COURSES TAUGHT AT THE FACULTY OF FORESTRY AND WOOD TECHNOLOGY

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | CODE | TITLE OF THE COURSE | SEMESTER | ECTS | NOTE |
| 1 | [ZAW](#_ZAW_Acoustics_of) | [Acoustics of Wood](#_ZAW_Acoustics_of) | W | 5 |  |
| 2 | [AEOG](#_AEOG_Applied_Ecology) | [Applied Ecology of Game](#_AEOG_Applied_Ecology) | S | 4 |  |
| 3 | [ZAG](#_Applied_Genetics) | [Applied Genetics](#_Course_title:_Applied_1) | S | 5 |  |
| 4 | [FMEF](#_Applied_Mycology) | [Applied Mycology](#_Course_title:_Applied_2) | W | 4 |  |
| 5 | [APO](#_Course_Title:_Applied_3) | [Applied Soil Science and Protection(foreign lecturer participation)](#_Course_Title:_Applied_3) | W | 6 | NEW COURSEVýsledek obrázku pro indie vlajka |
| 6 | [ZGM](#_ZGM_Basic_Principles) | [Basic Principles of Game Management](#_ZGM_Basic_Principles) | W | 4 |  |
| 7 | [BATS](#_BATS_Biomechanics_and) | [Biomechanics and Tree Stability](#_BATS_Biomechanics_and) | S | 4 |  |
| 8 | [ZBPH](#_Building_Physics) | [Building Physics](#_Course_title:_Building)  | W | 5 | NEW COURSE |
| 9 | [ZCHFE](#_Challenges_in_Forest) | [Challenges in Forest Ecosystems Research – Student Seminar](#_Course_title:_Challenges)  | W or S | 2 | NEW COURSEundefined |
| 10 | [ZCHE](#_ZCHE_Chemical_Ecology) | [Chemical Ecology](#_ZCHE_Chemical_Ecology) | S | 6 | NEW COURSE undefined |
| 11 | [ZCTS](#_ZCTS_Connections_in) | [Connections in Timber Structures](#_ZCTS_Connections_in) | S | 4 | NEW COURSE |
| 12 | [ZDCH](#_Dendrochronology) | [Dendrochronology](#_Course_title:_Dendrochronology)  | W | 3 | NEW COURSE  |
| 13 | [ZDEFT](#_Dendrology_and_Ecology) | [Dendrology and Ecology of Forest Tree Species](#_Course_title:_Dendrology) | S | 4 |  |
| 14 | [ZEOW](#_Ecophysiology_of_Woody) | [Ecophysiology of Woody Plants](#_Course_title:_Ecophysiology) | S | 4 |  |
| 15 | [ZEMT](#_Ecological_Materials) | [Ecological Materials](#_ZEMT_Ecological_Materials)  | S | 5 |  NEW COURSE  |
| 16 | [ESRM](#_Economics_of_Sustainable) | [Economics of Sustainable Resource Management](#_Course_title:_Economics) | W or S | 4 |  |
| 17 | [ZED](#_Engineering_Drawing_with) | [Engineering Drawing with CAD System Application](#_Course_title:_Engineering) | W | 5 |  |
| 18 | [EGEF](#_Environmental_Geochemistry) | [Environmental Geochemistry](#_Course_title:_Environmental) | W | 4 |  |
| 19 | [ZEFS](#_European_Forestry,_Environmental) | [European Forestry, Environmental and Science Policies](#_Course_title:_European)  | W | 4 | NEW COURSE  |
| 20 | [ZFAR](#_Forest_Access_Roads) | [Forest Access Roads](#_Course_title:_Forest) | W | 5 |  |
| 21 | [BMEF](#_Forest_Biometry_and) | [Forest Biometry and Modelling](#_Course_title:_Forest_1) | W | 6 |  |
| 22 | [ZFOB](#_Forest_Botany:_Plants) | [Forest Botany: Plants of Various Forest Ecosystems in Europe](#_Course_title:_Forest_2) | S | 4 |  |
| 23 | [FORECOL](#_Forest_Ecology) | [Forest Ecology](#_Course_title:_Forest_3) | W | 6 |  |
| 24 | [EFEP](#_Forest_Economics_and) | [Forest Economics and Policy](#_Course_title:_Forest_4) | S | 6 |  |
| 25 | [FEEF](#_Forest_Ecosystems_in) | [Forest Ecosystems in Europe](#_Course_title:_Forest_5) | S | 6 |  |
| 26 | [ZAKL](#_Forest_Establishment) | [Forest Establishment](#_Course_title:_Forest_6)  | W | 6 | NEW COURSE  |
| 27 | [HSUL](#_Course_title:_Forest_8) | [Forest Management and Planning](#_Course_title:_Forest_8) | W | 6 |  |
| 28 | [FOPA](#_Forest_Pathology_and) | [Forest Pathology and Protection](#_Course_title:_Forest_9) | S | 6 |  |
| 29 | [MOLP](#_Forest_Products_Marketing) | [Forest Products Marketing and Trade](#_Course_title:_Forest_10) | W | 6 |  |
| 30 | [FORT](#_Forest_Technology) | [Forest Technology](#_Course_title:_Forest_11) | W | 6 |  |
| 31 | [ZFD](#_Furniture_&_Design) | [Furniture and Design](#_Course_title:_Furniture) | W | 5 |  |
| 32 | [GSD](#_Genetics_and_Breeding) | [Genetics and Breeding of Forest Trees](#_Genetics_and_Breeding) | W | 4 | NEW COURSE  |
| 33 | [GBC](#_Geobiocoenology) | [Geobiocoenology](#_Course_title:_Geobiocoenology) | S | 5 |  |
| 34 | [GISEF](#_Course_title:_Geographical) | [Geographical Information Systems](#_Course_title:_Geographical) | W | 6 |  |
| 35 | [ZGEC](#_ZGEC_Global_Ecology) | [Global Ecology](#_Course_title:_Global)  | W | 4 | NEW COURSE  |
| 36 | [ZHRL](#_ZHRL_How_to) | [How to Read the Landscape](#_Course_Title:_How)  | W | 5 | NEW COURSE  |
