

# Design of forestry education at the Faculty of Forestry, Warsaw University of Life Sciences-SGGW

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ARTICLE

## Abstract

The study presents general design of the educational process at the Faculty of Forestry, WULS-SGGW. It does not include a detailed analysis of the program, but attention is focused on other (ie. general) aspects of that process. We are going to analyse, among others, enrolment system, general structure of students and graduates, description of a graduate's profile and the relationship between educational process and research and cooperation with other (domestic and international) entities.

**Keywords:** faculty of forestry, students, study programs, learning

## Streszczenie

W niniejszej pracy przedstawiono ogólny zarys procesu dydaktycznego na Wydziale Leśnym SGGW w Warszawie. Nie jest to przy tym szczegółowa analiza programowa, ale opis skupiony na innych, ogólnych aspektach tego procesu takich, jak system rekrutacji, ogólna struktura studentów i absolwentów, sylwetka absolwenta, stosowane metody dydaktyczne oraz związki procesu dydaktycznego z działalnością naukową i współpracą z innymi organizacjami, jednostkami z kraju i zagranicy.

Na Wydziale Leśnym SGGW w Warszawie oferowane są studia na kierunku „leśnictwo” na trzech stopniach kształcenia zgodnych z Deklaracją Bolońską. Rekrutacja na studia I stopnia w trybie stacjonarnym i niestacjonarnym odbywa się na podstawie wyników egzaminu maturalnego z biologii lub matematyki, zaś na studia II stopnia, w obu trybach, odbywa się na podstawie wyników testu kwalifikacyjnego.

W ostatnim czasie każdego roku studia na Wydziale Leśnym kończyło ponad 300 osób rocznie (przy ok. 1400 studiujących). Proces dydaktyczny realizowany na kierunku leśnictwo wymusza stosowanie różnych metod dydaktycznych powiązanych z celem, treścią i specyfiką poszczególnych przedmiotów.

Badania naukowe realizowane na Wydziale Leśnym koncentrują się wokół zagadnień związanych z analizą powiązań i prawidłowości występujących w funkcjonowaniu zrównoważonej gospodarki leśnej. Badania te realizowane są w ścisłym związku z potrzebami praktyki leśnej. Natomiast stosunkowo szybkie wprowadzanie nowych rozwiązań naukowych do bieżących działań gospodarczych w leśnictwie umożliwia również dynamiczne włączanie ich do realizowanego procesu dydaktycznego.

## Educational offer

Faculty of Forestry at Warsaw University of Life Sciences - SGGW (WULS-SGGW) offers forestry major at all levels of higher education according to the Bologna process and Polish legal system. Those embrace the following:

1. 3,5-year 1<sup>st</sup> level full-time engineer program,
2. 4-year 1<sup>st</sup> level part-time engineer program,

3. 1,5-year 2<sup>nd</sup> level full-time master program,
4. 2-year 2<sup>nd</sup> level full-time master program with specialty of „Forest Information Technology” (FIT) taught in English as a joint initiative with Faculty of Forest and Environment at University of Sustainable Development in Eberswalde (Germany),
5. 2-year 2<sup>nd</sup> level part-time master program.

Besides, the offer of the Faculty includes 4-year full- and part-time PhD program as well as 3 post-graduate programs („Application of GIS in forestry and nature protection,” „Sustainable utilization of forested areas in regional development” and „Supervision and management of non-industrial private forests”).

### **Enrollment**

Enrollment rules for candidates are regulated by the WULS-SGGW Senate resolution.

Recruitment to the 1<sup>st</sup> level programs (both full- and part-time) is based on the results of the 'Matura' exam (the standardized external high-school leaving exam) from such disciplines as biology or mathematics. The results are translated into „WULS-SGGW points” in accordance to the algorithm included in the above-mentioned resolution. The entire enrollment process is performed with the application of the Internet-based electronic system.

