological footprint. Desertification. Protection of species and populations. IUCN categories of protected areas. International networks of protected areas and ecological networks. International environmental agreements. Non-governmental non-profit organizations and associations.

**Instructor:** Ing. Petr Jelínek, Ph.D., Dept. of Forest Botany, Dendrology and Geobiocoenology

Language: English

Semester: W

**Duration:** 1 semester  
– 30 hours

**Time-table:** lectures, exercises and practices

ECTS Credits: 4

Prerequisite courses: -

Method of assessment: examination

### **Course Title: How to Read the Landscape**

**Objectives and contents:** Introduction to erosion and accumulation processes in the nature, main agents – gravitational, water, wind and glacier activity. The course is focused on interpreting the forms in the land and working out how they were created and shaped including description of sedimentary and erosion forms of streams and rivers (upland river meanders, river islands, waterfalls, gorges, pot-holes, debris fans, etc.), glaciated landscapes (creation of cirques, mountain peaks and edges, U-shaped valleys, fjords, hanging valleys, glacier deposits, drumlins, kettle lakes, long lakes, etc.), low-land areas landforms (floodplain systems, oxbows, alluvial fills, levees, river terraces, river deltas, meandering rivers, dry valleys, isolated hills, springs, fresh water wetlands, peat bogs, lakes, etc.), estuaries, saltwater marshes and saltflats, karst landscape evolution (main forms: caves, caverns, sink-holes, arches, limestone pavements), desert landscape (hollows, dunes, wadi, playas, etc.), erosion and accumulation in periglacial landscapes (polygons, soils, ice wedges, gelifluction, solifluction, rock debris and scree), fundamental forms of urban landscapes (road system, drainage canal, reservoir, quarry, ancient features, agriculture features, anti-erosion defenses, mining and extraction forms, reclaimed land, etc.).

A field trip will be focused on a) urban and karstic landscape (1.day), b) fluvial nature and antropogenic forms, wind and gravitation landscape forms (2. day).

**Instructor:** Assoc. prof. Aleš Bajer, Ph.D., Department of Geology and Pedology

Language: English

Semester: W

**Duration:** 1 semester  
Timetable: 1. lectures – 14 hours, 2. 2 days field trip – 16 hours  
30 hours

ECTS Credits: 5

Prerequisite courses: -

Method of assessment: Written test and oral exam

### **Course title: International Occupational Safety and Health Management**

**Objectives and contents:** The aim of the course is to provide students with knowledge in management and leadership of workplace safety, and related implications within an international context. They will be able to develop, implement, manage and continually improve an OHS Management system in compliance with international standards in the global business environment.

**Instructor:** Ing. Tomáš Zemánek, Ph.D., William Robb, BSc., Dept.of Engineering

Language: English

Semester: S

**Duration:** 1 semester **Time-table:** practices – 26 hours

**ECTS Credits:** 3

Prerequisite courses: -

**Method of assessment:** Written in the form of a credit and examination test, oral presentation of a semester project and part of the final exam.

### **Course title: Introduction to Engineering Computing**

**Objectives and contents:** Students will be introduced to computer aided engineering (CAE) using the finite element method (FEM) and with the help of ANSYS software. The course consists of the topics: CAE applications, methods and tools; FEM theoretical background; general concepts of model analyses; ANSYS environment; analysis pre-processing, solution and post-processing; building or import of geometry; building of finite element models; material models, modelling of basic mechanical and thermal problems based on tutorials. Students will choose their own project topics and work will be led by a teacher.

**Instructor:** Ing. Jan Tippner, Ph.D., Ing. Václav Sebera, Ph.D., Dept.of Wood Science

**Language:** English

Semester: S

**Duration:** 1 semester **Time-table:** lectures and practices – 40 hours, preparation of the project – 50 hours

ECTS Credits: 5

Prerequisite courses: -

**Method of assessment:** project, oral examination

### **Course title: Landscape Ecology**

**Objectives and contents:** The objective of teaching landscape ecology is to familiarise students with the theoretical background and methodological procedures of landscape ecology in an integrated holistic approach as a science studying the structure of the landscape and patterns of ecological processes in the landscape. The contents of the course will be adapted to the needs for applying the results of landscape ecology in the geobiocoenological approach within landscape planning and landscape maintenance. Instruction will focus on the geobiocoenological approach to studying the landscape, on creating supporting materials for designing an ecological network within a landscape, and on landscape maintenance leading to sustainable use. The examples of landscape ecology principles and policy around the world will be important components of lectures. Students should learn and understand the basic patterns in ecological processes and the relationship of natural and socio-economic components in a cultural landscape. They will be educated in the principles of bioindication and the methodological procedure of biogeographical differentiation of the landscape in the geobiocoenological approach, including examples of applications under the conditions of various landscapes. The instruction will aim to ensure that students are able to apply the differentiation of landscape as a basis for landscape planning and leading to sustainable use of the cultural landscape.