| 37 | [ZIOS](#_ZIOS_International_Occupational) | [International Occupational Safety & Health Management](#_Course_title:_International) | S | 3 |  |
| 38 | [ZIEC](#_ZIEC_Introduction_to) | [Introduction to Engineering Computing](#_Course_title:_Introduction) | S | 5 |  |
| 39 | [ZLENC](#_Course_title:_Landscape) | [Landscape Ecology (foreign lecturer participation)](#_Course_title:_Landscape) | S | 4 | Image result for vlajka amerika  |
| 40 | [ZLPRD](#_ZLPRD_Landscape_Planning) | [Landscape Planning and Regional Development](#_Course_title:_Landscape_1) | S | 4 |  |
| 41 | [ZLREC](#_ZLREC_Landscape_Recreology) | [Landscape Recreology](#_Course_title:_Landscape_2) | W | 4 |  |
| 42 | [LYEF](#_LYEF_Log_Yards) | [Log Yards and Sawmilling](#_Course_title:_Log) | W | 4 |  |
| 43 | [LTTEF](#_LTTEF_Logging_and) | [Logging and Transport of Timber in European Forests](#_Course_title:_Logging) | W | 6 |  |
| 44 | [ZMNG](#_Course_title:_Management) | [Management](#_Course_title:_Management) | S | 4 | NEW COURSE |
| 45 | [Z-MT](#_Z-MT_Mathematics) | [Mathematics](#_Course_title:_Mathematics) | S | 5 |  |
| 46 | [MULF](#_MULF_Multifunctional_Forestry) | [Multifunctional Forestry](#_Course_title:_Multifunctional) | S | 6 |  |
| 47 | [ZNC](#_ZNC_Nature_Conservation) | [Nature Conservation](#_Course_title:_Nature) | S | 4 |  |
| 48 | [ZOPL](#_ZOPL_Non-wood_Forest) | [Non-wood Forest Products (foreign lecturer participation)](#_Course_title:_Non-wood) | S | 3 | VÃ½sledek obrÃ¡zku pro vlajka velkÃ¡ britÃ¡nie  |
| 49 | [ZPWPN](#_ZPWPN_Pathology_of) | [Pathology of Woody Plants, Diseases of Trees](#_Course_title:_Pathology) | W | 5 |  |
| 50 | [PMEF](#_PMEF_Physical_and) | [Physical and Mechanical Properties of Wood](#_Course_title:_Physical) | W | 4 |  |
| 51 | ZPHCH | Phytochemistry | S | 6 | NEW COURSE undefined |
| 52 | [PMPC](#_PMPC_Project_Management) | [Project Management in Practice](#_Course_title:_Project) | S | 3 |  |
| 53 | [PREF](#_PREF_Public_Relations) | [Public Relations in Forestry](#_Course_title:_Public) | W | 4 |  |
| 54 | [PBEF](#_PBEF_Reveal_Tree) | [Reveal Tree Structure and Function](#_Course_title:_Reveal) | W | 4 |  |
| 55 | [SILV](#_SILV_Silviculture) | [Silviculture](#_Course_title:_Silviculture) (foreign lecturer participation) | S | 6 | https://upload.wikimedia.org/wikipedia/commons/thumb/e/e0/Civil_ensign_of_Slovenia.svg/1280px-Civil_ensign_of_Slovenia.svg.png |
| 56 | [ZSCM](#_ZSCM_Social_Communication) | [Social Communication](#_Course_title:_)  | W or S | 5 | NEW COURSE  |
| 57 | [ZSOB](#_ZSOB_Soil_Biology) | [Soil Biology and Biochemistry](#_Course_title:_Soil) (foreign lecturer participation) | S | 4 | Výsledek obrázku pro indie vlajka |
| 58 | [SAIEU](#_SAIEU_Statistical_Analysis) | [Statistical Analysis in Ecology Using R](#_Course_title:_Statistical) | W | 3 |  |
| 59 | [ZSRS](#_58._ZSRS_Surveying) | [Surveying and Remote Sensing](#_Course_title:_Surveying) | S | 5 |  |
| 60 | [ZSTC](#_ZSTC_Sustainable_Timber) | [Sustainable Timber Construction in Europe: Policies, Standards & Market Trends](#_ZSTC_Sustainable_Timber) | W | 5 | NEW COURSE   |
| 61 | [ZHHE](#_59._ZHHE_The) | [The Hidden Half of Ecosystems – Functional Ecology of Roots and Mycorrhizal Fungi](#_Course_title:_The) | S | 4 | VÃ½sledek obrÃ¡zku pro vlajka velkÃ¡ britÃ¡nie |
| 62 | [ZDPR](#_60._ZDPR_3D) | [3D Printing](#_Course_title:_3D)  | W or S | 5 | NEW COURSE  |
| 63 | [ZSTML](#_61._ZSTML_Tree) | [Tree Climbing](#_Course_title:_Tree)  | S | 4 | NEW COURSE  |
| 64 | [ZTTM](#_62._ZTTM_Trees) | [Trees and Timbers in the Mediterranean Area](#_Course_title:_Trees) (foreign lecturer) | S | 4 | VÃ½sledek obrÃ¡zku pro vlajka ÅeckoNEW COURSE  |
| 65 | [ZTMB](#_ZTMB_Tropical_Timbers) | [Tropical Timbers](#_Course_title:_Tropical) (foreign lecturer)  | W | 4 | VÃ½sledek obrÃ¡zku pro vlajka ÅeckoNEW COURSE  |
| 66 | [ZUPST](#_ZUPST_Utility_Plants) | [Utility Plants of Subtropics and Tropics](#_Course_title:_Utility) | S | 4 |  |
| 67 | [WSS](#_Course_title:_Water) | [Water Management and Water Quality Policy](#_Course_title:_Water) | W | 5 |  |
| 68 | [WAEF](#_WAEF_Wood_Anatomy) | [Wood Anatomy](#_Course_title:_Wood) | W | 4 |  |
| 69 | [ZWM](#_ZWM_Wood_Modification) | [Wood Modification](#_Course_title:_Wood_1) | W | 4 |  |
| 70 | [ZDRKO](#_ZDRKO_Wooden_Structures) | [Wooden Structures](#_Course_title:_Wooden)  | S | 5 | NEW COURSE  |