Recruitment to the 2<sup>nd</sup> level programs (both full- and part-time) is based on the results of the qualification test covering content of the basic and directional disciplines of the 1<sup>st</sup> level forestry program. Enrollment to the FIT specialty is based on the average of grades from the 1<sup>st</sup> level studies. Confirmed English language skills are required.

Candidates, who are winners of central-level, nation-wide official competitions on biology, mathematics, ecology and agriculture (forestry part), as well as laureates of some other recognized official competitions, are exempted from the qualifying procedure.

Limits for admission to particular types of studies are:

- 1<sup>st</sup> level studies: 150 places in full-time and 150 in part-time program,
- 2<sup>nd</sup> level studies: 120 places in full-time, 25 places in FIT and 120 places in part-time program.

Educational offer of the Faculty is addressed to all high school graduates who are interested in forestry, nature and natural environment and who chose mathematics or biology as a subject of their maturity exams ('Matura'). Because of the continuation, that offer applies particularly to the graduates of forestry high technical schools; however the recruitment system at the University by no means rewards graduates of such schools.

### **Students and graduates**

The overall number of students in forestry is currently around 1400. The detailed summary is presented in Table 1. Half of the students attend full-time programs. Further potential imbalance between the number of students enrolled in full-time and part-time programs is the result of processes, which the Faculty has no influence on. They are associated with the current system of recruitment, which recently has accepted much more people who achieve high ranks during the enrollment, but quit the study due to lack of interest in forestry issues, than in previous years. Using 'Matura' exam results as the only criteria for recruitment creates a situation in which a group of candidates, who are the most interested in forestry programs (graduates of forestry technical high schools), but usually have lower 'Matura' grades, receive fewer points in the recruitment process (often too few to get enrolled and study). Besides, after introducing the Bologna 2-level system of study, significant group of 1<sup>st</sup> cycle graduates start jobs and do not continue their education. In recent years various steps have been taken to reverse that trend. Among others, efforts were initiated to increase the number of candidates for full-time program among graduates from forestry technical high schools and in the current academic year the recruitment for part-time 2<sup>nd</sup> cycle studies was suspended in the spring semester.

Table 1. Number of forestry students at WULS-SGGW (as of 15.12.2011)

Study level (cycle)	Year	Number of students		Total
		Full-time	Part-time	
1	2	3	4	5
1 <sup>st</sup> cycle (engineer)	I	152	106	258
	II	117	90	207
	III	126	113	239
	IV	105	138	243
2 <sup>nd</sup> cycle (master)	I	91	66	157
	II	39	163	202
3 <sup>rd</sup> cycle (PhD)	I	0	0	0
	II	6	0	6
	III	6	0	6
	IV	3	16	19
	> IV	10	0	10
TOTAL	-	655	692	1347

In recent years more than 300 people have graduated from the Faculty each year. More people graduate in full-time stationary mode than in part-time (non-stationary). A detailed summary of forestry graduates is presented in Table 2.

Table 2. Number of graduates of Faculty of Forestry in 2006-2011 (as of 15.12.2011)

Study level (cycle)	Year	Number of students		Total
		Full-time	Part-time	
1	2	3	4	5
1 <sup>st</sup> cycle (engineer)	2006	1	68	69
	2007	112	107	219
	2008	116	106	222
	2009	118	116	234
	2010	105	102	207
	2011	105	97	202
2 <sup>nd</sup> cycle (master)	2006	-	71	71
	2007	-	121	121
	2008	37	53	90
	2009	50	49	99
	2010	70	76	146
	2011	62	31	93
TOTAL	2006-2008	776	997	1773

### Profiles of graduates

Graduates from the 1<sup>st</sup> level of study have knowledge that assures an implementation of various forest functions, emerging from forest management assumptions, as well as from the necessity of nature and environmental protection. Graduates possess knowledge and skills with regard to designing, managing, organizing and maintaining forest enterprise. They are able to organize nursery

production, silviculture and forest protection. This knowledge allows them to take necessary actions that contribute to forest protection against biotic, abiotic and anthropogenic threats. All those actions are carried out in accordance with the principles of environmental protection and laws of nature. Graduates are prepared to design and implement financial plans, protection and management plans as well as to design and implement engineering infrastructure and provide engineering supervision over the execution of forest work. They should possess language skills (incl. professional vocabulary) covering the requirements at B2 level of Common European Framework of Reference for Languages (CEFR). After graduation they can start their professional career or begin the 2nd cycle of higher education.