Contents of the course:

1. Definition of landscape, natural and cultural landscape
2. Landscape ecology, its origin, development, importance and current trends, schools of landscape ecology
3. Geobiosphere type theory and geobiocoenological concepts of landscape differentiation
4. Differentiation of the current status of the landscape, mapping of biotopes and the landscape
5. Categorisation of geobiospheres according to intensity of anthropogenic effects and degree of ecological stability
6. Homogeneity and heterogeneity of the landscape, individual and typological classification of landscapes
7. Landscape structure (matrices, patches, corridors, network characteristics in landscape, island biogeography theory.)
8. Landscape dynamics (ecological stability of landscape, homeostasis, homeorhesis, ecological stress in a landscape, succession of ecosystems and landscape development, transformations of central European landscape due to human influence)
9. Geoecological prognoses
10. Ecological landscape network (ecologically important segments in the landscape, classification according to biogeographical importance, defining the framework of ecological stability, designing territorial systems of ecological stability, current situation in designing, implementing and care for the structural components of the Territorial System of Ecological Stability, European Ecological Network)
11. Examples of the application of geobiocoenology and landscape ecology (protection of landscape character, assessment of environmental impacts, optimisation of landscape use, landscape planning, sustainable use of landscape)

Practices will be conducted in a combined format including field and laboratory work with subsequent processing of results. Each student will prepare a seminar paper on the landscape-ecological characteristics of a selected territory.

**Instructor:** Ing. Jan Šebesta, Ph.D., prof. Dr. Ing. Petr Maděra, Ing. Lenka Ehrenbergerová, Ph.D., Ing. Petr Jelínek, Ph.D., Ing. Jakub Kvasnica, Ing. Martin Valtera, Ph.D., Ing. Kateřina Žalmanová, Ing. Petr Čupa, Dept. of Forest Botany, Dendrology and Geobiocoenology, Paul C. Rogers, Ph.D, Utah state University.

Language: English

Semester: S

**Duration:** 1 semester **Time-table:** lectures – 28 hours, field practices – 24 hours

**ECTS Credits:** 4

**Prerequisite courses:** -

**Method of assessment:** course attendance (indoor lectures, 100% outdoor lectures), oral/written exam.

## **Course title: Landscape Planning and Regional Development**

**Objectives and contents:** To acquaint students with methods, procedures and legislative framework for planning in the landscape. Students gain basic information about contemporary trends in urban planning in the European and global context. Practical examples are presented to explain the procedures for handling various types of planning documents.

1. Landscape - categories, concept, content, taxonomy, classification, structure, standardization, classification of countries according to natural factors and cultural development of the country
2. Landscape-makers - the genesis, typing, processes, efficiency. Landscape elements - abiotic, biotic, anthropogenic, landscape as a self-regulatory system, landscape impacts, input-output linkages, balance of land
3. Cultural landscape - level of anthropization, anthropogenic influences, cultural landscape, types of conflicts, use
4. Methods of landscape analysis, landscape assessment and landscape planning (level) - topical, choric, regional
5. Types of landscape planning - spatial, landscape, territorial, environmental, regional development plan
6. Landscape planning - goals, objectives, importance, development paradigms, organic synthesis of landscape, landscape synthesis method
7. International relations in landscape planning
8. Sustainable development strategy - concept, design, resources, strategic planning and forecasting
9. Regional planning - legislation, objectives, tasks, planning information, members of the public, municipalities, assessment of the impact on sustainable development in the area
10. Planning tools - planning documents (planning analytical materials, geographical study), spatial development policy, planning documents (the principle of territorial development, land-use plan, control plan), zoning
11. Planning, special planning authorities, links to EIA, regional approval, built-up areas, territorial arrangements, arrangement of relations within a territory, right of first refusal and compensation
12. Landscape Projects and Programs - revitalization programs, restoration, landscape, etc.

**Instructor:** Ing. Jitka Fialová, MSc., Ph.D., Dept. of Landscape Management

Language: English

Semester: S

**Duration:** 1 semester

**Time-table:** lectures and practices – 40 hours, lab work - 20 hours

**ECTS Credits:** 4

**Prerequisite courses:** -

**Method of assessment:** 2 seminar works and 2 presentations, 2 homeworks, written/oral examination

## **Course title: Landscape Recreology**

**Objectives and contents:** Recreation as the social phenomenon, classification of recreation and activities realized in the countryside; Tourist trade as the form of recreation, social significance. Tourist trade zoning of the Czech Republic. The methods of analyzation of tourist trade. SWOT analysis; Positive and negative impact of landscape elements to the human. Ionization of the air, ozone, phytoncides, terpens, volatile oil. Allergy and *allergic* vegetation; Impact of recreation to the environment – positive and negative; Recreational stress of the landscape, capacities, acceptable impacts, recreational potential, recreational effect; Biological, technical and biotechnical treatments of landscape for

recreational and therapeutic utilization. Tourist lanes, nature trails, horse-riding trails, bicycle lanes, child playgrounds, golf courses, ski slopes, cross-country skiing lanes, accessing of landscape for handicapped people. Protective and correctional measures against the recreational damage; Control of recreational activities, legislature, organizations in the tourist trade and recreation; EU and national funding.

**Instructor:** Ing. Jitka Fialová, MSc., Ph.D., Dept. of Landscape Management

Language: English

Semester: W

**Duration:** 1 semester

**Time-table:** lectures and practices –  
40 hours, lab work - 20 hours

**ECTS Credits:** 4

**Prerequisite courses:** -

**Method of assessment:** 2 seminar works and 2 presentations, written/oral examination

### **Course title: Log Yards and Sawmilling**

**Objectives and contents:** The aim of this course is to get to know how to prepare the round wood for corresponding way of processing (species, volumes, dimensions and qualities), how to process it and produce the requested assortment of the sawn timber, necessary and suitable for subsequent production (buildings, furniture and the other wooden constructions). Students can learn the ways of sawn timber production, the necessary or possible operations, their aim and ways of realisation, production machines, lines and mechanisation. To get to know the sawn timber assortment, its properties and usage.