Instructions

* *Please be careful with selecting courses. “W” stands for winter semester, which is semester from September to February, and “S” stands for summer semester, which is semester from February to August.*
* *Each course will be offered only if there are enough students registered (usually the minimum is 4 students per course).*
* *Courses are intended for both Erasmus+ bachelor as well as master students.*

# ZAW 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

# AEOG 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:** prof. Ing. Jiří Kamler, Ph.D., Ing. Radim Plhal, 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

# ZAG Applied Genetics

**Objectives and contents:** The aim of the course is to introduce students to basics of molecular genetics and explore applications of molecular genetic technologies in forestry and agriculture. This field opens new possibil-ities and offers new tools usable for example in research, breeding, crop improvement, forest protection and conservation of genetic resources. We shall also discuss current topics like GMO (Genetically modified organ-isms), genome editing and sequencing etc. During practical laboratory exercises we will also perform basic tech-niques used in molecualr biology research (DNA isolation, polymerase chain reation etc.)

1. Transfer of genetic information, RNA

2. Genome composition and organization, Mutations

3. Gene expression regulation, Epigenetics

4. Introduction to laboratory work with nucleic acids

5. Practical isolation of DNA from plant tissue

6. Polymerase chain reaction principle, applications and variations

7. Practical PCR setup, DNA sequencing

8. Recombinant DNA, Cloning, DNA libraries

9. Practical electrophoresis, DNA markers and fingerprinting

10. GMO technology, transgenic crops

11. Nucleotide sequence databases, Bioinformatics

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

**Language:** English

Semester: S

**Duration:** 1 semester **Time-table:** lectures and exercises - 16 hours lab work – 8 hours

ECTS Credits: 5 Prerequisite courses: -

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

# FMEF 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](http://uolm.ldf.mendelu.cz?lang=en)

**Language:** English

Semester: W

**Duration:** 1 semester **Time-table:** lectures, exercises and practices - 30 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment: examination

# APO 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. Differ-ences 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, ero-sion, pedocompaction). Deterioration of chemical properties of soils (acidification, alkalization, entry of pollutants into the soil). Deterioration of biological properties of soil (accelerated mineralization of hu-mus in soil, pests, allelopathy of soil). Soil functions. Soil protection and use. Alternative ways of work-ing with soil. Soil monitoring. Remedial measures and legislation in soil protection. Examples of eco-logical 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 Soil Science

Language: English

Semester: W

**Duration:** 1 semester **Timetable:** lectures - 28 hours, practice - 14 hours

 1-day field trip - 8 hours

ECTS Credits: 6 Prerequisite courses: -

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

# ZGM 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 **Time-table:** lectures, exercises and practices - 49 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment: examination

# BATS 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; optimalisation 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 **Time-table:** lectures, exercises and practices - 30 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment: examination

# ZBPH 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 Science and Technology

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 examination

# ZCHFE Challenges in Forest Ecosystem Research – Student Seminar

**Objectives and contents**: This seminar provides a dynamic platform for graduate students to delve into the latest topics in forest ecology and forest ecosystem research. Topics discussed will relate to expert talks (“Challenges in Forest Ecology – FFWT Seminar Series) – where leading researchers in the field will unravel the mysteries of forest ecosystems, biodiversity, and sustainable forestry practices. A particular focus will be on below-ground patterns and processes - as roots, mycorrhizal fungi and root pathogens are often overlooked components of forest ecosystems. Students will first listen to expert researchers and then actively participate in the analysis of related research that pushes the boundaries of our understanding of forest ecosystem functioning and services. The heart of the seminar lies in the student presentations and discussions that follow each lecture. Participants take the lead in analysing and presenting a research paper on the topic, demonstrating their analytical skills and understanding of complex ecological concepts. The interactive format fosters a lively exchange of ideas and encourages students to challenge and broaden their perspectives. At the end of the term, students submit a short essay on one of the forest ecology topics discussed. This provides an opportunity to develop writing skills (in English) and to delve more deeply into an area of particular interest. Through a blend of expert insight, student-led discussion and individual, active exploration of scientific knowledge, the Forest Ecosystem Research Student Seminar not only educates but inspires the next generation of forest stewards and ecological thinkers. Students will develop skills in critical reading of scientific publications, oral and written synthesis of knowledge, and the ability to relate acquired knowledge to expert opinion. In general, they will gain enhanced insights into key topics within the broad field of forest ecology and forest ecosystem research. Topics typically covered include forest soils and their processes, mycorrhiza-tree interactions, disturbances, forests as habitats, carbon and nutrient cycling, ecosystem services including human welfare, impacts of climate change, biotic pests, tree tolerance and forest resilience, assisted migration … and many more.

**Instructor:** doc. Boris Rewald, prof, Douglas Godbold., Dept. of Forest Protection and W.M.

Language: English

Semester: W or S

**Duration:** 1 semester **Time-table:** seminar - 18 hours (6h lectures, 12h seminar)

ECTS Credits: 2 Prerequisite courses: -

**Method of assessment:** presentation (30%), assay (70%)

#  ZCHE Chemical Ecology

**Objectives and contents:** Chemical ecology is the study of the role of chemical signals in the interactions between organisms in ecosystems. This course will explore the chemical communication between plants, animals, fungi, and microbes, focusing on ecological interactions such as plant defense mechanisms, herbivory, pollination, and mutualistic relationships. The course is aimed at Erasmus students and PhD candidates interested in ecology, plant biology, forestry, and environmental science.

Contents of the course:

1. Introduction to Chemical Ecology
2. Plant Secondary Metabolites in Ecological Interactions
3. Chemical Defense Mechanisms in Plants
4. Plant-Insect Interactions: Herbivory and Chemical Signaling
5. Plant-Pathogen Interactions and Chemical Defense
6. Chemical Communication in Pollination
7. Insect Communication: Pheromones and Kairomones
8. Chemical Signaling in Mutualistic Relationships
9. Chemical Ecology of Forest Ecosystems
10. Experimental Methods in Chemical Ecology
11. Chemical Ecology of Invasive Species
12. Applications of Chemical Ecology in Agriculture and Pest Management
13. Human Impact on Chemical Interactions in Ecosystems
14. Future Trends and Challenges in Chemical Ecology

Instructor Ing. Lucie Vanickova, Ph.D., M.Sc. Antonio Pompeiano, Ph.D., Dept. of Forest Bot., Dendrology and Geobiocoenology

Language: English

Semester: S

Duration: 1 semester Time-table:

ECTS Credits: 6 Prerequisite courses: Basic understanding of ecology and plant biology. Introductory chemistry knowledge is beneficial but not required

**Method of assessment:**

· Midterm Exam (Week 7) – 30%

· Practical Laboratory Report (Week 9-11) – 20%

· Research Paper or Project (Week 14) – 30%

· Final Exam (Week 14) – 20

#  ZCTS Connections in Timber Structures

Objectives and contents: Students will be introduced to the theoretical and applied grasp of connections used in timber structures, it specifically introduces following topics: 1. Introduc-tion to joining, fasteners and joints, principle of joining; 2. History of joints and fasteners, traditional timber structural joints in world; 3. Properties of materials used in connections in timber structures; 4. Carpentry joints, joints with tenons and pins; 5. Adhesives and glued connections, GLT and CLT; 6. Design of connections following Eurocode 5 I – Metal fasteners (nail joints, staple joints, bolt joints, single lap-shear); 7. Design of connections following Eu-rocode 5 II – pin joints, screw joints, slotted plates, double lap-shear; 8. Design of connec-tions following Eurocode 5 III – practical calculations; 9. Special wood joining technologies – wood welding; 10. Testing structural joints, general requirements for joints, Special fasteners and composite structures, dowel joints; 11. Verification of structural joints using finite ele-ment analysis; 12. Design of optimal structural joint using finite elements analysis

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

Language: English

Semester: S

**Duration:** 1 semester  **Time-table:** lectures, exercises – 30 hour

ECTS Credits: 6 Prerequisite courses:

**Method of assessment:** test examination, seminar work

#  ZDCH 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 Vavrčík, 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

#  ZDEFT Dendrology and Ecology of Forest Tree Species

**Objectives and Contents:** The course covers the morphology, taxonomy, chorology, and ecology of European woody plants, with a primary focus on trees significant for forestry. The teaching will also emphasize allochtho-nous tree species, providing a potential perspective for forest and landscape management. Students will acquire information about the distribution of trees in various geographic areas of European forest regions, including: 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. An integral part of the course involves the practical identification of woody plants based on mac-roscopic attributes such as leaved shoots, buds, fruits (cones), seeds, bark, and wood.