Graduates from the 2<sup>nd</sup> level of study are prepared for implementation of the idea of sustainable forest management, particularly in the context of regional development. Their knowledge, skills and social competencies influence the character and quality of the designed financial and management plans. Graduates are able to formulate their own judgments and to lead proper communication with the surrounding society. This also allows them to independently conduct continuous self-education, especially in the context of changes on the labor market. They are prepared to work at higher level positions or start PhD research in forestry.

Forestry graduates are prepared to work in various organizational units of the State Forests or in public administrative bodies responsible for forestry, nature conservation and environmental protection. They also possess qualifications to work in forestry-related enterprises, including their establishment and operation. After accomplishing specialty for teachers (according to the separate ministry regulations concerning methodological courses) they are prepared to work in education area.

The specifics of the study programs at the Faculty of Forestry and their implementation shape a number of social competencies of graduates that turn them into active and effective participants of the labor market. Those activities concern wider areas of the labor market, than only those traditionally related to forestry, forestry services, nature conservation, environmental protection and management. They include such competencies as the ability to work in a team, creative thinking and independence of action, which allow active graduates to find other, even distant from forestry, professions.

### **Teaching methods and organization of education**

The educational process carried out at the Faculty requires application of different teaching methods related to the goal, content and specificity of individual disciplines. Its principal objective is to provide sufficient knowledge to develop the habit of independent thinking and teamwork skills and of solving tasks and problems, especially in a situation of dynamic economic and environmental changes.

Some disciplines, especially those conducted in the auditorium class system, are based on traditional teaching methods. However, the vast majority of subjects, including primarily directional and optional, apply teaching methods that promote and support the process of active learning and challenging student's cognitive activity. The methods worth mentioning are as follows:

1. Performing experiments (e.g. chemistry, physics, wood properties, botany, physiology, phytopathology, entomology) to study certain phenomena and processes and to gain laboratory skills,
2. Preparing papers on a given subject, presenting them to a group of peers and conducting thematic panel discussions - thus acquiring skills of presenting and justifying one's own opinions,
3. Performing multi-variant design work (e.g. geodesy, remote sensing, GIS, engineering infrastructure, wood harvesting, forest transportation, forest mensuration, forest management planning, forest economics, business administration in forestry) that strengthens the ability of creative thinking and independent or group work, forcing the search of the necessary information and analysing tasks in order to present a number of alternatives and select optimal solution,

4. Seminars - students present research progress concerning their thesis and in the meantime learn precision in asking and answering questions,
5. Consulting - individualization of the learning process through direct contact with the teacher/tutor, particularly in the context of diploma thesis and initiation of research performed by students,
6. Planned field classes - familiarizing students with processes occurring in the forest environment, functioning of forest objects and execution of economic activities related to the process of forest production; practising teamwork skills, including decision-making on various levels of management,
7. Occasional field classes - field work carried out beyond the scope of the formal study program, depending on emerging needs, to identify and analyze the occurred processes (hurricanes, floods, fires, pest gradation, etc.),
8. Administrative and professional practice (4 weeks) - presentation of the current operation of the individual units of the State Forests or other entities functioning in the area of nature conservation and environmental protection, giving the opportunity for review and practical application of theoretical knowledge,
9. Education in foreign language - FIT specialty and elective courses in English.

