

Poznan University of Life Sciences

Faculty of Forestry  
Poznań, Poland

MSc in Forestry

2019

Contents:	Page
General Information	3
MSc in Forestry study programme	5
Semester 1. Description of obligatory courses	7
Semester 2. Description of obligatory courses	26
Electives. Description of courses	40

## M.Sc. Programme in Forestry

### General Information

University	Poznań University of Life Sciences
Faculty	Faculty of Forestry
Programme title	MSc in Forestry
Degree received	MSc in Forestry
Address of the institution	Faculty of Forestry ul. Wojska Polskiego 28 60-637 Poznan Poland
Programme web site	<a href="http://www.up.poznan.pl">www.up.poznan.pl</a>
Contact person	Dr. hab. Krzysztof Jabłoński
Phone:	+48 61 848 76 40
Fax:	+48 61 848 76 45
e-mail:	<a href="mailto:jabkrys@up.poznan.pl">jabkrys@up.poznan.pl</a>
Language of instruction	English
Tuition	For details see the University web page: <a href="http://msc-bsc.puls.edu.pl/">http://msc-bsc.puls.edu.pl/</a>
Duration	18 months
The next programme begins	October 2019
Deadline for application	End of April 2019
Education requirements	BSc in Forestry or in related sciences, good command of English
Description	<p>The MSc programme in Forestry is geared for students who have completed their undergraduate studies in Forestry and have obtained the degree of BSc in Forestry or in related sciences. The programme lasts for three semesters (18 months) and starts in October. After completing the courses, presenting the Master's thesis and passing the final examinations the student receives the degree of M.Sc. in Forestry.</p>

During their studies, students are offered lectures, seminars, labs and field practicals/trips. Apart from obligatory courses students may select from a number of electives.

Semester 1 consists of 17 obligatory courses. Semester 2 consists of 11 obligatory courses and 7 electives. Semester 3 is of a slightly different character, as it offers courses and seminars which should help students complete their Master's theses. It contains no obligatory courses, but students select from a variety of electives,

labs and field practicals.

The detailed description of the programme and courses is presented in the following MSc in Forestry brochure.

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## MSc in Forestry study programme

The programme consists of three semesters

### Semester 1

No.	Course	Teaching hours			
		Lectures	Seminars	Total	
1	Scientific observation and experiment design in forestry	15	15	30	
2	Biotechnology	10	5	15	
3	Techniques of Silviculture	5	15	20	
4	Selection, Seed Management and Forest Nurseries	5	15	20	
5	Forest Ecology	5	15	20	
6	Forest Inventory	5	15	20	
7	Forest Utilisation	5	15	20	
8	Forest Entomology - Wood Protection	5	15	20	
9	Forest Pathology	5	15	20	
10	Forest Management and Economics	5	15	20	
11	Game Management	5	15	20	
12	Forest Botany	5	15	20	
13	Forest Engineering	5	15	20	
14	Forest Technology	5	15	20	
15	Forest Soil Science	10	10	20	
16	Forest Protection	5	15	20	
17	Forest Mensuration and Yield Science	5	15	20	
Total hours:				345	

## Semester 2

No.	Course	Teaching hours			
		Lectures	Seminars	Total	
1	Soil Reclamation	10	10	20	
2	Forest Products	4	13	17	
3	Forest Transport	4	12	16	
4	Forest Entomology - Ecosystem Protection Ecologization	4	13	17	
5	Dynamic Ecology	8	0	8	
6	Forest Hydrology	10	0	10	
7	Global Change	10	0	10	
8	Forest Management Planning	4	6	10	
9	Forest Education	9	6	15	
10	Forest GIS with Elements of Geomatics	3	4	7	
11	Plant Ecophysiology	12	8	20	
12 - 18	7 Electives (lectures, seminars, labs, field practicals)			140	
<b>Total hours:</b>					290

## Semester 3

No.	Course	Teaching hours			
		Lectures	Seminars	Total	
1-5	5 Electives (lectures, labs, field practicals)			100	
6	Diploma seminars	0	65	65	
7	Master's thesis and preparation for the final exams				
<b>Total hours in semester 3:</b>					165

**Total number of teaching hours**

		<b>800</b>	
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Semester 1

Descriptions of  
Obligatory Courses

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Management</b>
Course title: <b>Scientific Observation and Experiment Design in Forestry</b>	Lecturer's name: <b>Dr. Tomasz Najgrakowski</b> <b>Dr. hab. Katarzyna Kaźmierczak</b> <b>Dr. Janusz Szmyt</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment: <b>Written examination</b>	Number of hours: <b>30</b>
	Lectures: <b>15</b>
	Seminars: <b>15</b>
<b>Lectures:</b> <ol style="list-style-type: none"> <li>1. Scientific methods – general approach. Terms and Definitions. (1hr)</li> <li>2. Descriptive statistics for samples and general populations. (2hrs)</li> <li>3. Formulating and testing hypotheses. Parametric and non-parametric tests. (3hrs)</li> <li>4. ANOVA and multiple comparisons. (2hrs)</li> <li>5. Regression and modeling. Allometric equations. (2hrs)</li> <li>6. Sampling and Selection Systems for Forest Inventory purposes. (2hrs)</li> <li>7. Designing experiments in forestry sciences. (2hrs)</li> <li>8. Data processing. (1hr)</li> </ol>	
<b>Seminars:</b> <ol style="list-style-type: none"> <li>1. Mathematical statistics as the main tool in scientific observation in forestry. (2hrs)</li> <li>2. Solving problems and case studies comprising elements of descriptive statistics, ANOVA and regression analysis. (4hrs)</li> <li>3. Solving problems and case studies comprising data management and sampling planning. (4hrs)</li> <li>4. Solving problems and case studies comprising experiment design. (5hrs)</li> </ol>	



<b>MSc in Forestry</b>															
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Silviculture</b>														
Course title: <b>Biotechnology</b>	Lecturer's name: <b>Dr. Maria Hauke-Kowalska</b>														
	Year: <b>1</b> Semester: <b>1</b>														
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>15</b>														
	Lectures: <b>10</b>														
	Seminars: <b>5</b>														
<p>Lectures:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding-left: 20px;">1. History of biotechnology</td> <td style="text-align: right; padding-right: 20px;">1 hr</td> </tr> <tr> <td style="padding-left: 20px;">2. Micropropagation</td> <td style="text-align: right; padding-right: 20px;">3 hr</td> </tr> <tr> <td style="padding-left: 20px;">3. Plant transformation, GMO</td> <td style="text-align: right; padding-right: 20px;">3 hr</td> </tr> <tr> <td style="padding-left: 20px;">4. Cryopreservation of tissues</td> <td style="text-align: right; padding-right: 20px;">3 hr</td> </tr> </table> <p>Seminars:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding-left: 20px;">- DNA as a carrier of genetic information</td> <td style="text-align: right; padding-right: 20px;">5 hr</td> </tr> <tr> <td style="padding-left: 20px;">- Isolation of DNA</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">- Genetic markers used in forestry</td> <td></td> </tr> </table>		1. History of biotechnology	1 hr	2. Micropropagation	3 hr	3. Plant transformation, GMO	3 hr	4. Cryopreservation of tissues	3 hr	- DNA as a carrier of genetic information	5 hr	- Isolation of DNA		- Genetic markers used in forestry	
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<b>MSc in Forestry</b>	
Field of Study and Faculty:  <b>Forestry</b>	Department:  <b>Department of Silviculture Sub-department of Silvicultural Techniques</b>
Course title:  <b>Techniques of Silviculture</b>	Lecturer's name:  <b>Dr. Janusz Szmyt</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment:  <b>Examination</b>	Number of hours: <b>20</b>
	Lectures: <b>5</b>
	Seminars: <b>15</b>
<b>Lectures:</b> 1.Characterization of the forest management system in Polish forestry – 2 hours 2.Forest tending methods – review – 2 hours 3.Plantations of the fast growing tree species – linking possibilities with demands – 1 hour  <b>Seminars:</b> 1. Planning species composition under different forest site conditions – 5 hours 2. Tending operations – case study of Ilmurzynski's method – 5 hours 3. Afforestation under different environmental conditions (e.g. in case of former farmland) – 3 hours 4. Sustainable forestry – looking for the future – 2 hours	