Course Objective:

The objective of the course is to identify selected species of trees based on morphological features, gain knowledge of their scientific names, understand their ecology, morphology, and explore their use in forest man-agement and landscape utilization.

**Instructor:** 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

#  ZEOW 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: W or S

**Duration:** 1 semester **Time-table:** lectures - 30 hours

ECTS Credits**:** 4 Prerequisite courses:-

Method of assessment:**examination**

#  ZEMT Ecological Materials

**Objectives and contents:** This course provides a structured framework for learning about ecological materials, covering a wide range of topics from material properties and performance to regulatory frameworks and emerging trends. Through hands-on projects and real-world applications, students can deepen their understanding of sustainable materials and their role in addressing environmental challenges.

Course content:

* + - 1. Introduction to Ecological Materials
			2. Sustainable Material Categories
			3. Material Properties and Performance
			4. Life Cycle Assessment (LCA) and Environmental Impact
			5. Certification and Standards
			6. Design with Ecological Materials
			7. Material Sourcing and Supply Chain Management
			8. Emerging Trends and Technologies
			9. Hands-on projects where students apply knowledge of ecological materials to design and prototype sustainable products or solutions.
			10. Field trips, guest lectures, or workshops with industry experts to gain practical insights into material selection and application.
			11. Presentation of final projects showcasing innovative uses of ecological materials and their environmental benefits.

**Instructor:** Maryna Babenko, Ph.D., Dept. of Wood Science and Technology

Language: English

Semester: S

**Duration:** 1 semester **Time-table:** lectures, exercises, practices - 40 hours

ECTS Credits: 5 Prerequisite courses: **-**

**Method of assessment:**Presentation of final projects

#  ESRM Economics of Sustainable Resource Management

**Objectives and contents:** An examination of forest management both in the context of the microeconomics of decision-making as well as its role in the larger economy and society. This course will examine the con-ditions for market performance and market failure. It will examine elementary capital theory and its application for investment decision-making in forest resources. In addition, the course will examine how changes in forestry activities affect employment in both the forest industries as well as in the larger economy. Students will be expected to be able to understand and utilize compound interest concepts and should be exposed to the principles of economics before tak-ing the class. Attention will be paid to resource allocation issues which involve both market and non-market environmental values. The course will stress an "economic way of thinking about forestry".

As part of the course, develop a business plan using the digital tool KABADA.

**Instructor:** Ing. Jitka Meňházová, Ph.D.**,** [Dept. of Forest and Wood Products Economics and Policy](https://is.mendelu.cz/auth/pracoviste/pracoviste.pl?id=44;nerozbaluj=1;lang=en)

Language: English

Semester: W or S

**Duration:** 1 semester **Time-table:** lectures and seminars

ECTS Credits**:** 4 Prerequisite courses**:** -

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

#  ZED 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 assembles not only in wood-working industry.

**Instructor:** Ing. Pavla Mocová, Ph.D., Dept. of Wood Science and Technology

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

#  EGEF 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 Science

Language: English

Semester: W

**Duration:** 1 semester **Time-table:** lectures, exercises and practices - 30 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment: examination

#  ZEFS European Forestry, Environmental and Science Policies

**Objectives and contents:** The course aims to discuss selected EU sectoral policies active in forestry, environment and science. It provides students with a theoretical basis and takes them through the EU institutions. The course bridges the theoretical knowledge obtained in the classes and analysis and discussion on the policy impacts. After completing the course, the student will understand the role of the European Union, selected institutions and sectoral policies. Furthermore, they will be able to hold discussions on the current trends in the EU in designated areas. Finally, they will orientate themselves in the roles of the individual institutions.

1. Introduction EEC/EC/EU, current issues (subsidy 2/1)

2. European institutions and advisory bodies (subsidy 6/3)

a. The main institutions of the EU - the European Council and the Council of the EU

b. Main EU institutions - European Parliament, European Commission

c. Other European institutions and advisory bodies (Economic and Social Committee, Committee of the Regions, Court of Auditors, European Agencies, European Court of Justice), other institutions with European competence

3. Decision-making in the EU (subsidy 2/1)

4. Current political priorities, strategies and initiatives (grant 2/1)

5. Selected policies and strategies (subsidy 12/6)

a. Regional policy of the EU

b. Agricultural policies and strategies

c. Forestry policies and strategies

d. Environmental policies and strategies

e. Research and innovation policies and strategies

f. Education policies and strategies

6. Current EU topics (subsidy 2/1)

**Instructor:** Ing. Pavlína Pancová Šimková, Ph.D., Dept. of Forest Protection and Wildlife Management

Language: English

Semester:W

**Duration:** 1 semester **Time-table:** lectures

ECTS Credits**:** 4 Prerequisite courses:-

Method of assessment: written examination

#  ZFAR Forest Access Roads

**Objectives and contents:** The aim of the course is theoretical and practical preparation of students for the planning, construction, maintenance and repair of forest road network.

Course content: Forest road network. Layout of forest haul roads and factors affecting road location. Design and road construction. Formation, horizontal curves, longitudinal gradient, culverts, road sur-facing. Materials and machines, soils, crushed stone. Maintenance of formation, road surface and drainage. Forest road systems surveying, evaluation and proposal of specific solution to improve the access function.

Course completion consists of a practical part (50% of the total evaluation) and the theoretical part (50% of the total evaluation). The practical part consists in the processing of the term project. The pro-ject is evaluated by the leader of the course and the project can be accepted if it meets stated re-quirements. The theoretical part consists of an oral exam, which is focuses on issues of presented topics with connection to term project issue. Students are evaluated on the basis of established knowledge.

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

Language: English

Semester:W

**Duration:** 1 semester **Time-table:** lectures and practices - 40 hours

 field work - 20 hours

ECTS Credits: 5 Prerequisite courses: -

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

#  BMEF Forest Biometry and Modelling

Objectives and contents:

Introduction to open source statistical and modelling language R.

1. Graphical methods of exploratory data analysis.

Biometrical and statistical analysis of measured quantities with R.

Estimation of parameters of non-normal data.

Linear and non-linear regression models.