Lectures describe the topics: primary preparing of the round wood (usually in the forest); log yards of the sawmills (prepare the logs for sawing, their aim, equipment and layout; sawmills as such (sawn timber production – operations, their order, correlations, workers, assortment of sawmill products); sawn timber yards (sorting and storage of sawn timber, adjustment, preparation of the sawn timber for the customer); wastes, their types, volumes, processing and usage.

The course graduates will have the general ability to choose the way of sawmill wood processing of given volume and assortment of production, to design the corresponding equipment and to manage the production in different conditions depending on the different sources of material (from tropical to boreal forests) and the possibilities of society associated with this source (from developing to developed countries).

**Instructor:** doc. Ing. Karel Janák, CSc., Dept. of Wood Science and Technology

Language: English

Semester: W or S

**Duration:** 1 semester

**Time-table:** lectures, practical exercises

– 30 hours

ECTS Credits: 4

Prerequisite courses: -

Method of assessment: examination

### **Course title: Logging and Transport of Timber in European Forests**

Objectives and contents:

1. Introduction to the course. Characteristics of the Czech forestry.
2. Wood defects.
3. Wood assortments
4. Timber record
5. Timber felling
6. Skidding with draught animals
7. Tractor skidding
8. Cableways
9. Cableways
10. Other ways of skidding
11. Harvesting systems
12. Elimination of forest environment damage caused by logging of timber.
13. Timber transport

**Instructor:** Ing. Tomáš Zemánek, Ph.D., Dept. of Engineering

Language: English

Semester: W

**Duration:** 1 semester  
exercises – 56 hours

**Time-table:** theoretical lectures, practical

ECTS Credits: 6

Prerequisite courses: -

Method of assessment: examination

### **Course title: Management**

**Objectives and contents:** Concepts of organization and Management. Organization environment. Manager's roles and managerial functions including planning, organizing, leading, and controlling. Ethics and corporate social responsibility. Trends of organization and management in the future.

**Instructor:** Assist.Prof.Dr.Nirundon Tapachai

**Language:** English

Semester: S

**Duration:** lessons given in 2 weeks  
exercises – 30 hours

**Time-table:** theoretical lectures, practical

ECTS Credits: 4

Prerequisite courses: -

Method of assessment: examination

### **Course title: Mathematics**

**Objectives and contents:** The Mathematics course is the the classical one semester course for undergraduates. It is focused on the parts of mathematics which are typically used in engineering applications. The topics include linear algebra (vectors, matrices and determinants, systems of linear equations), basic numerical methods, calculus (derivatives with applications), integral calculus (antiderivative, Riemann integral with applications) and simple modelling with differential equations (with separated variables).

**Instructor:** Mgr. Simona Fišnarová, Ph.D., Dept. of Mathematics

**Language:** English

Semester: W or S

**Duration:** 1 semester  
– 40 hours

**Time-table:** lectures and practices

ECTS Credits: 5

Prerequisite courses: -

Method of assessment: written exam

### **Course title: Multifunctional Forestry**

**Objectives and contents:** The goal of the course is to familiarise students with the principles of multifunctional forestry including: (a) the biological and biotechnical principles of multifunctional forestry (growth dynamics of harvested trees, possibilities to influence them, their use in harvesting practice), (b) the biological, biotechnical and technical measures used in multifunctional forestry, and (c) the effects of multifunctional forestry on the economy and society as a whole. Instruction format: (1) theoretical instruction as practised in the Czech Republic (and, in a broader context, in the EU) and (2) practical demonstrations directly in the field (Training Forest Enterprise of MENDELU in Křtiny)

Instruction schedule (system: block-module-topic)

Block 1: Biological and biotechnical principles of multifunctional forestry

Module 1: Main biotic components Topic 1: Soil, water T2: Radiation, meteo-climate

Module 2: Biometrics T1: Dynamics of specimens T2: Dynamics of the underbrush

Module 3: Structures of landscape components T1: Role of the forest in the landscape T2: Forest functions T3: Landscape planning

Block 2: Biological, biotechnical and technical measures used in multifunctional forestry

M1: Soil care T1: Biological measures T2: Biotechnical measures T3: Technical measures

M2: Care of water sources T1: Biological measures T2: Biotechnical measures T3: Technical measures

M3: Care of wood production T1: Biological measures T2: Biotechnical measures T3: Technical measures

M4: Care of social effects T1: Biological measures T2: Biotechnical measures T3: Technical measures

Block 3: The effects of multifunctional forestry on the economy and society as a whole

M1: Economic effectiveness of MF T1: Evaluation of functions T2: Applications of forest functions evaluation

M2: Financial support of MF T1: Forms of subsidising T2: Comparison of models

**Instructor:** doc. Ing. Petr Kupec, Ph.D., Dept of Landscape Formation and Protection

Language: English

Semester: S

**Duration:** 1 semester  
– 56 hours

**Time-table:** lectures, exercises, practices

ECTS Credits: 6

Prerequisite courses: -

Method of assessment: examination

## **Course title: Nature Conservation**

**Objectives and contents:** Definition and description of nature conservation. Ethical principles and motives of nature conservation. Development of nature conservation in Europe and around the world. Biodiversity and its imperilment. Extinction of species and causes of extinction today. Other causes of environmental disturbance. Global market and organization. Exploitation of raw materials, forestry, agriculture, urbanization. Air, water and soil pollution. Global climate changes. Protection of species and populations. Legal protection of species in Europe and related international agreements. Ex-situ conservation. Territorial nature conservation. International categories of protected areas. Territorial protection under IUCN and in other countries. International networks of protected areas. Plans for care of protected areas. General nature conservation. Biological evaluation, EIA, SEA, landscape character. Public access to information. Non-governmental non-profit organizations and associations.