<b>MSc in Forestry</b>											
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Silviculture</b>										
Course title: <b>Selection, Seed Management and Forest Nurseries</b>	Lecturer's name: <b>Dr. Maria Hauke-Kowalska</b>										
	Year: <b>1</b> Semester: <b>1</b>										
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>15</b>										
	Lectures: <b>5</b>										
	Seminars: <b>10</b>										
<p>Lectures:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding-left: 20px;">1. Selection of forest trees (seed stand, seed orchards, plus trees)</td> <td style="text-align: right; padding-right: 20px;">3 hr</td> </tr> <tr> <td style="padding-left: 20px;">2. Forest nursery (bareroot and container seedling production)</td> <td style="text-align: right; padding-right: 20px;">2 hr</td> </tr> </table> <p>Seminars:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding-left: 20px;">1. Seed management</td> <td style="text-align: right; padding-right: 20px;">4 hr</td> </tr> <tr> <td style="padding-left: 20px;">2. Seed storage, preparation to sowing</td> <td style="text-align: right; padding-right: 20px;">3 hr</td> </tr> <tr> <td style="padding-left: 20px;">3. Seed testing</td> <td style="text-align: right; padding-right: 20px;">3 hr</td> </tr> </table>		1. Selection of forest trees (seed stand, seed orchards, plus trees)	3 hr	2. Forest nursery (bareroot and container seedling production)	2 hr	1. Seed management	4 hr	2. Seed storage, preparation to sowing	3 hr	3. Seed testing	3 hr
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<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Sites and Ecology</b>
Course title: <b>Forest Ecology</b>	Lecturer's name: <b>Prof. dr. hab. Piotr Robakowski, Dr. Adrian Łukowski</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment: <b>TEST with a mark</b>	Number of hours: <b>20</b>
	Lectures: <b>5</b>
	Seminars: <b>15</b>
<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. Basic ecological concepts</li> <li>2. Basic ecological laws</li> </ol> <p><b>Seminars:</b></p> <ol style="list-style-type: none"> <li>1. Abiotic environmental factors</li> <li>2. Biotic environmental factors</li> <li>3. Ecological adaptation of populations</li> <li>4. Dynamics of forest communities</li> <li>5. Functioning of forest ecosystems</li> <li>6. Environmental impact of forest ecosystems</li> <li>7. Forest biomes</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Management</b>
Course title: <b>Forest Inventory</b>	Lecturer's name: <b>Dr. Grzegorz Rączka</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment: <b>Test with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>5</b>
	Seminars: <b>15</b>
<p><b>Main objective of the subject</b> is to acquire theoretical and practical knowledge on the forest inventory method used in forest management planning.</p> <p><b>Lectures:</b></p> <p>1. Basic terms and definitions .....<b>2.</b></p> <p>2. Principles of forest inventory method .....<b>3.</b></p> <p><b>Seminars:</b></p> <p>1. Valuation characteristics of stands .....<b>3.</b></p> <p>2. Timber characteristics of stands .....<b>6.</b></p> <p>3. Management trends for stands .....<b>6.</b></p>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Utilisation</b>
Course title: <b>Forest Utilisation</b>	Lecturer's name: <b>Dr. hab. Piotr S. Mederski</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment: <b>Oral exam with mark</b>	Number of hours: <b>20</b>
	Lectures: <b>5</b>
	Seminars: <b>15</b>
<p><b>Objectives:</b> Lectures: the objective of the course is to characterise forest utilisation with respect to wood forest products and non-wood forest products. The broader scope will be focused on forest operations applied at all stages of forest tending (cleanings, thinnings) as well as in final fellings; the impact of forest operations on forest environment, economic aspects and ergonomics; access to the forests (strip roads) for forestry machines;</p> <p>Seminars: designing forest operation under particular stand conditions with respect to establishment of strip roads and different thinning intensity, ecological Aspects of thinning operations – calculating stand damage.</p> <p><b>Contents:</b> Lectures:</p> <ol style="list-style-type: none"> <li>1) forest utilisation as part of forestry: 1h</li> <li>2) early thinning: 1h</li> <li>3) late thinning: 1h</li> <li>4) thinning in broadleaved stands: 1h</li> <li>5) final felling: 1h</li> </ol> <p>Seminars:</p> <ol style="list-style-type: none"> <li>1) Introduction and design structure: 2h</li> <li>2) selection of forest operation for particular stand conditions: 1h</li> <li>3) access to forest: designing of strip roads: 2h,</li> <li>4) assessment of the impact of strip roads impact on the intensity of thinning operation; analysing scenarios with different thinning intensities : 8h</li> <li>5) environmental impact of forest operation: 2h</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Entomology</b>
Course title: <b>Forest Entomology - Wood Protection</b>	Lecturer's name: <b>Dr. hab. Andrzej Mazur</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>5</b>
	Seminars: <b>15</b>
<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. General conditions for wood habitation by insects – 1 hour</li> <li>2. Wood protection in forests and repositories – 2 hours</li> <li>3. Protection of wood structures and objects – 2 hours</li> </ol> <p><b>Seminars:</b></p> <ol style="list-style-type: none"> <li>1. Identification of xylophagous butterflies of Cossidae, Sesiidae families and their feeding patterns – 2 hours</li> <li>2. Identification of xylophagous insects of Siricidae, Xiphydriidae, Formicidae families and flies and their feeding patterns – 3 hours</li> <li>3. Beetles of Cerambycidae, Curculionidae, Buprestidae, Anobiidae, Lyctidae, Platypodidae families and their feeding patterns – 7 hours</li> <li>4. Identification of xylosaprophagous insects of Lucanidae, Scarabidae families and their feeding patterns – 3 hours</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Pathology</b>
Course title: <b>Forest Pathology</b>	Lecturer's name: <b>Prof. dr. hab. Małgorzata Mańka</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>5</b>
	Seminars: <b>15</b>
<p><b>Lectures:</b></p> <p>1. Diseases in forest nursery production <i>versus</i> environment..... 2</p> <p>2. Root diseases and trunk diseases of trees <i>versus</i> environment ..... 2</p> <p>3. Leaf and needle diseases of woody plants <i>versus</i> environment ..... 1</p> <p><b>Seminars:</b></p> <p>1. Diagnosis of tree diseases - symptoms of root diseases ..... 4</p> <p>2. Diagnosis of tree diseases - symptoms of trunk and branch diseases ..... 4</p> <p>3. Diagnosis of tree diseases - symptoms of leaf and needle diseases..... 4</p> <p>4. Diagnosis of tree diseases – fungi pathogenic to trees (microscopic identification)..... 3</p>	



<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Technology</b>
Course title: <b>Forest Management and Economics</b>	Lecturer's name: <b>Dr. hab. Krzysztof Jabłoński</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>5</b>
	Seminars: <b>15</b>
<p><b>Lectures:</b></p> <p>Forestry in Europe.</p> <p>Organization of forestry in Poland.</p> <p><b>Seminars:</b></p> <p>Market. Demand and supply. Market equilibrium. Elasticity of demand.</p> <p>Opportunity cost. Marginal costs and benefits</p> <p>Optimum production level - calculations.</p> <p>Time value of money. Commonly used compound interest formulas - calculations.</p> <p>Investment calculations. The Net Present Value. The Cost/Benefit ratio.</p> <p>A number of case studies will be performed and analyzed to learn how to assess investment opportunities.</p>	