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 **Time-table:** lectures, exercises and practices - 56 hours

ECTS Credits: 6 Prerequisite courses: -

Method of assessment: personal project

#  ZFOB 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 LvončíkDept. of Forest Botany, 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

#  FORECOL 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

#  EFEP Forest Economics and Policy

Objectives and contents:

The aim of the course is to provide students with the ability to orient in forestry and forest-based industries within the European context to the local level. Ability to critically (objectively) evaluate the situation in forestry both at the state level and at the corporate (organizational) level, using the tools of sectoral economics, management and sectoral policy. Gaining an overview of current is-sues in the field of sectoral policy and economics (comprehensively in the context of the environ-ment), understanding the principles of sustainable development and management of forest eco-systems. Ability to evaluate the links of forestry to other components and activities of human activi-ty (for example, climate protection, adaptation measures or employment in the region). The student will learn to orientate themselves in the field of environmental and economic, can re-veal the shortcomings in forestry of the country or evaluate the positives of approaches to forestry in some countries and apply them appropriately in other geopolitical and biogeographical areas.

Course outlines (main topics):

- Basic terminology in forestry and related sectors - division into fields. Total forest area, re-gional breakdown and raw material base. Ownership of forests, rights of use, multifunctional management of forests. Social aspects of forest use.

- Processes and chains of added value creation in wood, production of goods from renewable wood raw material. Creation of added value in multifunctional forestry.

- Enterprises and business behavior. Structural features of forest and timber enterprises and for-estry service enterprises. Horizontal and vertical cooperation. Effects (Impact) on forestry and the timber industry.

- Markets and marketing: life cycles of markets for wood products, forestry services and ecosys-tem services. Forestry and timber industry customers.

- Economic information systems: managerial analysis of financial statement data. Accounting of budgetary organizations managing public forests.

- Logistics and forest production process: material and energy use of wood. Integration of the ma-terial chain of the creation of added value in wood. Characteristic features of forestry and wood processing industry logistics.

- Strategic planning and controlling, structural analysis of industries and branches. Assessment of strategic options of forest enterprises and enterprises of the wood processing industry.

- Forest capital structure and the valuation of biological assets, the principles of tax policy and subsidies within the EU and national policies, bioeconomy and the assessment of natural re-sources, ecosystem services and their assessment. Profitability and calculation of economic efficiency in forestry.

- Basic terminology and definitions in the field of forestry policy and forestry economics in an inter-national context and in relation to the environment. The geopolitical situation of Europe, the system and structure of the functioning of the European Union.

- New EU forestry strategy: for forests and forest-based sectors. Significant institutions in relation to forestry and environmental policy (from an international and European perspective): UNCED, IPF, COFO, UNFF, etc.

- Application instruments of forestry policy and economics. Reporting, analysis and evaluation. Public Relations in forestry and communication strategies, PR tools, feedback, crisis man-agement within forestry.

- The process of sustainable development. Principles of sustainable forest management Criteria and indicators of sustainable development according to Forest Europe (MCPFE) - Montreal Protocol.

- Certification in forestry. Certification of forestry management and certification of the processing chain. Fair Trade. PEFC and international and national standards. FSC and international and national standards. Comparison, specifications from the point of view of selected countries.

**Instructor:** Ing. Kateřina Holušová, Ph.D. et Ph.D., [Dept. of Forest and Wood Products Economics and Policy](https://is.mendelu.cz/auth/pracoviste/pracoviste.pl?id=44;nerozbaluj=1;lang=en)

Language: English

Semester: S

**Duration:** 1 semester **Time-table:** lectures, exercises and practices - 56 hours

ECTS Credits: 6 Prerequisite courses: -

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

#  FEEF 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 given 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 **Time-table:** lectures, exercises and practices – 56 hours

ECTS Credits: 6 Prerequisite courses: for non European students Dendro-

**Method of assessment:** examination logy of European Forest Tree Species

#  ZAKL 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 **Time-table:** lectures, practices, laboratory works,

 field work a excursion - 64 hours

ECTS Credits: 6 Prerequisite courses: -

Method of assessment: examination

#  HSUL 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 **Time-table:** lectures, exercises and practices - 56 hours

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.

#  FOPA 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 **Time-table:** lectures, exercises and practices - 56 hours

ECTS Credits: 6 Prerequisite courses: -

Method of assessment: examination

#  MOLP Forest Products Marketing and Trade

**Objectives and contents:** The aim of the course is to acquaint students with the basic principles of trading in forest timber and non-timber products and services that are undergoing an active market with special attention to the development and use of marketing skills, market analysis and compet-itiveness. Students will gain an overview of international trade in wood products or non-wood products from the forest (cork, eucalyptus oil, chestnuts, mushrooms - truffles, fruit - cranberries, blueberries, meat - game, etc.). They can compare the natural conditions and production of the regions, evaluate the competitive advantages of the market, assess opportunities and ways of trading, orient themselves in EU legislative frameworks and regulations in the areas of internation-al trade and forwarding, timber trade, gain an overview of institutions and associations in market-ing and trading with wood.

The digital tool KABADA will be used as part of the course to create a business plan.

**Instructor:** Ing. Jitka Meňházová, Ph.D., [Dept. of Forest and Wood Products Economics and Policy](https://is.mendelu.cz/auth/pracoviste/pracoviste.pl?id=44;nerozbaluj=1;lang=en)

Language: English

Semester: W

**Duration:** 1 semester **Time-table:** lectures, exercises and practices - 56 hours

ECTS Credits: 6 Prerequisite courses: -

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

#  FORT 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 **Time-table:** lectures, exercises and practices - 72 hours

ECTS Credits: 6 Prerequisite courses: -

Method of assessment: examination

#  ZFD 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 **Time-table:** lectures - 40 hours, project preparation and excursions - 30 hours

ECTS Credits: 5 Prerequisite courses: -

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

#

#  GSD Genetics and Breeding of Forest Trees

**Objectives and contents:** Introduction to Molecular (Structure of DNA, Genetic Code) and General Genetics (Rules of Heritability) - 4 hours lectures + 4 hours lessons (Lessons: Basic Terms & Definitions, Genetic Code & Consequences of Point Mutations)

Theory, Types, and Applications of Genetic Markers - 4 hours lectures + 2 hours lessons

Introduction to Population Genetics, Reproduction Processes, and Evolutionary Factors with Examples in Forest Tree Species - 4 hours lectures + 10 hours lessons (Lessons: Hardy-Weinberg Law, Genetic Structure of a Population, Reproduction Processes in a Seed Orchard)

Introduction to the Genetics of Qualitative and Quantitative Traits, Heritability, Examples in Forest Trees, Phenotypic Selection - 4 hours lectures

Introduction to Improvement and Breeding with Focus on Forest Tree Species - General Introduction, Selection in Forestry, Hybridization, Mutation Breeding, Genetic Manipulations - 6 hours lectures + 2 hours lessons

Conservation and Sustainable Use of Forest Genetic Resources - 2 hours lectures + 2 hours lessons

Application of Genetics in the System for Forest Reproductive Materials - EU Directive for FRM, OECD Scheme, Protection of Breeders' Rights. Brief Introduction to the Plant Health Rules and Genetically Modified Organisms in the EU - 2 hours lectures + 2 hours lessons

**Instructor:** Ing. Roman Longauer, CSc., Dept. of Silviculture

Language: English

Semester: W

**Duration:** 1 semester **Time-table:** lectures, exercises and practices - 30 hours

ECTS Credits: 4 Prerequisite courses: -

**Method of assessment:** For further information contact the Faculty Coordinator

#  GBC 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 ty-pological system and geobiocoenological method of differentiating vegetation. To obtain practical skills for de-scribing 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 geobiocoe-nology.