### **Practical training**

Under current curriculum, students are required to undergo a 4-week administration and silvicultural practices after the 6<sup>th</sup> semester of study. During practical training they are obliged to get familiar with basic problems of administration and production in selected forest districts or national parks. The scope of practice includes both forestry technology as well as their practical execution, with reference to the work duties required in the Forest Service. The practice should be carried out in accordance with the framework program, the scope of which depends on the field and also organizational and technological capabilities of the selected unit. The outline of the practice includes both administrative jobs and fieldwork. The requirement to achieve in order to pass the practice is to present a completed practice log, which has been certified and endorsed by the forest district or a national park. In randomly selected units the implementation of practical training and its compliance with the purpose and an established program are controlled throughout the practice by a practice supervisor and the dean.

### **Requirements for thesis and graduation**

During the 4<sup>th</sup> semester of the 1<sup>st</sup> cycle study there are meetings of representatives of various departments with students. In the course of those meetings the potential area and sample topics of the diploma theses are presented. Following the meetings, students choose topics for theses. This can be done in two ways: students accept a suggestion of the supervisor or the supervisor adopts a suggestion of the topic provided by a student. Each department/division/chair elaborates the list of suggested diploma topics together with the name of the supervisor and delivers it to the dean, who accepts the reported subjects and supervisors and recommends reviewers. There is also an analysis of the number of applications falling into various areas done and the specialization groups are formed. In a situation, where a potential specialization group is smaller than half of the regular student group, students are assigned to the thematically similar specialization, but the supervisor of the thesis and the thesis topics remain unchanged. The total number of diploma theses supervised by individual teachers is also controlled. Since those can be supervised and reviewed only by teachers holding professor and doctor habilitated degrees, consent for supervising and reviewing diploma theses by academics of other degrees must be granted by the Faculty Board. The procedure for determining the choice of specialization and thesis topic at the master level is similar.

The quality of the diploma theses and degree of their realization are controlled, among others, by means of seminars. They are conducted in accordance with the progress of work and consist of three stages. The first phase includes the presentation of the research problem and literature review. In the second stage, the student presents methodological assumptions and methods of collecting materials. A series of seminars ends with a presentation of the results and conclusions.

The detailed arrangements for the final exam are included in the Study Regulations. In all cases (for full- and part-time studies of 1<sup>st</sup> and 2<sup>nd</sup> cycle) the exam is conducted in an oral form, preceded by preparation of the thesis (engineering or master, respectively).

### **Relationship between teaching and research**

After the most recent scientific evaluation by Polish Ministry of Science and Higher Education, the Faculty of Forestry in Warsaw got the highest, first category. Research performed by the Faculty focuses on issues related to the analysis of relationships and regularities occurring in the sustainable forest management and has extremely broad scope: starting from fundamental research and ending at optimization of forest operations; hence, a large variety of research fields and tasks.

Research carried out at the Faculty of Forestry covers issues associated with life of plants and animals, technique and technology of forest operations as well as organization, business administration and management. The vast majority of work is carried out on empirical material gathered in the forests or in the organizational units of the State Forests. Large variability of natural conditions and characteristics of the studied objects requires measurements to be collected over a large area, in some cases even the entire country. Final effects are then related to the develop tables or guidelines that will be introduced to every-day operation of all forest districts or groups of units operating in similar natural conditions. In many cases, such tasks require a large group of people to form an efficient research team. It should also be emphasized that the realization of many research works, especially applied ones, is greatly supported by the State Forests. The funds allocated for research are also used to maintain permanent research plots, providing invaluable data (time series) that over time show an increasing value as an object of both cognitive and applied science.

The development of academic staff and scientific specializations is partially carried out in the area of basic research. This kind of activity is rarely financed by business entities; thus, other sources have to be used to cover the costs. In such cases the most important grants come from national and international funding agencies, including Polish Center of Science and Polish Center of Research and Development, as well as European Commission, and they are gained on competitive bases. The availability of those funds to a large extent may be essential for the pace of development of forest sciences.