<b>MSc in Forestry</b>	
Field of Study and Faculty:  <b>Forestry</b>	Department:  <b>Department of Game Management and Forest Protection</b>
Course title:  <b>Game Management</b>	Lecturer's name:  <b>Dr. Anna Wierzbicka</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment:  <b>Oral exam</b>	Number of hours: <b>20</b>
	Lectures: <b>5</b>
	Seminars: <b>15</b>
<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. General situation of main game animal species in Poland and Europe – 2h.</li> <li>2. Main principles of game management in Poland and Europe – 2h.</li> <li>3. Ecological foundations of game management – 1h.</li> </ol> <p><b>Seminars:</b></p> <ol style="list-style-type: none"> <li>1. Biology and ecology of big game species. Red deer, Fallow deer, Roe deer, Wild boar and hare – 5h.</li> <li>2. Population balance and methods of counting big and small game shooting rates – 2h.</li> <li>3. Environmental impact of game – how to reduce damage causes by animals – 2h.</li> <li>4. Introduction, reintroduction and restitution methods for different animal species -2h.</li> <li>5. Principles of game management planning – 2h.</li> <li>6. Game Breeding Centers – 1h.</li> <li>7. Hunting traditions – 1h.</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Botany</b>
Course title: <b>Forest Botany</b>	Lecturer's name: <b>Dr. Irmina Maciejewska-Rutkowska</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment: <b>TEST with a mark</b>	Number of hours: <b>20</b>
	Lectures: <b>5</b>
	Seminars: <b>15</b>
<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. Subject range. Position of botany in nature and forestry sciences. Bibliography. Study methods. 1 hour.</li> <li>2. Plants and environment. Ecological and life plant forms. 1 hour.</li> <li>3. General characteristic of flora of Poland. 1 hour.</li> <li>4. Review of forest vegetation of Poland. 1 hour.</li> <li>5. Synanthropic plants. Man's role in vegetation forming. Plants as bioindicators of habitats. 1 hour.</li> </ol> <p><b>Seminars:</b></p> <p>Lichens, mosses, clubmosses, horsetails, ferns, conifers and flowering plants – characteristics and identification of selected species from the following forest communities:</p> <ol style="list-style-type: none"> <li>1. <i>Peucedano-Pinetum, Leucobryo-Pinetum, Cladonio-Pinetum, Empetro nigri-Pinetum</i> – 2 hours;</li> <li>2. <i>Quercu roboris-Pinetum, Calamagrostio arundinaceae-Quercetum</i> – 2 hours;</li> <li>3. <i>Potentillo albae-Quercetum petraeae</i> – 2 hours;</li> <li>4. <i>Tilio-Carpinetum, Galio sylvatici-Carpinetum, Stellario holosteae-Carpinetum</i> – 2 hours;</li> <li>5. <i>Galio odorati-Fagetum, Luzulo pilosae-Fagetum</i> – 2 hours;</li> <li>6. <i>Ficario-Ulmetum minori, Fraxino-Alnetum</i> – 2 hours;</li> <li>7. <i>Salicetum albo-fragilis, Populetum albae, Ribeso nigri-Alnetum</i> – 2 hours.</li> </ol> <p>Invasive species – characteristics and identification – 1 hour.</p>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Engineering</b>
Course title: <b>Forest Engineering</b>	Lecturer's name: <b>Dr. Bernard Okoński</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment: <b>TEST with a mark (in writing) + technical project</b>	Number of hours: <b>20</b>
	Lectures: <b>5</b>
	Seminars: <b>15</b>
<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. Civil engineering infrastructure in forest management; civil engineering infrastructure as a factor modifying ecosystems (factor impacting the environment, as a means of forest environment protection); Investment in civil engineering infrastructure; foresters as investors; participants of investment process and investment cycle (1h)</li> <li>2. Civil engineering infrastructure needs and planning, preparatory phase of investment project, investment decision, procedures of public tendering ; selection of designers and building contractors; phase of technical design and compilation of technical documentation, phase of construction and utilization (1h)</li> <li>3. Review of civil engineering infrastructure utilized in forest management, their technical characteristics and parameters (building infrastructure, road infrastructure, forest environment protection infrastructure) (1h)</li> <li>4. Introduction to road-building and road design: explaining fundamentals of road design and construction principles and terms; road technical project documentation and design process phases; explaining technical distinct characteristics and parameters of rural/forest roads(2h)</li> </ol> <p><b>Seminars/ Laboratories:</b></p> <p>Planning, design and compilation of technical project documentation for rural/forest roads</p> <ol style="list-style-type: none"> <li>1. Road planning and selection of road technical specifications data: corridor study - route planning, road location variants, selection of optimal road location variants; selection of technical specification data source, road technical category, speed parameters, geometric and pavement technical parameters; compliance with environmental and land use planning requirements (1h)</li> <li>2. Pavement design: subgrade and soil evaluation; type of pavement and surfacing selection, technical pavement parameters depending on load-bearing, moisture and freezing characteristics of soil (2h)</li> <li>3. Culverts and road drainage: calculating hydrologic parameters of storm rainfall for roads; selection of type of road drainage and drainage parameters, calculation (open drains, table drains etc.); selection of culvert type, calculation of hydraulic</li> </ol>	

parameters for culverts, integrating culvert in road drainage systems (2h)

4. Geometric design I: General guidelines for horizontal alignment, principles for selection of horizontal geometric parameters; horizontal curvature (curves, transition curves) and straight line design; road plan drawing for horizontal situations (2h)
5. Geometric design II: General guidelines for vertical alignment, principles for selection of vertical geometric parameters; vertical curvature (curves) and straight line design; longitudinal section view drawing (3h);
6. Geometric design III and calculation of soil/construction material quantities: cross section parameters; cross section view drawing (cross sections and construction cross sections); integrating drainage geometry in road plan, longitudinal section and cross section view drawings; cut and fill earthwork volume calculation, pavement material volume calculation, landscaping area calculation, quantitative calculations of other construction materials (3h)
7. Technical project documentation compilation: preparing of documentation for technical parameters; compilation of drawings and documents for technical road project documentation (2h)