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, phytoindi-cation).

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 inci-dence 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. Geobiocenological 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, geobiocenology, geobiocenosis, forest type, geobiocene, ecology of plants, forest typology, ecosystem, plant community, typology.

**Instructor:** Ing. Jan Šebesta, Ph.D., Ing. Petr Dujka, Ing. Antoním Kusbach, Ph.D. Dept. of Forest Botany, Dendrol-ogy and Geobiocoenology

Language: English

Semester: S

**Duration:** 1 semester **Time-table:** lectures, exercises and practices - 30 hours

ECTS Credits: 5 Prerequisite courses: -

Method of assessment: examination

#  GISEF 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 **Time-table:** lectures, exercises and practices - 56 hours

ECTS Credits: 6 Prerequisite courses: -

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

#  ZGEC 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 **Time-table:** lectures, exercises and practices - 30 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment: examination

#  ZHRL 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, potholes, 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.), lowland 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, sinkholes, 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 Soil Science

Language: English

Semester: W

**Duration:** 1 semester  **Timetable:** lectures - 14 hours, 2 days field trip - 16 hours

 total of 30 hours

ECTS Credits**:** 5 Prerequisite courses**:** -

**Method of assessment:**Written test and oral exam

#  ZIOS 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:** lectures and practices – 32 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.

#  ZIEC 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

#  ZLENC Landscape Ecology

**Objectives and contents:** The objective of teaching landscape ecology is to familiarise students with the theo-retical background and methodological procedures of landscape ecology in an integrated ho-listic approach as a science studying the structure of the landscape and patterns of ecological pro-cesses in the landscape. The con-tents of the course will be adapted to the needs for applying the re-sults of landscape ecology in the geobiocoe-nological approach within landscape planning and land-scape maintenance. Instruction will focus on the geobi-ocoenological approach to studying the land-scape, on creating supporting materials for designing an ecological network within a landscape, and on landscape maintenance leading to sustainable use. The examples of land-scape ecology principles and policy around the world will be important components of lectures. Students should learn and un-derstand the basic patterns in ecological processes and the relationship of natural and socio-eco-nomic components in a cultural landscape. They will be educated in the principles of bioindication and the meth-odological procedure of biogeographical differentiation of the landscape in the geobiocoenologi-cal approach, including examples of applications under the conditions of various landscapes. The in-struction 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. Geobiocene 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 geobiocenoses according to intensity of anthropogenic effects and degree of eco-logical sta-bility

6. Homogeneity and heterogeneity of the landscape, individual and typological classification of land-scapes

7. Landscape structure (matrices, patches, corridors, network characteristics in landscape, island bio-geography theory.)

8. Landscape dynamics (ecological stability of landscape, homeostasis, homeorhesis, ecological stress in a land-scape, succession of ecosystems and landscape development, transformations of cen-tral 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 terri-torial systems of eco-logical stability, current situation in designing, implementing and care for the structural components of the Ter-ritorial 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 charac-teristics of a selected territory.

**Instructor:** Ing. Jan Šebesta, Ph.D., prof. Dr. Ing. Petr Maděra, Ing. Antonín Kusbach, Ph.D., Mgr. Vladimír Hula, Ph.D., Ing. Lenka Ehrenbergerová, Ph.D., Ing. Petr Jelínek, Ph.D., Ing. Martin Valtera, Ph.D., 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.

#  ZLPRD 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

#  ZLREC 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

#  LYEF 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

**Duration:** 1 semester **Time-table:** lectures, practical exercises - 30 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment: examination

#  LTTEF 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 **Time-table:** lectures, exercises and practices - 72 hours

ECTS Credits: 6 Prerequisite courses: -

Method of assessment: examination

#  ZMNG 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:** Ing. Jitka Meňházová, Ph.D.

Language: English

Semester: S

**Duration:** lessons given in 2 weeks **Time-table:** theoretical lectures and practical exercises

 30 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment: examination

#  Z-MT 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: S

**Duration:** 1 semester **Time-table:** lectures and practices - 40 hours

ECTS Credits: 5 Prerequisite courses: -

Method of assessment: written exam

#  MULF 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](http://inldf.mendelu.cz/ldf/ustavy/stavby/ulsm_info.htm?lang=en)

Language: English

Semester:S

**Duration:** 1 semester **Time-table:** lectures, exercises, practices - 56 hours

ECTS Credits: 6 Prerequisite courses: -

Method of assessment: examination

#  ZNC 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 **Time-table:** lectures, exercises, practices - 30 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment: examination

#  ZOPL 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 taping.  |
| 7. | Resin taping.  |
| 8. | Vitamin powder. Chlorophyll compound. Essential oils. Tan bark harvesing.  |
| 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 **Time-table:** lectures, excercises - 36 hours

ECTS Credits: 3 Prerequisite courses: -

Method of assessment: personal project

#  ZPWPN 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 imunofluorescency, 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 theirs influence on stability of trees, rot of stems, branches and twigs, diseases of leaves, vascular diseases. Diseases of coniferous species - the root and but 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

#  PMEF 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 and Technology

Language**:** English

Semester:W

**Duration:** 1 semester **Time-table:** lectures, exercises, practices - 30 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment: examination

#  ZPHCH Phytochemistry

**Objectives and contents:** Phytochemistry is the study of the chemical compounds found in plants and their biological functions. This course will provide an in-depth exploration of plant metabolites, including primary and secondary metabolites, their biosynthesis, and their ecological, pharmacological, and industrial relevance. The course is designed for Erasmus students and PhD candidates from various fields, especially those with an interest in plant biology, forestry, environmental science, and biotechnology.