The close relationship of research with forest practice causes that they are to a large extent directed by expectations of practice. This in turn affects the amount of research work carried out within a given scientific specialization. For example, a large-surface damage of forests by abiotic factors, appearing in recent years, led to the need of intensification of research in the field of damage inventory, restoration methods and forest conservation. Issues related to the mechanical stability of stands began to be taken into consideration to a larger extent than previously. At the same time, changing conditions of forest production were reflected in the development of new techniques and technologies of forest work and their optimization.

Research results are also used in the teaching process. Relatively fast introduction of the results of new scientific studies to the practice of forestry causes, that those issues are communicated to students as new developments. Having good knowledge of the latest solutions students can successfully implement new technologies after getting a professional job.

Faculty of Forestry supervises the Forest Experimental Station in Rogów. This is a place where scientific research and the vast majority of field classes for students are conducted. Research is

performed practically over the entire area of 3.7 thousand ha of forests and most of research facilities are permanent research plots. Those objects are very often used to carry out field classes for students. The findings which were obtained during long-term, often lasting more than 50 years, measurements and observations are presented to students on the spot. A very common form of combining research with teaching is to include students to carry out research in projects led by particular units. In that case the scope is not limited to Experimental Forest and applies to all research work carried out throughout the country. Students often receive topic of thesis that is a part of broader research. The most valuable are those carried out with the use of data from permanent sample plots, e.g. in Rogów or Białowieża National Park. Application of long-term and well-documented results allows to draw conclusions about the dynamic of forest ecosystems and the influence of various factors (including anthropogenic) on the development of forests.

Each year, the Faculty organizes or co-organizes at least several scientific conferences at national and international level. Some of them turned into regular events with recognized reputation.

### **Domestic and international cooperation**

The exchange of students and staff takes place mainly on the basis of the Erasmus program, cooperation with Swedish University of Agricultural Science (SLU), University in Daugavpils (Latvia), University of Sustainable Development in Ebeswalde (Germany) and Czech University of Life Sciences in Prague. Apart from European institutions the staff and the students also visit Russia and Asian countries (Taiwan, Japan) within the framework of international agreements (including Tempus and Erasmus Mundus External Cooperation Window). There are also activities carried out in the frame of Euroleague for Life Sciences (ELLS) and network. In addition, efficient scientific contacts are maintained with scientific organizations such as International Union of Forest Research Organizations (IUFRO) or European Forest Institute (EFI) and its regional offices (e.g. EFINORD) and many reputable universities, such as e.g. the University of Freiburg in Germany. Faculty authorities take an active part in activities of the Conference of Deans and Directors of European Forestry Faculties and Schools (CONDDEFFS) as well as the cooperation of the group of deans of Visegrad countries.

### **Summary**

It is clear, that the effective education of foresters at the university level is a difficult process and requires a great commitment of both the student and the teaching staff. At the same time it is a multidimensional process, which efficiency is strongly linked to the curriculum and also conditioned by other factors, including the external ones. The curriculum used in a forester training must be the effect of long experience acquired by the entity offering education - which takes place at the Faculty of Forestry in Warsaw, with its 90-year tradition of teaching.

The process of education, as mentioned above, is not only the curriculum, but many other aspects that affect the final desired result, i.e. a high quality graduate. The first is the organization of educational process, starting from the recruitment of candidates and ending at the graduation (also including further monitoring of graduate's performance). Secondly, it is not possible to conduct the training without binding it to the scientific research. That is the only possible way to transfer the experience gained from the observation of natural processes to the educational process. Thirdly, a fully trained graduate is the one who was given the opportunity to explore new environments or different perspectives on the subject of the future professional activities. Such opportunities can be provided only by a large university with a large faculty that carry out long-term and multidimensional cooperation with other teaching and research entities, associations, employers and many others, not only on the national but also an international scale.

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