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Technology</b>
Course title: <b>Forest Technology</b>	Lecturer's name: <b>Dr. hab. Krzysztof Jabłoński</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>5</b>
	Seminars: <b>15</b>
<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. Classification of forest machines and their roles in forest operations. Machine types, functions and capabilities.</li> <li>2. Human factor and safety in forest machines</li> </ol> <p><b>Seminars:</b></p> <ol style="list-style-type: none"> <li>1. Chain-saws. Safety solutions. Environmental aspects of using internal combustion engines. Cutting equipment used in chain-saws.</li> <li>2. Main systems in forest machines. Hydraulics – principles and main components. Oils, lubricants and fuels.</li> <li>3. Power transmission, traction and environmental impacts. Field conditions and their effect on machine performance.</li> <li>4. Calculations of machine costs. Break-even-point calculations.</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty:  <b>Forestry</b>	Department:  <b>Department of Soil Science and Land Reclamation</b>
Course title:  <b>Forest Soil Science</b>	Lecturer's name: <b>Prof. Dr. hab. Jolanta Komisarek</b> <b>Dr. Katarzyna Wiatrowska</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment:  <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>10</b>
	Seminars: <b>10</b>
<p><b>Lectures:</b></p> <p>Specific topics covered in the course include the following:</p> <ol style="list-style-type: none"> <li>1. Soil formation and soil classification.</li> <li>2. Spatial soil cover distribution in Poland and worldwide according to Polish soil classification, WRB-FAO and Soil Taxonomy.</li> <li>3. Role of soil cover in spatial diversity of forest plant communities</li> </ol> <p><b>Seminars:</b></p> <ol style="list-style-type: none"> <li>1. Determination of the most relevant soil properties with demonstration in the lab, e.g.: particle size distribution (soil separates, soil texture, groupings of soil texture classes)</li> <li>2. Soil structure,</li> <li>3. Soil acidity,</li> <li>4. Soil color.</li> <li>5. Overview of soil classification and understanding of relationships between soil units and forest community distribution in: lowland areas and mountain regions.</li> <li>6. Soil survey and soil mapping</li> <li>7. Methods of assessing the current status and potential production capacity of forest soils.</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Game Management and Forest Protection</b>
Course title: <b>Forest Protection</b>	Lecturer's name: <b>Dr. hab. Maciej Skorupski, prof. UP</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment: <b>Exam</b>	Number of hours: <b>20</b>
	Lectures: <b>5</b>
	Seminars: <b>15</b>
<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>Objective and tasks of forest protection. - 1hr..</li> <li>Influence of meteorological factors and trees and stands (light, temperature, wind, atmospheric electricity, atmospheric precipitation and deposits, glaze, fluctuations in groundwater levels). - 1 hr. Motifs in the art of forest use. - 2 hrs.</li> <li>Effect of industrial pollution on trees and forests (the impact on leaves, roots, soil and forest soil microorganisms, environmental risk assessment for forests in Poland, compensation, general principles of management in areas impacted by emissions, methods of measuring industrial air pollution, designation of vulnerable zones, legislation). - 2h.</li> <li>Forest fires: causes, types of fires, conditions conducive to the emergence of fires - 1 hr.</li> </ol> <p><b>Seminars:</b></p> <ol style="list-style-type: none"> <li>Damage caused by selected invertebrates, small mammals and game, and its prevention. - 5 hours.</li> <li>Forest fires: methods of prediction and fire detection, prevention, fire fighting tactics, job security for shares extinguishing, fire-fighting equipment, fire-fighting measures, consequences of fires setting the level of fire risk, early detection of fires, prevention dampers, Work with maps - the localization of fire. Legislation on protection dampers in forest areas. - 5 hrs.</li> <li>Elements of recreational forest management (determination of the natural capacity of leisure tree, recreational area). - 3 hrs. damage caused by human activity (crimes) 1 hr</li> <li>Damage caused by improper forest management and exploitation of forest resources (inappropriate selection of thinning, tree species composition, negligence in care, the impact on trees and forest soil of heavy equipment used in harvesting and transport). - 1 hr.</li> </ol>	



<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Management</b>
Course title: <b>Forest Mensuration and Forest Yield Science</b>	Lecturer's name: <b>Dr. Tomasz Najgrakowski</b>
	Year: <b>1</b> Semester: <b>1</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>5</b>
	Seminars: <b>15</b>
<p><b>Lectures:</b></p> <p>1. Basic rules of tree measuring, single tree volume and stands survey – 1 hour</p> <p>2. Methods of wide area forest inventory - 3 hours            Defining the aim and scale of inventory. Defining elements to be measured. Sampling techniques. Analysis of desired accuracy and calculating the sample size. Localization of samples and measurement techniques. Creating the database and data adjustment. Calculating characteristics for forest complexes. Creating the database and data adjustment. Calculating characteristics for forest complexes.</p> <p>3. Modelling of stand growth and increment - 1 hour            Foundations of model construction. Models of: individual tree, classes of thickness, entire stand, estate. Application of modelling in managing forest estates</p> <p><b>Seminars:</b></p> <p>1. Wide area inventory based on simple sampling. Selection of sampling technique. – 1hour</p> <p>2. Wide area inventory based on systematic sampling - 1hour</p> <p>3. Processing the results of traditional measurements and ground-based LIDAR measurements - 3 hours</p> <p>4. Basic elements and algorithms of stand models - 3 hours</p> <p>5. Preparation of income data for stand modelling - 1 hour</p> <p>6. Comparison of results derived from different models - 2 hours</p> <p>7. Modelling as element of problem analysis and decision-making process - 2 hours</p> <p>8. Application of modelling results in forest estate planning - 2 hours</p>	

Semester 2

Descriptions of  
Obligatory Courses

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Soil Science and Land Reclamation</b>
Course title: <b>Soil Reclamation</b>	Lecturer's name: <b>Prof. Dr. hab. Jolanta Komisarek Dr. Katarzyna Wiatrowska</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>10</b>
	Seminars: <b>10</b>
<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. The concept of soil quality (SQ).</li> <li>2. Natural and anthropogenic causes of soil degradation, processes, forms and effects</li> <li>3. Soil acidification and chemical degradation – causes and symptoms. Soil pollution and contamination. Prevention and protection.</li> <li>4. Classification of degraded land. Methods of assessment of reclamation progress</li> <li>5. Physical and chemical methods of soil reclamation in forest ecosystems</li> </ol> <p><b>Seminars:</b></p> <ol style="list-style-type: none"> <li>1. Assessment of soil properties and processes related to ability of soil to function effectively as a component of a healthy ecosystem.</li> <li>2. Nutrient balance in soils.</li> <li>3. Assessment of soil quality.</li> <li>4. Use of nutrient cycling models to predict long-term sustainability.</li> <li>5. Land stabilization and erosion control.</li> <li>6. Physical, chemical and biological methods of soil remediation.</li> <li>7. Reclamation of a burned forest soil.</li> <li>8. Reclamation of areas devastated by open cast mining.</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Utilisation</b>
Course title: <b>Forest Products</b>	Lecturer's name: <b>Dr. hab. Marcin Jakubowski</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>17</b>
	Lectures: <b>4</b>
	Seminars: <b>13</b>
<p><b>Lectures:</b>  Wood and non-wood forest products in global context – 2h  Importance of various types of timber in wood industry – 2h</p> <p><b>Practicals:</b>  Macrostructure of wood – 2h  Quality of wood in relation to site conditions – 1h  Methods of identifying wood species – 1h  Practical identifying of hardwoods and softwoods – 5h  Selected wood properties in practices – 2h</p>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Technology</b>
Course title: <b>Forest Transport</b>	Lecturer's name: <b>Dr. Krzysztof Polowy</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>16</b>
	Lectures: <b>4</b>
	Seminars: <b>12</b>
<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. Definitions and classification of technological operations in wood transport.</li> <li>2. Technologies and vehicles used for wood transport.</li> </ol> <p><b>Seminars:</b></p> <ol style="list-style-type: none"> <li>1. Planning forest transport operations – a case study that allows a student to calculate time consumption for wood extraction and haulage from a given forest area, costs of wood transport operations and their economics.</li> <li>2. Machine costing in wood transport operations.</li> <li>3. Break-even point calculations.</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Entomology</b>
Course title: <b>Forest Entomology – Ecosystem Protection Ecologization</b>	Lecturer's name: <b>Dr. hab. Andrzej Mazur</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>17</b>
	Lectures: <b>4</b>
	Seminars: <b>13</b>
<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. Consequences of damage caused by insects in nature – 1 hour</li> <li>2. Succession of entomocenoses in forest ecosystems – 1 hour</li> <li>3. Bioindication and forecasting of status in forest biocenoses – 2 hours</li> </ol> <p><b>Seminars:</b></p> <ol style="list-style-type: none"> <li>1. Identification of epigeic species – 3 hours</li> <li>2. Identification of eurytopic and stenotopic insects – 4 hours</li> <li>3. Identification of insects characteristic of specific development stages in forest biocenoses – 4 hours</li> <li>4. Examples of entomological bioindication – 2 hours</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty:  <b>Forestry</b>	Department:  <b>Department of Game Management and Forest Protection</b>
Course title:  <b>Dynamic Ecology</b>	Lecturer's name:  <b>Dr. Andrzej M. Jagodziński</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment:  <b>Assessment based on student's active participation in classes</b>	Number of hours: <b>8</b>
	Lectures: <b>8</b>
	Seminars: <b>0</b>
<b>Lectures:</b> 1.Organization and functioning of ecosystems. – 1 h 2.Population structure. – 0,5 h 3.Population dynamics and demographic processes. – 1 h 4.Time and space in population dynamics. Models of population dynamics. – 1 h 5.Interspecific interactions and functioning of populations. – 1 h 6.Succession as a result of demographic processes. Mechanisms and regularities. – 1 h 7.Ecosystem and disturbances. – 1 h 8.Mechanisms that determine success of alien species colonization. – 0,5 h 9.Metapopulation dynamics. – 1 h	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Engineering</b>
Course title: <b>Forest Hydrology</b>	Lecturer's name: <b>Dr. Bernard Okoński</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>10</b>
	Lectures: <b>10</b>
	Seminars: <b>0</b>
<b>Contents</b>	
<p>Fundamentals of general hydrology. Application of general hydrology methods in forest hydrology. Water as a factor modulating forest productivity and habitat processes. Interactions of water processes with radial tree growth – dendrohydroclimatology. Hydrological distinction of forest ecosystems versus other terrestrial vegetation cover categories and ecosystems. Forest environment organization levels and hydrologic processes/water balance elements – catchment, ecosystem, element of ecosystem structure, plants). Impact of physiographical characteristics on water processes in forest ecosystems. Interactions of forest ecosystem with hydrologic processes/ water balance elements. Anthropogenic factors affecting water processes and water balance elements in forests. Practical issues of water management in forests. Forest wetlands protection, restitution.</p>	
<b>Lectures</b>	
<ol style="list-style-type: none"> <li>1. Water science fundamentals; branches of hydrology; physical properties of water; water recourses, water cycle; hydrologic processes; water balance, physiographic factors modulating water processes and water balance elements; spatial units in hydrology; catchment characteristics; hydrometeorologic parameters measurements (precipitation, evapotranspiration, runoff, storage) (2h)</li> <li>2. Forest environment organization levels and hydrologic processes, different scale forest spatial units (catchment, ecosystem, element of ecosystem structure, plant); impact of ecosystem characteristics and elements on hydrologic processes (e.g. climate, relief, soil); atmosphere-vegetation-soil exchange in forest ecosystems (2h)</li> <li>3. Key rules determining interactions of forest ecosystem with precipitation, evapotranspiration, runoff, water storage; hydrology of forest areas versus hydrology of other terrestrial vegetation cover areas (agrocenoses and natural ecosystems) and urban areas (1h)</li> <li>4. Water as a factor modulating forest productivity and forest sustainability; water and biomass production; water and forest ecosystem productivity/growth; water as a factor modifying forest habitat processes, forest habitat type as a function of site moisture (2h)</li> <li>5. Dendrohydroclimatology – interaction of climatic and hydrological conditions with</li> </ol>	