**Instructor:** Ing. Petr Jelínek, Ph.D., Dept. of Forest Botany, Dendrology and Geobiocoenology

Language: English

Semester: S

**Duration:** 1 semester  
– 30 hours

**Time-table:** lectures, exercises, practices

ECTS Credits: 4

Prerequisite courses: -

Method of assessment: examination

## **Course title: Non-wood Forest Products**

**Objectives and contents:** The aim of the subject is to obtain basic knowledge of the activities associated with non-wood forest products which are important for economic evaluation of utilization of non-wood forest products. This subject inspires for deeper learning about subsequent use of such products.

1. Non-wood forest products - introduction.
2. Forest fruits.
3. Mushrooms.
4. Medicinal plants.
5. Animal products.
6. Sap tapping.
7. Resin tapping.
8. Vitamin powder. Chlorophyll compound. Essential oils. Tan bark harvesting.
9. Use of branches, logging residues and bark.
10. Charcoal production.
11. Willow wicker.

**Instructor:** William Robb BSc(Hons), Dept. of Forest Technologies

Language: English

Semester: S



**Duration:** 1 semester  
exercises – 30 hours  
**ECTS Credits:** 3  
**Method of assessment:** personal project

**Time-table:** theoretical lectures, practical  
**Prerequisite courses:** -

### **Course title: Pathology of Woody Plants, Diseases of Trees**

**Objectives and contents:** The conception of diseases. Resistance, predisposition, tolerance, immunity. Symptoms, habit diagnostic and aetiology of disorders - the macroscopic appearances, discoloration, branching etc. Biological agents of diseases - viruses, bacteria, fungi, vascular plants, nematodes, insects, other pests etc. Methodology of pest identification on amenity trees and shrubs - symptoms of disease, sign of pathogen, identification using immunofluorescence, isoenzymes, molecular biology, etc. Wood decay, white rot, brown rot, blue-staining fungi, endophytic fungi. Wood decay, pathogen of vascular tissues fungi - symptoms, agents, host and control. Diseases of leaves and needles: rust, blight etc. - symptoms, agents, host and control. Diseases of broadleaved trees - root and butt rots and their influence on stability of trees, rot of stems, branches and twigs, diseases of leaves, vascular diseases. Diseases of coniferous species - the root and butt rots, rots of stems, vascular diseases. Disease of seedlings and young plants, plant protection in nurseries and public gardens. The epidemiology and quarantine pest. Distribution of main diseases of woody plants. Phytosanitary service and plant protection organisations. Biodiversity of wood destroying fungi under context of stability of forests ecosystems, conservation of wood inhabiting organisms. Economic impact of diseases of woody plants.

**Instructor:** prof. Dr. Ing. Libor Jankovský, Dept. of Forest Protection and Wildlife Management

**Language:** English

Semester: W

**Duration:** 1 semester

**Time-table:** lectures and practices –  
40 hours, lab work - 20 hours

**ECTS Credits:** 5

**Prerequisite courses:** -

**Method of assessment:** practical and oral examination

### **Course title: Physical and Mechanical Properties of Wood**

**Objectives and contents:** The objective of the course is applied and theoretical instruction focused on the following groups of topics:

- water in wood, moisture content of wood and its absorptivity, absorption theory, thermodynamics
- water displacement in wood, types of diffusion of liquids, permeability of cell walls, capillary phenomena
- density of wood and its porosity
- changes in the volume and shape parameters of wooden products in relation to changes in moisture content
- heat and wood: heat transfer in wood, heat conductivity, heat convection in wood
- electromagnetic and acoustic properties of wood
- resistance of wood and wood products
- tensile and compressive stress

The variability of particular parts of the piece of wood will be emphasised within the listed topics, focusing especially on the variability of the physical properties of the wood, wood defects, and demonstrations of laws governing cracking and Hooke's law in woodwork. With respect to the profile of a graduate of the given study programme, attention will also be dedicated to the application of the elasticity theory into ecosystem stress theory, which is also used in the context of European forestry.

The overview in the final part of the semester will be focused on a comprehensive conception of the dynamic properties of wood, on the technological properties of wood, on the methods of determining the basic mechanical properties of wood applicable in practice, as well as on the principles of the theory of tree biomechanics also used in biologically oriented subjects of this study programme.

**Instructor:** Ing. Václav Sebera Ph.D., Dept of Wood Science

**Language:** English

Semester: W

**Duration:** 1 semester  
– 30 hours

**Time-table:** lectures, exercises, practices

**ECTS Credits:** 4

**Prerequisite courses:** -

**Method of assessment:** examination

## **Course title: Public Relations in Forestry**

### **Objectives and contents:**

The aim of the course is to teach students how to use appropriate public relations tools with respect to a given event or situation and tools of appropriate communication, realize public relations activities and evaluate whether these activities had the desired effect. They will be able to take into account the current situation of the goodwill of the given company, know the current approach in public relations most often used in forestry and environmental policy, evaluate feedback on realized public relations activities, set appropriate ways and intensity of communication with the target group members and the problem.

Students will be able to orientate themselves in the area of social perception of a given group/company / company with respect to their interests, they can identify communication deficiencies, suitability of using public relations tools, they can use these tools, adapt them to specific conditions and needs. It has its own communication plan and develops its own communication strategies based on a thorough assessment of the situation, both internally and externally. The key issue is communication during the crisis, especially in forestry caused by natural disturbances (wind calamity, fires, invasive species, overgrowth of animals, insect damage, etc.).