Course contents:

1. Introduction to Phytochemistry
2. Primary Metabolites: Carbohydrates, Proteins, and Lipids
3. Alkaloids: Chemical Properties and Biological Activities
4. Terpenoids: Structure, Classification, and Applications
5. Phenolic Compounds: Flavonoids, Lignans, Tannins
6. Glycosides and Saponins: Structure and Biological Effects
7. Plant Hormones and Signaling Compounds
8. Plant Defense Mechanisms: Phytochemicals in Plant Protection
9. Extraction and Isolation of Phytochemicals
10. Modern Analytical Techniques in Phytochemistry
11. Pharmacological Applications of Phytochemicals
12. Industrial Applications of Phytochemicals
13. Environmental and Ecological Roles of Phytochemicals
14. Future Directions in Phytochemistry

**Instructor:** Ing. Lucie Vanickova, Ph.D., M.Sc. Antonio Pompeiano, Ph.D., Dept. of Forest Botany, Dendrology and Geobiocoenology

Language: English

Semester:S

Duration: 1 semester Time-table:

ECTS Credits: 6 Prerequisite courses: Basic knowledge of organic chemistry and biochemistr, Background in plant biology is beneficial but not required.

Method of assessment:

· Midterm Exam (Week 7) – 30%

· Practical Laboratory Report (Week 9-11) – 20%

· Research Paper or Project (Week 14) – 30%

· Final Exam (Week 14) – 20%

#  PMPC Project Management in Practice

**Objectives and contents:** The course aims to provide hands-on experiences. Showcase best practices and enhance finding solutions to common issues. It provides students with a theoretical basis and the practical implementation of projects and takes students through the individual phases of the project life cycle. The course bridges the theoretical knowledge obtained in the classes focused on general management with communication skills and project implementation.

After completing the course, the student will be ready to carry out a basic grant/subsidy/tender search, draw up a project preparation schedule and plan its milestones. Furthermore, they will be able to perform a fundamental risk analysis and draw up an outline of communication with selected interest groups and stakeholders. Finally, they will orientate themselves in the individual phases of the project's life.

Course content:

1. THEORETICAL PART

European policies, strategies, basic terms

Personnel management and coordination, basics of financial management

Communication as an essential tool in the implementation of projects

Public procurement

2. PRACTICAL PART - PROJECT LIFE CYCLE

Formulating the project plan and objectives

Data and Time management, Risk management

Preparation of the project application

Project initiation and implementation

Project monitoring and control

Project Termination, Sustainability

Current Issues and Topics

**Instructor:** Ing. Pavlína Pancová Šimková, Ph.D., Dept. of Forest Protection and Wildlife Management

Language: English

Semester:S

**Duration:** 1 semester **Time-table:** practices - 28 hours

ECTS Credits: 3 Prerequisite courses: -

Method of assessment: student’s project

#  PREF 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](http://uldep.ldf.mendelu.cz?lang=en)

Language: English

Semester:W

**Duration:** 1 semester **Time-table:** lectures, exercises, practices - 30 hours

ECTS Credits: 4 Prerequisite courses: -

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

#  PBEF 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 **Time-table:** lectures, exercises, practices - 30 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment: examination

#  SILV 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 **Time-table:** theoretical lectures,

 practical excercises – 56 hours

ECTS Credits: 6 Prerequisite courses: -

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

#  ZSCM 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 or S

**Duration:** 1 semester **Time-table:** lectures and practices - 30 hours

ECTS Credits: 5 Prerequisite courses: -

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

#  ZSOB 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 trans-formation 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 Science

Language: English

Semester: S

**Duration:** 1 semester **Time-table:** lectures, exercises, laboratory, practices

 50 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment:examination

#  SAIEU 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:

- Introduction to R statistical environment – how to operate R, plots in R

- Sampling design and pseudoreplication issue, assumptions of statistical models

- Linear models – review, multiple regression

- Generalized linear models – presence/absence data, counts, data limited by zero

- Mixed effect models – analysing data with multilevel structure – brief introduction

**Instructor:** Ing. Daniel Volařík, Ph.D., Dept. of Forest Botany, Dendrology and Geobiocoenology

Language: English

Semester: W

**Duration:** intensive one week course **Time-table:** lectures, exercises, practices - 30 hours

ECTS Credits: 3 Prerequisite courses: -

**Method of assessment:** approved exercises, small oral examinatio

#  ZSRS Surveying and Remote Sensing

**Objectives and contents:** Surveying part provides 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, in-cluding 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 are-as and volumes. Field operations planning.

Remote sensing part provides information on the most important technologies of acquiring and pro-cessing remotely sensed data and on possible applications of results for landscape and forest moni-toring.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 sen-sors. Data transmission and storing. Data processing methods - image enhancement, visual interpre-tation, digital analysis and interpretation. Applications – topographic mapping, land cover and land use mapping, forestry, agriculture, hydrology.

**Instructor:** doc. Ing. Tomáš Mikita, Ph.D., Ing. Petr Vahalík, Ph.D., Ing. Lucie Zejdová, 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 - 30 hours

ECTS Credits: 5 Prerequisite courses: -

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

#  ZSTC Sustainable Timber Construction in Europe: Policies, Standards & Market Trends

**Objectives and contents:** This course explores the latest European trends in sustainable timber construction, focusing on policies, standards, and market demands. Students will learn about key EU initiatives like the Green Deal, Circular Economy, and New European Bauhaus and their impact on the building sector. The course covers essential regulations, sustainability certifications, and innovative construction practices. Through a mix of lec-tures and hands-on activities, students will analyze case studies, explore market trends, and engage in a group project to design a sustainable timber building concept. The course promotes critical thinking and practical skills for applying sustainability principles in construction.

Course Structure (Lectures & Activities):

1. Introduction to European sustainability policies

2. Timber construction standards & certifications

3. Market trends & innovation in timber buildings

4. Workshop: circular economy in timber construction

5. Group project: designing a sustainable timber building

6. Project presentation & discussion on future trends

**Instructor:** Maryna Babenko, Ph.D., Dept. of Wood Science and Technology

Language: English

Semester: W

**Duration:** 1 semester **Time-table:** lectures, exercises, practices - 40 hours

ECTS Credits: 5 Prerequisite courses: **-**

**Method of assessment:**Presentation of final projects

#  ZHHE The Hidden Half of Ecosystems – Functional Ecology of Roots and Mycorrhizal Fungi

**Objectives and contents:** Roots and their fungal symbionts are key players influencing tree productivity and forest ecosystem services. The course will enable students to understand the function of the root system and identify the anatomical, morphological, and physiological parameters of roots and their distribution in space and time that underlie resource uptake. Concepts of root classification and morphological analysis will be discussed and practised. The functional biodiversity of mycorrhizae will be introduced; morphotypes will be sampled and the concept of identifying mycorrhizal morphotypes will be practised. The interactions of mycorrhizal fungi with roots and other soil biota for nutrient mobilisation and acquisition will be determined. The contribution of roots and mycorrhizal hyphae turnover and the antagonistic effects of mycorrhizal fungi with saprotrophic fungi will be taught. The effects of the abiotic environment on root system plasticity, and root traits related to drought and nutrient limitation avoidance, and abiotic effects on soil fungal communities and the stress alleviating effects of ecto- or endomycorrhizal fungal symbionts will be elucidated. The students will acquire skills in identifying key environmental factors that shape roots and mycorrhizal communities and the role of those hidden organs/organisms on ecosystem functioning and ecosystem services. The established knowledge will be extended with information on recent scientific developments in the hidden half of forest ecosystems. Discussed topics: Definition of roots and mycorrhizal traits / functioning, overview mycorrhizal diversity related to edaphoclimatic properties, root-mycorrhizal interactions, effects of roots and mycorrhiza on ecosystem services, plasticity of root systems under different soil conditions. Practice: Soil sampling for ectomycorrhizal fine roots at the UFE, sample preparation, root morphological measurements, morphotyping of ectomycorrhizal root tips