radial tree growth – ecological context; radial tree growth as an indicator of hydrologic and meteorological conditions – case studies (2h).

6. Water storage forms, significance of water storage for ecosystems; temporal stability of water storage – “stable and unstable” forms, impact of climate, non-climatic physiographic and forest environment characteristics on water storage; water storage control and management in forests (controllable and uncontrollable water storage); significance of forest wetland and hydrogenic habitats for the environment; wetland restoration and protection, wetland restoration/protection projects (1h).

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Sites and Ecology</b>
Course title: <b>Global Change</b>	Lecturer's name: <b>Dr. hab. Piotr Robakowski</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>10</b>
	Lectures: <b>10</b>
	Seminars:
<p><b>Lectures:</b></p> <p>I. Functional characteristics of forest ecosystems.</p> <ol style="list-style-type: none"> <li>1. State of forests worldwide.</li> <li>2. General description of climate and structure of atmosphere.</li> <li>3. Climate in the forest ecosystem and effects of forests on climate.</li> </ol> <p>II. Definitions of global changes.</p> <ol style="list-style-type: none"> <li>1. Global climate changes: global warming, El Niño, changing precipitation, drought, winds.</li> <li>2. Ice cover and glacier melting, rising of ocean levels.</li> <li>3. Depletion of stratospheric ozone layer, increase in tropospheric ozone concentration.</li> <li>4. Environmental pollution and forest decline.</li> <li>5. Other global problems.</li> </ol> <p>III. Global warming.</p> <ol style="list-style-type: none"> <li>1. Rising of temperature on land and sea surface.</li> <li>2. Mechanism of global warming.</li> <li>3. Natural and anthropogenic causes of global warming: greenhouse gases.</li> <li>4. Predictions of temperature changes.</li> <li>5. Effects of high CO<sub>2</sub> concentration on forest trees. Experiments with open top chambers.</li> <li>6. Impact of high temperature on forest tree ecophysiology (based on silver fir).</li> </ol> <p>IV. Changes at forest ecosystem level.</p> <ol style="list-style-type: none"> <li>1. Forests as systems of carbon sources and sinks.</li> <li>2. Economic pressure on forests – growing role of plantations.</li> <li>3. Effects of global climate change on distribution, composition, structure and functioning of forests: global warming, fires, drought, diseases and insect outbreaks.</li> <li>4. Drought effects on trees (based on silver fir).</li> </ol> <p>V. History, mechanism and results of stratospheric ozone layer depletion</p> <ol style="list-style-type: none"> <li>1. Solar spectrum and the role of stratospheric ozone in spectral fitting.</li> </ol>	

2. Photochemical reactions in stratosphere.
3. Damage from enhanced UV-B radiation:
  - effects on human health
  - impact of UV-B on plant growth, productivity and ecophysiology
  - potential effects on forest ecosystems, projections.

VII. Impact of environmental pollution on forests.

1. Most important pollutants in Poland.
2. Effects on forests: loss of tree vitality, defoliation, increase in vulnerability to disease, insects and drought
3. Hypotheses linking forest decline in Europe with environmental pollution.
4. Ecological disaster in Sudety Mountains (southern Poland).

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Management</b>
Course title: <b>Forest Management Planning</b>	Lecturer's name: <b>Dr. Grzegorz Rączka</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>Test with a mark (in writing)</b>	Number of hours: <b>10</b>
	Lectures: <b>4</b>
	Seminars: <b>6</b>
<p><b>Main objective of the course</b> is to acquire theoretical knowledge on management planning methods used in the process of formulating the Forest Management Plan as the main document regulating principles of sustainable, multi-functional and balanced forestry.</p> <p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. Historical outline; legal background .....<b>1.</b></li> <li>2. Basic terms and definitions; principles of the Forest Management Plan's preparation ... .....<b>1.</b></li> <li>3. Analysis and prediction of forest resources .....<b>2.</b></li> <li>4. Regulation of forest utilization; main cutting plan; plan of intermediate cutting products; forest conversion .....<b>3.</b></li> <li>5. Silvicultural management plan .....<b>1.</b></li> <li>6. Forest and nature protection plans; recreation development plan .....<b>1.</b></li> <li>7. GIS tools in forest management planning; spatial general land use planning .....<b>1.</b></li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Game Management and Forest Protection</b>
Course title: <b>Forest Education</b>	Lecturer's name: <b>Dr. Anna Wierzbicka</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>Project</b>	Number of hours: <b>15</b>
	Lectures: <b>9</b>
	Seminars: <b>6</b>
<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. Main principles and legal regulations for forest education in Poland and EU – 2h.</li> <li>2. Pedagogical foundation for forest education – 3h.</li> <li>3. Preparation and use of teaching aids useful in forest education– 2h.</li> <li>4. Interactive teaching methods in forest education – 2h.</li> </ol> <p><b>Seminars:</b></p> <ol style="list-style-type: none"> <li>1. Forest education in Łopuchówko Forest District - 6h.</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Management</b>
Course title: <b>Forest GIS with Elements of Geomatics</b>	Lecturer's name: <b>Dr. Grzegorz Rączka</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>Test with a mark (in writing)</b>	Number of hours: <b>7</b>
	Lectures: <b>3</b>
	Seminars: <b>4</b>
<p><b>Main objective of the course</b> is to acquire theoretical and practical knowledge concerning geographic information system (GIS) methods used as a tool in forest management planning. New technologies of collecting, converting and presenting data including laser scanning will be described and demonstrated.</p> <p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. Basic terms and definitions.</li> <li>2. Description of Forest Numerical Map System.</li> <li>3. New tools of collecting data – laser scanning.</li> </ol> <p><b>Seminars:</b></p> <ol style="list-style-type: none"> <li>1. Demonstration of laser scanning.</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Sites and Ecology</b>
Course title: <b>Plant Ecophysiology</b>	Lecturer's name: <b>Prof. Dr. hab. Piotr Robakowski</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>12</b>
	Seminars: <b>8</b>
<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. Foundations of Plant Ecophysiology (1h)</li> <li>2. Structure of the Photosynthetic Apparatus. The Light and Dark Reactions of Photosynthesis (1h)</li> <li>3. Farquhar's Model of Photosynthesis (2h)</li> <li>4. Responses of Photosynthesis and Respiration to the Abiotic Environment (2h)</li> <li>5. Growth and Biomass Allocation (2h)</li> <li>6. Interactions between Plants: Competition and Allelopathy (2h)</li> </ol> <p><b>Seminars:</b></p> <ol style="list-style-type: none"> <li>1. Methods in Ecophysiological Research (1h)</li> <li>2. Gas Exchange in Plants (2h)</li> <li>3. Practical Use of Gas Analyzer (2h)</li> <li>4. Measurements of Pulse-Modulated Chlorophyll <i>a</i> Fluorescence (3h)</li> <li>5. Biophysical and Physiological Interpretation of Fluorescence Parameters (2h)</li> </ol>	