### Course contents:

1. Definition of Public Relations (what is and what is not Public Relations, the importance of PR, forestry and PR)
2. History of the use of public relations in the course of human history (antiquity, middle ages, modern times, World War I, 2nd half of the 20th century, present)
3. Media Relations (current status and use, social media)
4. Marketing Mix and questions of sponsorship, fundraising and their use in forestry
5. Public Relations activities (conferences, publications, excursions, performances, lectures, seminars, trade fair, media, social networks, events, events,...)
6. Types of communication models (symmetric, asymmetric, direct, indirect, balance)
7. Types of communication (internal and external) and types of target groups, the situation in forestry
8. Communication in case of conflict and crisis situations and possibilities of its use in forestry (fire, bad reputation, interest groups, accidental logging, illegal logging)
9. Requirements for persons working in the field of public relations in relation to forestry
10. Theory, ethics and professionalism in public relations (organization, cooperation, remuneration)
11. Evaluation of public relations activities (feedback) and methods of PR measurement

Development of communication strategy and planning in the field of public relations, international forestry institutions, national forestry institutions and their communication tools and

**Instructor:** Ing. Kateřina Holušová, Ph.D. et Ph.D., Dept. of Forest and Wood Products Economics and Policy

**Language:** English

Semester: W

**Duration:** 1 semester  
– 30 hours

**Time-table:** lectures, exercises, practices

ECTS Credits: 4

Prerequisite courses: -

**Method of assessment:** PR project work, written and oral examination

## **Course title: Remote Sensing**

**Objectives and contents:** The course provides information on the most important technologies of acquiring and processing remotely sensed data and on possible applications of results for landscape and forest monitoring.

Introduction to geoinformation technologies (GIT); principles of geoinformation systems (GIS) and remote sensing (RS). RS and its 7 elements. Electromagnetic radiation.

Data types - aerial photography x satellite imagery. RS data characteristics, color systems, color composites. Interaction of radiation with atmosphere and objects. Data recording. Satellites and sensors. Data transmission and storing. Data processing methods - image enhancement, visual interpretation, digital analysis and interpretation. Applications – topographic mapping, land cover and land use mapping, forestry, agriculture, hydrology.

**Instructor:** doc. Ing. Martin Klimánek, Ph.D. Ing. Petr Vahalík, Ph.D., Dept. of Forest Management and Applied Geoinformatics

**Language:** English

**Semester:** S

**Duration:** 1 semester

**Time-table:** lectures and practices –  
40 hours, lab work - 20 hours

**Prerequisite courses:** -

**ECTS Credits:** 5

**Method of assessment:** written and oral examination

### **Course title: Reveal Tree Structure and Function**

**Objectives and contents:** Theory and practical measurements used to reveal tree structure and function – from anatomy to tree level.

1. Microscopy technique – from optics to electrons, what can we see by different techniques?
2. Anatomical analysis – basic methods and techniques.
3. Plant cell – structure and function, cell wall, plastids and mitochondria.
4. Vascular plants – what are their tissues, how they grow, meristems – secrets of long-lived organisms.
5. Vascular bundles – xylem and phloem of angiosperms and conifer species.
6. Tree morphology – structure and function of roots, stems and leaves.
7. Meteorology – the main driving factors and the way of their measurements.
8. Stress ecology – introduction
9. Water relations – tree level, practical measurements in stress ecology.
10. Photosynthesis and respiration – theory, practical measurements, indexes in stress ecology.
11. Mineral nutrition – cycle, transport, accumulation.
12. Stress signalling – overview, secondary metabolites, gene expression.

**Instructor:** Ing. Roman Plichta, Ph.D., Dept. of Forest Botany, Dendrology and Geobiocoenology

**Language:** English

**Semester:** W

**Duration:** 1 semester

– 30 hours

**Time-table:** lectures, exercises, practices

**ECTS Credits:** 4

**Prerequisite courses:** -

**Method of assessment:** examination

### **Course title: Silviculture**

**Objectives and contents:** The theory and practice of controlling the establishment, composition, and growth of stands of trees for any of the goods (including timber, pulp, energy, fruits, and fodder) and benefits (water, wildlife habitat, microclimate amelioration, and carbon sequestration) that they may be called upon to produce.

This course will cover the principles for establishing, tending, and regenerating stands in the context of various ecological, economic, and social considerations. Students will develop a broad understanding of the silvicultural concepts and applications needed to manage forest stands for a variety of commodity and non-commodity values. Some of the values to be addressed in this course include timber production, wildlife habitat, water quality, recreation, forest health, and ecosystem restoration.

**Instructor:** doc. Ing. Radek Pokorný, Ph.D., Department of Silviculture

**Language:** English

**Semester:** S

**Duration:** 1 semester

exercises – 56 hours

**Time-table:** theoretical lectures, practical

**ECTS Credits:** 6

**Prerequisite courses:** -

**Method of assessment:** written and oral examination, project work

### **Course title: Social Communication**

**Objectives and contents:** Students will have an overview of the core principles of social communication including cross-cultural issues. The course introduces the possibilities for self development, knowledge dissemination, the role of various communication channels. Students will understand how

people interpret, modify, and respond to the information, the credibility of messages, the role of status and particular interests in the community, transfer of knowledge to local communities and a dialogue.