**Instructor:** doc. Boris Rewald, prof. Douglas Godbold, Dr. Petra Veselá, Ing. Aneta Bačová

Language: English

Semester: S

**Duration:** 1 semester **Time-table:** lectures, exercises and practices - 30 hours

 (12h lecture, 12h labor work, 6h excursion UFE)

 3 hours per week

ECTS Credits: 4 Prerequisite courses: -

**Method of assessment:** short presentation (40%), written exam (60%)

#  ZDPR 3D Printing

**Objectives and contents:** Students will be introduced to 3D printing process with orientation in different tech-nologies 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 (stereolitography) printing with resin, other technologies, designing for 3D printing, general design and considerations for 3D print-ing, 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, Furniture Design and Habitat (Bambulab, Prusa). The result will be a 3D model of keychain/furniture which they will have to 3D model and 3D print.

**Instructor:** doc. Ing. Milan Gaff, Ph.D., Ing. Tomáš Mikulec

Language**:** English

Semester: W or S

**Duration:** 1 semester **Time-table:** ectures and practices - 2 hours per week

ECTS Credits: 5 Prerequisite courses: -

Method of assessment: written examination

#  ZSTML 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

#  ZTTM Trees and Timbers in the Mediterranean Area

**Objectives and contents:** Objectives and contents: This specialised course is tailored for Forest and Wood Engineering students, focusing on the Mediterranean region's unique tree species, timber characteristics, and forest ecosystems. Students will gain essential knowledge and practical skills related to the sustainable utilisation of forest resources, timber processing, and the engineering applications of Mediterranean timbers. Learning Objectives: By the end of this course, students will be able to: 1. Identify and classify key tree species endemic to the Mediterranean and evaluate their ecological and economic significance. 2. Analyse Mediterranean timbers' physical and mechanical properties, understanding their applications in construction and design. 3. Learn the characteristics of Mediterranean forests, woodlands, and shrubs. 4. Analyse the use and trade of timber during ancient times and nowadays. 5. Familiarise with the macroscopic and microscopic structure of wood species (Selected wood species from the Mediterranean area will be studied). 6. Explore innovative uses of Mediterranean wood resources, including advanced timber products and engineering solutions. This course will enable students in Forest and Wood Engineering to develop a robust understanding of the unique trees and timbers of the Mediterranean region. Students will be well-prepared to contribute to responsible forestry and timber utilisation within the Mediterranean context and beyond by fostering a comprehensive grasp of sustainable management practices and engineering applications. The course will include a combination of lectures and hands-on workshops. Assessment will involve a mix of practical assignments, quizzes, and exams. Students will complete a final project/essay: Key Topics: - Overview of the Mediterranean climate and its impact on forest ecology - Identification and characteristics of major Mediterranean tree species (e.g., oak, pine, beech) - Wood properties: Density, strength, durability, and workability of Mediterranean timbers that involves the design and proposal of a sustainable engineering solution utilising Mediterranean timber, emphasising both technical feasibility and ecological impact.

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

Language: English

Semester: S

**Duration:** 1 semester **Time-table:** lectures and practices - 30 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment: examination

#  ZTMB Tropical Timbers

**Objectives and contents:** This course is designed specifically for students in Forest and Wood Engineering, focusing on the diverse range of tropical timber species, their physical and mechanical properties, and the sustainable practices involved in their management and utilization. Given the ecological significance and eco-nomic potential of tropical forests, this course will explore the complexities of tropical timber markets, the challenges of sustainability, and innovative engineering solutions. Students will engage in both theoretical learning and practical experiences, equipping them with the knowledge necessary to function effectively within the global timber industry. Learning Objectives: By the end of this course, students will be able to: 1. Identify and classify key tropical timber species, understanding their ecological, economic, and cultural significance. 2. Analyze tropical timbers' physical (density, grain, moisture) and mechanical properties (strength, durability) and their implications for design and construction. 3. Evaluate sustainable management practices for tropical forests, including certification systems and community-based forestry initiatives. 4. Discuss the role and impact of tropical timber in the global market, including trends, challenges, and opportunities. 5. Course Structure: The course will be delivered through lectures and seminars. This course will prepare Forest and Wood Engineering students to understand the complexities of tropical timber resources deeply. By emphasizing sustainable prac-tices and innovative engineering applications, students will be equipped to contribute effectively to the re-sponsible management and utilization of tropical forest resources in a global context. Assessment will involve a mix of practical assignments, quizzes, and exams. Students will complete a final project/essay: Key Topics: Overview of tropical forest ecosystems: Characteristics and biodiversity - Identification of major tropical timber species (e.g., mahogany, teak, meranti) and their specific properties - Wood science fundamentals: Growth rings, grain structure, and moisture content in tropical woods - Mechanical properties of tropical timbers: Test-ing and performance standards - Sustainable forestry practices: Certification (FSC, PEFC) and community forest-ry models - Timber processing and utilization: Sawmilling, drying techniques, and value-added products - Mar-ket dynamics: Export/import regulations and the role of tropical timber in global trade.

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

Language: English

Semester: W

**Duration:** 1 semester **Time-table:** lectures and practices - 30 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment: examination

ECTS Credits: 3 Prerequisite courses: -

Method of assessment: examination

#  ZUPST 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

#  WSS 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

#  WAEF 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 and Technology

Language: English

Semester:W

**Duration:** 1 semester **Time-table:** lectures, exercises, practices - 30 hours

ECTS Credits: 4 Prerequisite courses: -

Method of assessment:examination

#  ZWM 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 and Technology

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

#  ZDRKO Wooden Structures

**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 Science and Technology

Language: English

Semester: S

**Duration:** 1 semester **Time-table:** lectures, exercises, practices - 50 hours

ECTS Credits: 5 Prerequisite courses: -

Method of assessment:examination