# Electives

Students choose 7 courses in Semester 2 and 5 courses in Semester 3

Some of the courses presented in the following pages are available only in semester 2 (spring) or only in semester 3 (autumn), while others are available in both semesters.

Course	Taught in semester:
Biological Control of Plant Diseases	2 or 3
Protection of Forest Trees against Diseases	2 or 3
Regeneration and Tending of Forests	2
Root Systems of Woody Plants	2 or 3
Assessment of Environmental Impact of Infrastructure	2
Forest Communities – Zonal Vegetation of the Sea Coast	2
Babia Gora Mountain Forests	2
Wood as a Renewable Energy Source	2
Forest Management Planning	2
Practical Aspects of Forest Inventory and Management Planning	2
Forest Monitoring	2 or 3
Practical Aspects of Forest Monitoring	2 or 3
Forest Conversion	2 or 3
Practical Aspects of Forest Management Planning in National Parks	2 or 3
Game Management in Game Breeding Centres	2
Introduction and Reintroduction of Animal Species	3
Techniques of Environmental and Zoological Research	3
Environmental Ethics	3
Microbiology with elements of Mycology	3
Pruning of Forest Trees	2 or 3
Forest Utilisation in Conservation Areas	2



<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Pathology</b>
Course title: <b>Biological Control of Plant Diseases</b>	Lecturer's name: <b>Prof. dr. hab. Małgorzata Mańka</b>
	Year: <b>1</b> Semester: <b>2</b> or Year: <b>2</b> Semester: <b>3</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>20</b>
LECTURES:	
Biological control within integrated pest management (IPM) ..... 2	
Contemporary requirements concerning plant protection ..... 2	
History of biological control of plant diseases..... 2	
Contemporary concept of biological control of plant diseases..... 3	
Biopreparations in biological control of plant diseases..... 3	
Environment shaping in biological control of plant diseases..... 2	
Genetic modifications in biological control of plant diseases..... 2	
Biological control of tree diseases versus IPM contemporary plant protection requirements.2	
Evaluation and future prospects of biological control of plant diseases..... 2	

<b>MSc in Forestry</b>	
Field of Study and Faculty:  <b>Forestry</b>	Department:  <b>Department of Forest Pathology</b>
Course title:  <b>Protection of Forest Trees against Diseases</b>	Lecturer's name:  <b>Prof. Dr. hab. Piotr Łakomy</b>
	Year: <b>1</b> Semester: <b>2</b> or Year: <b>2</b> Semester: <b>3</b>
Method of assessment:  <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>20</b>
	Practicals: <b>-</b>
LECTURES:	
1. Integrated pest management in forest protection against diseases..... 2 2. Methods of forest protection against diseases .....7 3. Principles of forest tree protection against the most damaging diseases .....11	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Silviculture</b>
Course title: <b>Regeneration and Tending of Forests</b>	Lecturer's name: <b>Dr. Janusz Szmyt</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>TEST with a mark</b>	Number of hours: <b>20</b>
	Lectures: <b>0</b>
	Field practicals: <b>20</b>
<p><b>Field practicals:</b></p> <ol style="list-style-type: none"> <li>1. Methods of artificial regeneration and management in oak forests – effects of long-term experiments.</li> <li>2. Problems with regeneration and tending of pine, spruce and oak stands.</li> <li>3. Shaping of the forest environment by different forest tree species – based on a scientific experiment.</li> <li>4. Conversion of species composition of stands - examples</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Sites and Ecology</b>
Course title: <b>Root Systems of Woody Plants</b>	Lecturer's name: <b>Dr. Bartosz Bulaj</b>
	Year: <b>1</b> Semester: <b>2</b> or Year: <b>2</b> Semester: <b>3</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>20</b>
	Practicals:
<b>Lectures:</b>	
<ol style="list-style-type: none"> <li>1. Root systems of woody plants – an introduction – 1 hour</li> <li>2. Tree root systems – 2 hours</li> <li>3. Root system research techniques – 2 hours</li> <li>4. Fine root lifespan and physiology in Scots pine populations originating from a broad latitudinal range in Europe – 2 hours</li> <li>5. The effect of initial spacing on fine root biomass and morphology of common oak trees in untended pole forest – 2 hours</li> <li>6. Fine root biomass and morphology of Scots pine trees originating from self-seeding and growing on formerly arable land– 3 hours</li> <li>7. The role of roots in interaction mechanisms between sessile oak and black cherry – 2 hours</li> <li>8. Roots in culture, language and food– 2 hours</li> <li>9. Student's presentations – 4 hours</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Botany</b>
Course title: <b>Assessment of Environmental Impact of Infrastructure</b>	Lecturer's name: <b>Dr. Wojciech Szwed</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>Assessment in the field</b>	Number of hours: <b>20</b>
	Lectures: -
	Field practicals: <b>20</b>
<p><b>Field practicals:</b></p> <ol style="list-style-type: none"> <li>1. Investments could substantially affect habitats and "Natura 2000" areas (environmental decisions) - 2 hours</li> <li>2. Criteria for selection of scope of survey and level of analyzing; methods of nature survey; methods of environmental valorisation; methods of estimation of conflicts; Principles and criteria for assessment of minimization and compensation; principles of monitoring - 3 hours</li> <li>3. Variety of habitat types, vegetation and fauna - 2 hours</li> <li>4. Guidelines for ecological impact assessment - 2 hours</li> <li>5. Indicators and focal species in evaluation of ecological effects of infrastructure. - 2 hours</li> <li>6. „Natura 2000” areas - vegetation, natural habitats and fauna varieties and values - 2 hours</li> <li>7. Mitigation measures minimizing environmental impact of infrastructure - 2 hours</li> <li>8. Minimisation and compensation expected environmental loss - 2 hours</li> <li>9. Examples of environmental impact analyses and mitigation measures - 3 hours</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Botany</b>
Course title: <b>Forest Communities – Zonal Vegetation of the Sea Coast</b>	Lecturer's name: <b>Dr. Wojciech Szwed</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>Assessment in the field</b>	Number of hours: <b>20</b>
	Lectures: -
	Field practicals: <b>20</b>
<p><b>Field practicals:</b></p> <ol style="list-style-type: none"> <li>1. Physiographic characteristic - 3 hours</li> <li>2. Słowiński National Park - vegetation characteristic – 3 hours</li> <li>3. Selected aspects of vegetation history; fossil soil – 3 hours</li> <li>4. Vegetation dynamics - specific character of the Słowiński National Park – 3 hours</li> <li>5. Forest plant communities : alder carr forest, riverside carr forest, maritime pine forest, marshy coniferous forest, boggy birch forest, Pomeranian beech forest, beech-oak forest – 5 hours</li> <li>6. Plant adaptation to extreme environmental condition found on dunes and protection aspects – 3 hours</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Botany</b>
Course title: <b>Babia Gora Mountain Forests</b>	Lecturer's name: <b>Dr. Wojciech Szwed</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>Assessment in the field</b>	Number of hours: <b>20</b>
	Lectures: -
	Field practicals: <b>20</b>
<p><b>Field practicals:</b></p> <ol style="list-style-type: none"> <li>1. Physiographic characteristics of the mountain range (geographical position, surface features, geology, soils, climate and water conditions - 3 hours</li> <li>2. Climate-Vegetation zones – 1 hour</li> <li>3. Lower forest zone and covering forest communities – 6 hours</li> <li>4. Upper forest zone and covering forest communities – 6 hours</li> <li>5. Subalpine and alpine zone – 3 hours</li> <li>6. Vegetation variety: autogenic and degenerating plant associations - 3 hours</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Technology</b>
Course title: <b>Wood as a Renewable Energy Source</b>	Lecturer's name: <b>Dr. hab. Krzysztof Jabłoński</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>20</b>
	Practicals: <b>-</b>
<b>Lectures:</b> <ol style="list-style-type: none"> <li>1. Energy sources worldwide. The problem of fossil fuels.</li> <li>2. Climate change, greenhouse gas emissions.</li> <li>3. The carbon cycle.</li> <li>4. Renewable energy sources – definition, classification and use.</li> <li>5. Geothermal, solar, wind and hydropower sources.</li> <li>6. Biomass as an energy source, different types and uses of biomass.</li> <li>7. Wood and its structure and composition in relation to its energy content</li> <li>8. Energy-wood harvesting technologies</li> <li>9. The problem of logging residues</li> <li>10. Energy wood plantations, short rotation coppice</li> <li>11. Combustion systems for woody fuels</li> </ol>	