Course content:

1. Introduction to social communication
2. The role of culture, language and environment
3. Verbal and Non-verbal communication
4. Social Perception and Active Listening
5. Hard Skills and Soft Skills
6. Communication among cultures, cross-cultural theories
7. Communication approaches, participation and community needs
8. Research methods and critical thinking
9. Practical identification of selected problems, case studies
10. Discussion and consultations

**Instructor:** Mgr. Eva Abramuszkinová Pavlíková, PhD, MA, Dept. of Engineering

**Language:** English

**Semester:** W/S

**Duration:** 1 semester

**Time-table:** lectures and practices –  
- 30 hours

ECTS Credits: 5

Prerequisite courses: -

**Method of assessment:** project work, written assignment/examination

### **Course title: Soil Biology and Biochemistry**

**Objectives and contents:** Introduction to the issue - basic terms and definitions. Influence of soil organisms on soil - viruses, cyanobacteria, bacteria and actinomycetes. Influence of soil organisms on soil - fungi, algae and protozoa in soil. Soil fauna, food chains and interactions between soil organisms (neutralism, protocol cooperation, competition, commensalism, amensalism, parasitism and predation).

Microorganisms and the environment. Decomposition of carbonaceous substances in soil (cellulose, hemicelluloses, lignin, etc.) - role of different groups of organisms. The role of organisms in the transformation of individual elements (e.g. N, P, S, Fe). Soil enzymes. Soil organisms in polluted soils, use of various organisms in soil decontamination, indicators of polluted soils. Methods of study in soil biology and biochemistry. Effective microorganisms. The role of microorganisms in the development of the biosphere. Biochemistry of important elements in soil. Biochemical processes in soil.

**Instructor:** doc. Ing. Valerie Vranová, Ph.D., Ing. Rahul Datta, Ph.D., Dept. of Geology and Soil Sciences

**Language:** English

**Semester:** S

**Duration:** 1 semester

**Time-table:** lectures, exercises, laboratory, practices

– 50 hours

ECTS Credits: 4

Prerequisite courses: -

Method of assessment: examination

### **Course Title: Soil Science – Principles and Practices**

**Objectives and contents:** Following theoretical fundament of Soil science to approach practical use of field and laboratory investigation. Dealing with presentations of studies and expertise outputs including forest, agronomy as well as urban land use. The topics are focused on soil physics, aeration, hydric regime, chemical, biological properties assessment to explain plant-soil relation, stand (vegetation)-soil relation under influence of specific management, changes in land use, changes in soil properties. The output of the course should target importance, vulnerability and need of sustainability of soil in anthropogenic context that, especially in the central-European landscape represents one of the most intensive and the most dynamic factors forming soil development and soil properties.

The course includes (1) student presentations as a partial output; (2) fieldtrip on research plots with demonstration of soil investigation.

**Instructor:** Ing. Aleš Kučera, Ph.D., Department of Geology and Pedology

**Language:** English

**Semester:** S

**Duration:** 1 semester **Time-table:** 1. lectures – 14 hours, 2. 1 day field trip – 8 hours, 30 hours  
ECTS Credits: 3 **Prerequisite courses:** -  
**Method of assessment:** Presentations; written test and oral exam

### **Course title: Statistical Analysis in Ecology Using R**

**Objectives and contents:** The objective of the course is to introduce students to procedures of data analysis used in ecology. The course focuses on practical examples of ecological case studies. The R statistical environment will be used and the basic theory will be explained.

**Content:**

- 1) Introduction to R statistical environment
- 2) Sampling design and pseudoreplication issue
- 3) Linear models
- 4) Generalized linear models
- 5) Non-linear regression
- 6) Mixed effect models

**Instructor:** Ing. Daniel Volařík, Ph.D., Dept. of Forest Botany, Dendrology and Geobiocoenology, M.Sc. Juliette Chamagne, Institute of Evolutionary Biology and Environmental Studies

**Language:** English

**Semester:** W

**Duration:** intensive one week course  
– 30 hours

**Time-table:** lectures, exercises, practices

ECTS Credits: 3

**Prerequisite courses:** -

**Method of assessment:** approved exercises

### **Course title: Surveying and Land Records**

**Objectives and contents:** Basic concepts of Surveying. Shape and dimensions of the Earth and their effect on geodetic operations. An overview of cartographic projections. Maps and their scales, sorts of maps, topographic and thematic maps, forest maps and their preparation. Geodetic points, fields, networks. Methods of horizontal and vertical survey. Tools and instruments used for surveying, including electronic devices. Coordinate systems and calculations of point coordinates of in large-scaled surveys. Creating of contours. Compass surveying and its use in forestry. Calculations of areas and volumes. Field operations planning. GPS measurements and processing. Preparation of cartographic and planning background materials for landscape engineering constructions – surveys for land regulation, line constructions, torrent training, water reservoirs; lay-out methods for buildings. Historical development of land records, present real estate cadastre, land registers, map and documentary materials, legislation concerning legal relations to real estate. Computer processing of geodetic data and information.

**Instructor:** Ing. Tomáš Mikita, Ph.D., Dept. of Forest Management and Applied Geoinformatics

**Language:** English

**Semester:** S

**Duration:** 1 semester  
exercises – 42 hours

**Time-table:** theoretical lectures, practical

ECTS Credits: 5

**Prerequisite courses:** -

**Method of assessment:** written and oral examination

### **Course title: 3D Printing**

**Objectives and contents:** Students will be introduced to 3D printing process with orientation in different technologies of 3D printing. The course covers the following topics: 3D printing technologies and materials, overview of 3D printing, 3D printing process, FDM (fused deposition modeling) with PLA filaments, STL (stereolithography) printing with resin, other technologies, designing for 3D printing, general design and considerations for 3D printing, design rules and possible problems with 3D printing and their solutions. Later, students will be able to apply this information for producing 3D design, application for FDM printing with use of 3D printers which are available at Department of Furniture, Furni-

ture Design and Habitat (Ultimaker, Prusa). The result will be a 3D model of keychain/furniture which they will have to 3D model and 3D print.

**Instructor:** doc. Ing. Jiří Tauber, Ph.D., Ing. Alena Sobotková, Ing. Jiří Stádník

**Language:** English

**Semester:** W/S

**Duration:** 1 semester

**Time-table:** lectures and practices –  
3 hours per week

**ECTS Credits:** 5

**Prerequisite courses:** -

**Method of assessment:** written examination

### **Course title: Tree Climbing**

**Objectives and contents:** The knowledge of theoretical bases and the practical use of current methods for climbing to tree crowns. Requirements for the occupational health and safety at work in tree crowns and searching for the evaluation of working hazards. Optimization solutions of the selection of technological procedures and personal equipment, cost, environmental and other aspects. Effective provision of the first aid and the rescue of persons from crowns of standing trees. Planning and organization of tree climbing operations. If the subject graduate finishes the subject with evaluation "excellent" and obtains 90 points of 100 at a practical credit, he can obtain a certificate on the successful graduation of the subject.

**Instructor:** Ing. Pavel Nevrkla, Dept. of Engineering

**Language:** English

**Semester:** S

**Duration:** 1 semester **Time-table:** theoretical lectures and practical exercises.– 30 hours

**ECTS Credits:** 4

**Prerequisite courses:** -

**Method of assessment:** practical examination

### **Course title: Trees and Timbers in the Mediterranean Area**

**Objectives and contents:** The aim of the course is to learn about the most important trees species growing in the Mediterranean area and their uses starting from the ancient world until nowadays. The students will be introduced to the Mediterranean forests, woodlands and shrub biome growing in the mountains, hills and coastal plains. They will have the overview of the various ecosystems that cover the vast area of the Mediterranean basin in order to understand the specific features of the area. This will allow going deeper in the structure and properties of the wood and the timber. The students will be able to identify wood samples of important Mediterranean species macroscopically and microscopically. The content of the course includes: 1. Characteristics of Mediterranean forests, woodlands and shrubs, 2. Features of the produced timber produced, 3. Use and trade of timber during the ancient times and nowadays, 4. Macroscopic and microscopic structure of wood species 5. Selected wood species from the Mediterranean area will be studied 6. Practical identification of selected wood species will be applied as practice.

**Instructor:** Kyriaki Giagli, Ph.D., Dept. of Wood Science

**Language:** English

**Semester:** S

**Duration:** 1 semester

**Time-table:** lectures and practices –  
30 hours

**ECTS Credits:** 5

**Prerequisite courses:** -

**Method of assessment:** examination

### **Course title: Tropical Timbers**

**Objectives and contents:** The students will have an overview of the interaction between the structure, properties and uses of selected tropical species from Africa, South and Latin America and South-Eastern Asia. The course introduces the tropical and subtropical forest, localizes the most important wood species and gives technical information about the production and processing. Its objective is to deepen the knowledge of the students on wood structure and identification by introducing the tropical timber and highlighting the benefits that it provides when used in construction. A range of uses were tropical timber has undoubtedly proven to be the best solution will be discussed. The content of the course includes: 1. Characteristics of tropical and subtropical forest, 2. Timber and its characteristics,

3. Proper use of timber, 4. Macroscopic and microscopic structure of tropical wood species 5. Selected tropical wood species from Africa, South-Eastern Asia, South and Latin America will be studied 6. Practical identification of selected tropical wood species will be applied as practice.

**Instructor:** Kyriaki Giagli, Ph.D., Dept. of Wood Science

**Language:** English

**Semester:** W

**Duration:** 1 semester

**Time-table:** lectures and practices –  
30 hours

**ECTS Credits:** 4

**Prerequisite courses:** -

Method of assessment: examination

### **Course title: Urban Forestry**

**Objectives and contents:** The course aims on the upcoming Urban Forestry concept in Europe and especially in the Czech Republic. Students will get information on UF practices, management and planning, that differs from recent practices.

1. Urban Forestry concept in Europe and USA, History of urban forestry
2. Tree benefits and negatives
3. UF - Policy and planning in CZ and Europe
4. Research and education in UF
5. Practical Urban Forestry
  - a. Management and planning of UF
  - b. Arboricultural practices
  - c. Tree assessment

**Instructor:** Ing. Luděk Praus, Ph.D., Dept. of Wood Science

Language: English

Semester: W

**Duration:** 1 semester

**Time-table:** three block 8 hours

**ECTS Credits:** 3

**Prerequisite courses:** -

Method of assessment: examination

### **Course title: Utility Plants of the Subtropics and Tropics**

**Objectives and contents:** The objective of the course is to present the current state of knowledge in the area of non-timber forest products (NTFP), or non-wood-forest-products (NWFP), which have not only great importance in the history and tradition of trade but also great potential for improving the economic situation of rural areas in tropical countries in the case of improved marketing (as with Fair Trade, for example). The content of the course results from the intention to inform students of similar characteristics of selected plants in terms of the properties of their species, importance in cultivation, and processing of products in main utility groups.

Lectures

Introduction – History of the relationship between humans and useful plants, The concept of usefulness, Usefulness of tropical plant species in an economic and global context

Plants as food – Fruit trees of the tropics and subtropics, Selected species of tropical vegetables, Plants with a specific culinary use, Cereals, Starchy plants, Sugar-bearing plants, Oil-bearing plants, Plants used as spices.