<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Management</b>
Course title: <b>Forest Management Planning</b>	Lecturer's name: <b>Dr. Grzegorz Rączka</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>Test</b>	Number of hours: <b>20</b>
	Lectures: <b>0</b>
	Labs: <b>20</b>
<p><b>Main objective of the course</b> is to acquire practical knowledge on determining management directions for stands and regulation of forest utilization used in the process of formulating the Forest Management Plan.</p> <p><b>Labs:</b></p> <p>1. Introduction .....<b>1.</b></p> <p>2. Management directions for stands .....<b>7.</b></p> <p>3. Valuation, analysis and prediction of forest resources .....<b>2.</b></p> <p>4. Regulation of forest utilization; main cutting plan .....<b>10.</b></p>	

<b>MSc in Forestry</b>	
Field of Study and Faculty:  <b>Forestry</b>	Department:  <b>Department of Forest Management</b>
Course title:  <b>Practical Aspects of Forest Inventory and Management Planning</b>	Lecturer's name:  <b>Dr. Grzegorz Rączka</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment:  <b>Test</b>	Number of hours: <b>20</b>
	Lectures: <b>0</b>
	Practicals (outdoor): <b>20</b>
<p><b>Main objective of the course</b> is to acquire on-site practical knowledge concerning forest inventory and management planning methods used in the process of formulating the Forest Management Plan as the main document regulating principles of sustainable, multi-functional and balanced forestry.</p> <p>The practicals will take place in the Experimental Forest Division in Siemianice situated 190 km from Poznan.</p> <p><b>Practicals (outdoor):</b></p> <ol style="list-style-type: none"> <li>1. Introduction .....<b>2.</b></li> <li>2. Forest measurements; map making; determining valuation features and timber attributes of stands .....<b>12.</b></li> <li>3. Determining management directions for stands resulting from their silvicultural, conversion and cutting requirements .....<b>6.</b></li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Management</b>
Course title: <b>Forest Monitoring</b>	Lecturer's name: <b>Dr. Grzegorz Rączka</b>
	Year: <b>1</b> Semester: <b>2</b> or Year: <b>2</b> Semester: <b>3</b>
Method of assessment: <b>Test</b>	Number of hours: <b>20</b>
	Lectures: <b>20</b>
	Practicals: <b>0</b>
<p><b>Main objective of the course</b> is to acquire theoretical knowledge concerning methods of valuation, analysis and prediction of forest health and condition which are used in forest monitoring and national inventory systems.</p> <p><b>Lectures:</b></p> <p>1. Historical outline; legal background .....<b>1.</b></p> <p>2. Basic terms and definitions .....<b>2.</b></p> <p>3. Forest monitoring system .....<b>10.</b></p> <p>4. National forest inventory .....<b>7.</b></p>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Management</b>
Course title: <b>Practical Aspects of Forest Monitoring</b>	Lecturer's name: <b>Dr. Grzegorz Rączka</b>
	Year: <b>1</b> Semester: <b>2</b> or year: <b>2</b> Semester: <b>3</b>
Method of assessment: <b>Test</b>	Number of hours: <b>20</b>
	Lectures: <b>0</b>
	Practicals (outdoor): <b>20</b>
<p><b>Main objective of the course</b> is to acquire on-site practical knowledge concerning methods of valuation of forest health and condition used in forest monitoring and national inventory systems.</p> <p>The practicals will take place in the Experimental Forest Division in Murowana Goslina situated 25 km from Poznan.</p> <p><b>Practicals (field classes):</b></p> <ol style="list-style-type: none"> <li>1. Introduction .....<b>2.</b></li> <li>2. Valuation of tree condition (defoliation and discoloration of crowns; increment in height; vitality of trees) .....<b>6.</b></li> <li>3. National forest inventory (location of circle sample plots; measurements and observations on sample plots) .....<b>12.</b></li> </ol>	

<b>Master Studies</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Management</b>
Name of Subject: <b>Forest Conversion</b>	Lecturer's name: <b>Dr. Grzegorz Rączka</b>
	Year: <b>1</b> Semester: <b>2</b> or Year: <b>2</b> Semester: <b>3</b>
Method of assessment: <b>Test</b>	Number of hours: <b>20</b>
	Lectures: <b>20</b>
	Practicals: <b>0</b>
<p><b>Main objective of the course</b> is to acquire theoretical knowledge concerning methods to describe detailed stand elements important in the conversion process. Based on stand descriptions different variables are calculated:</p> <ul style="list-style-type: none"> <li>- need for conversion (urgent vs. non-urgent conversion),</li> <li>- degree of conversion (full or partial conversion),</li> <li>- age of starting conversion (pre-mature or mature stands),</li> <li>- conversion methods (intermediate or final cuttings depending on different site and stand conditions),</li> <li>- intensity of conversion (rapid vs. conversion),</li> <li>- extent of silviculture activity.</li> </ul> <p>On the basis of the variables the system of forest conversion is created for a forest division or other different areas. Estimations of timber volume together with volume increment and actual potential for conversion are the most important elements of the forest conversion system.</p> <p><b>Lectures:</b></p> <p>1. Basic terms and definitions .....<b>2.</b></p> <p>2. Principles of stand conversion.....<b>4.</b></p> <p>3. Forest conversion system .....<b>4.</b></p>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Management</b>
Course title: <b>Practical Aspects of Forest Management Planning in National Parks</b>	Lecturer's name: <b>Dr. Grzegorz Rączka</b>
	Year: <b>1</b> Semester: <b>2</b> or Year: <b>2</b> Semester: <b>3</b>
Method of assessment: <b>Test</b>	Number of hours: <b>20</b>
	Lectures: <b>0</b>
	Practicals (outdoor): <b>20</b>
<p><b>Main objective of the course</b> is to acquire theoretical and field practical knowledge concerning forest management planning methods used in protected areas of national parks.</p> <p>The practicals will take place in the Karkonoski National Park situated in the Sudety Mountains at the border of the Czech Republic, 250 km from Poznan.</p> <p><b>Practicals (outdoor):</b></p> <p>1. Introduction .....<b>3.</b></p> <p>2. Climate vegetation zones .....<b>6.</b></p> <p>3. Environmental and forest protection zones .....<b>6.</b></p> <p>4. Organization and management of forest protection .....<b>5.</b></p>	