Plants with psychoactive effects, Species affecting the psyche, Medicinal plants

Industrial plants – Selected plants providing dyes and tannins, Textile and wax-bearing plants, Plants containing resin, rubber and increased proportion of essential oils

Ornamental plant species

Practices: Practical demonstrations of 3-D botanical collection exhibits, slides, greenhouse practice during practices. Work on a seminar paper on a selected topic or preparation of a case study corresponding to the student's landscape of origin or geographical area of his or her professional interest. Main practical with a topic-specific trip to greenhouses with botanical collections.

**Instructor:** doc. Dr. Ing. Jindřich Pavliš, Ing. Petr Němec, Ph.D., Dept. of Forest Botany, Dendrology and Geobiocoenology

Language: English

Semester: S

**Duration:** 1 semester

**Time-table:** lectures, exercises, practices – 30 hours

**ECTS Credits:** 4

**Prerequisite courses:** -

**Method of assessment:** approved exercises, seminars, laboratory work, project work, written/oral examination

### **Course title: Water Management and Water Quality Policy**

**Objectives and contents:** Objective and contents: Water management in the Czech Republic – total precipitation amount, runoff, floods. Hydrological balance. Quality of surface water and groundwater: evaluation of surface water quality monitoring, sources of pollution – point pollution sources and area pollution.

**Instructor:** doc. Ing. Petr Kupec, Ph.D., Dept. of Landscape Management

**Language:** English

Semester: W

**Duration:** 1 semester

**Time-table:** lectures and seminars – 40 hours

**ECTS Credits:** 5

**Prerequisite courses:** -

**Method of assessment:** written/oral examination

### **Course title: Wood Anatomy**

**Objectives and contents:** Wood Anatomy familiarises students with the structure of wood on a macroscopic, microscopic and submicroscopic levels. It also deals with the chemical composition of wood and description of the processes of creating wood.

On the macroscopic level, features of the macroscopic structure of wood are defined for basic cuts of wood. The types of wood are divided into groups on the basis of individual features. On the microscopic level, the basic anatomical elements comprising wood of coniferous and deciduous trees are described. Individual types of wood are divided into groups based on features of the microscopic structure of the wood. Within the submicroscopic structure of wood, individual layers of the woody cell wall of the wood's different anatomic elements are described.

Theoretical knowledge includes command of practical identification of wood types on the basis of macroscopic and microscopic features. Practical identification focuses on economically important trees growing in the European area.

**Instructor:** doc. Ing. Hanuš Vavrčík, Ph.D., doc. Ing. Vladimír Gryc, Ph.D., Dept. of Wood Science

**Language:** English

Semester: W

**Duration:** 1 semester

**Time-table:** lectures, exercises, practices – 30 hours

**ECTS Credits:** 4

**Prerequisite courses:** -

Method of assessment: examination

### **Course title: Wood Modification**

**Objectives and contents:** The objective of the course is to make the students familiar with existing discrepancies in availability and demand of wood quantity as well as in native wood properties and demanded technical requests. The main problem in utilization of lot of wood species and assortments is low quality of wood, which is often not suitable for higher value demands.

Wood modification can help to improve these insufficient wood properties. Traditional wood protection, processed by impregnation of wood with biocides, is mainly limited on increase of durability of wood, reducing or preventing the wood deterioration activity of wood decaying fungi or insects. Effectiveness of inserted biocides with typically toxic components is mainly limited on decay restriction, further improvements of additional wood properties are not possible or possible only in a minor degree, because relevant structure of wood is widely unchanged by this process. In contrast to this wood modification, which works on the basic of structure changes of wood components, influences a lot of wood properties, like moisture behavior (humidity uptake, swelling/ shrinkage), physical and elasto-mechanical properties as well as durability.



In addition the mainly toxic-free composition of wood modification agents leads to environmental friendly process conditions and non-complex admission requirements. Furthermore not only toxic-free, but additionally sustainable and renewable production and application processes, using native solutions from plant growing components have been developed by Mendelu wood research group.

Students will be educated in theoretical background of native and technical improved wood quality as well as in techniques of wood impregnation with semi-practical autoclave plant in Department Technology Center Utechov. Additional tests, using quality and quantity evaluations, are introduced to prove success of treatments.

**Instructor:** Ing. Petr Čermák, Ph.D., Ing. Petr Pařil, Dept. of Wood Science

**Language:** English

Semester: W

**Duration:** 1 semester

**Time-table:** lectures, exercises, practices – 40 hours

**ECTS Credits:** 4

**Prerequisite courses:** -

**Method of assessment:** laboratory work, examination

### **Course title: Wooden Structures – From Tradition to Sustainability**

**Objectives and contents:** The course is based on three pillars: tradition, sustainability and life-cycle. The history of building presents a library of good and bad examples of house forms, bearing structures and materials. It brings the knowledge of their right and wrong use not only from the point of view of the building stability and safety, but also sustainability and renewability of the resources and life cycle of the material and their recycling possibilities. Combining this knowledge with the science of new materials, modern types of structures, local resources and socio-environmental conditions provides the necessary insight in the field of wood-based building design.

**Instructor:** Ing. Veronika Hunková, Ph.D., Dept. of Wood Processing Technologies

**Language:** English

Semester: S

**Duration:** 1 semester

**Time-table:** lectures, exercises, practices – 50 hours

**ECTS Credits:** 5

**Prerequisite courses:** -

**Method of assessment:** examination