<b>MSc in Forestry</b>	
Field of Study and Faculty:  <b>Forestry</b>	Department:  <b>Department of Game Management and Forest Protection</b>
Course title:  <b>Game Management in Game Breeding Centres</b>	Lecturer's name:  <b>Dr. Anna Wierzbicka</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment:  <b>Field test</b>	Number of hours: <b>20</b>
	Lectures: <b>-</b>
	Field practicals: <b>20</b>
<p>The aim of the course is to identify and practice what needs to be done to improve natural conditions to adapt them to specific game species. How to manage different types of facilities useful for hunters.</p> <ol style="list-style-type: none"> <li>1. How to prepare and use watchtowers, feeding racks, salt licks and other facilities – 6h.</li> <li>2. Establishing and managing shelter belts, meadows and hunting fields – 6h.</li> <li>3. How to remove entrails after shooting, how to storage carcasses and diagnose illnesses – 6h.</li> <li>4. Field test – 2h.</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Game Management and Forest Protection</b>
Course title: <b>Introduction and Reintroduction of Animal Species</b>	Lecturer's name: <b>Dr. Anna Wierzbicka</b>
	Year: <b>2</b> Semester: <b>3</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>20</b>
	Practicals:
<b>Lectures:</b> <ol style="list-style-type: none"> <li>1. Goals and legal basis for introduction and reintroduction of wild animal species – 2h</li> <li>2. How to prepare „Introduction/Reintroduction Programme” – 3h.</li> <li>3. Preparation of a natural environment needed for (re)introduction of animals – 3h.</li> <li>4. Catching animals from wild populations – 3h.</li> <li>5. Animal Breeding Centres – 3h.</li> <li>6. Methods of (re)introduction of birds and their effectiveness – 3h.</li> <li>7. Methods of (re)introduction of mammals and their effectiveness – 3h.</li> </ol>	



<b>MSc in Forestry</b>	
Field of Study and Faculty:  <b>Forestry</b>	Department:  <b>Department of Game Management and Forest Protection</b>
Course title:  <b>Techniques of Environmental and Zoological Research</b>	Lecturer's name:  <b>Dr. Grzegorz Górecki</b>
	Year: <b>2</b> Semester: <b>3</b>
Method of assessment:  <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>-</b>
	Labs: <b>20</b>
<b>Lectures:</b> <ol style="list-style-type: none"> <li>1. Legal regulations concerning research conducted on animals - 1h</li> <li>2. Catching and caring for animals – 2h</li> <li>3. Immobilisation of large mammals – 2h</li> <li>4. Animal labelling – 2h</li> <li>5. Evaluation methods of environment and food utilization by animals – 3h</li> <li>6. Evaluation of animal physiological condition – 3h</li> <li>7. Evaluation of animal mortality – 2h</li> <li>8. Sampling techniques – 2h</li> <li>9. Radiotelemetry – 3h</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty:  <b>Forestry</b>	Department:  <b>Department of Game Management and Forest Protection</b>
Course title:  <b>Environmental Ethics</b>	Lecturer's name:  <b>Dr. Anna Wierzbicka</b>
	Year: <b>2</b> Semester: <b>3</b>
Method of assessment:  <b>Discussion</b>	Number of hours: <b>20</b>
	Lectures: <b>20</b>
	Labs: <b>-</b>
<b>Lectures:</b> <ol style="list-style-type: none"> <li>1. Definitions and terms useful in ethics – 2h</li> <li>2. Environmental ethics in biggest religions worldwide – 2h</li> <li>3. Albert Schweizer's and Aldo Leopold's holistic point of view – 2h</li> <li>4. Paul T. Taylor's individualistic ethic – 2h</li> <li>5. John Passmore's anthropocentric philosophy – 2h</li> <li>6. Animal Liberation Movement (Peter Singer, Tom Reagan and Andrew Lindzey)-2h</li> <li>7. Henryk Skolimowski's ecophilosophy – 2h</li> <li>8. Arne Ness and his deep ecology – 2h</li> <li>9. Ecofeminism and Gaia Hypothesis – a fairytale or truth? – 2h</li> <li>10. Movie and following discussion: Mindwalk, Fritjof Capra's philosophy presented in a popular manner – 2h.</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Pathology</b>
Course title: <b>Microbiology with elements of Mycology</b>	Lecturer's name: <b>Prof. dr. hab. Hanna Kwaśna</b>
	Year: <b>2</b> Semester: <b>3</b>
Method of assessment: <b>TEST with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>-</b>
	Labs: <b>20</b>
<b>Labs:</b>	
1. Sterilization and disinfection procedures and the proper use of antibiotics to control microbial growth ..... 2 2. Culture methods and methods for identification of viruses, bacteria and fungi .... 4 3. Morphology of viruses, bacteria and fungi..... 4 4. Metabolism of microorganisms .....2 5. Mechanisms controlling organic matter cycling and stabilization with reference to C, N, S and P .....4 6. Microbial symbiosis with plants and animals..... 2 7. Possibilities of genetic engineering in bacteria and fungi..... 2	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Utilisation</b>
Course title: <b>Pruning of Forest Trees</b>	Lecturer's name: <b>Dr. hab. Piotr S. Mederski</b>
	Year: <b>1</b> Semester: <b>2</b> or Year: <b>2</b> Semester: <b>3</b>
Method of assessment: <b>Test with a mark (in writing)</b>	Number of hours: <b>20</b>
	Lectures: <b>20</b>
	Practicals:
<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. Natural pruning caused by desimilation – 2h;</li> <li>2. Acceleration of natural tree pruning – 2h;</li> <li>3. Description of pruning objectives – 2h;</li> <li>4. Tree response due to pruning – 2h;</li> <li>5. Biological response of trees due to pruning of dead and live brunches – 2h;</li> <li>6. Selection of trees for pruning – 2h;</li> <li>7. Pruning methods – 2h;</li> <li>8. Organisation and tools for pruning – 2h;</li> <li>9. Pruning of different tree species – 2h;</li> <li>10. Benefits of pruning – 1h;</li> <li>11. Tests – 1h.</li> </ol>	

<b>MSc in Forestry</b>	
Field of Study and Faculty: <b>Forestry</b>	Department: <b>Department of Forest Utilisation</b>
Course title: <b>Forest Utilisation in Conservation Areas</b>	Lecturer's name: <b>Dr. hab. Piotr S. Mederski Dr. Mariusz Bembenek</b>
	Year: <b>1</b> Semester: <b>2</b>
Method of assessment: <b>Oral exam with mark</b>	Number of hours: <b>20</b>
	Lectures: <b>-</b>
	Field practicals: <b>20</b>
<p><b>Contents:</b></p> <ol style="list-style-type: none"> <li>1. forest functions, Bialowieza National Park and conservation area – 2h;</li> <li>2. conditions for forest operations in National Parks, conservation areas, Natura 2000 – 2h;</li> <li>3. forest operations with respect to ecological aspects – 2h;</li> <li>4. harvesting of non-wood forest products and touristic functions – 2h;</li> <li>5. impact of forest utilisation on National Park and conservation areas – 2h;</li> <li>6. impact of selected forest operations on conservation areas – 2h;</li> <li>7. social aspects of forest protection and conservation – 3h;</li> <li>8. forms of wildlife protection as non-wood forest products (tourism) - 2h;</li> <li>9. educational function of conservation areas – 2h;</li> <li>10. test.</li> </ol> <p>Pre-requisites: two days of lectures and discussions with local managers are planned in the Bialowieza National Park (Białowieski Park Narodowy) and local conservation area (Leśny Kompleks Promocyjny Puszcza Białowieska); transport, accommodation and food paid by students (ca. 320 PLN/EUR 80).</p>	