საქართველოს ტექნიკური უნივერსიტეტი
GEORGIAN TECHNICAL UNIVERSITY

Approved by
Resolution № 2319 of the
Academic Council of GTU dated
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Academic Council of GTU dated
April 2, 2018

Master's Educational Program

Program Title

სამკურნალო მცენარეების მოყვანის ტექნოლოგია
Technology of medicinal herb growing

Faculty

აგრარული მეცნიერებების და ბიოსისტემების ინჟინერინგი
Agricultural Science and Biosystems Engineering

Program Head

Professor Tamar KACHARAVA

Qualification to be Awarded

Master of Agricultural Sciences, with speciality in Technology of medicinal herb growing *Will be awarded upon completion of at least 120 credits of the educational program*

Language of Teaching

Georgian

Prerequisite for Admission to the Program

A person with at least a bachelor's degree or equivalent academic degree who is enrolled through Master's examinations (General Master's Examination and examination/s as determined by the GTU) is eligible to study in the Master's program. Examination questions/tests will be posted on the GTU Training Department website, at least one month prior to the examinations. Admission to the program without passing Master's exams is possible according to the rules established by the Ministry of Education and Science of Georgia.

Program Description

The program is based on the ECTS system; 1 credit is equal to 25 hours, which includes both contact and independent work hours. The distribution of credits is presented in the curriculum. The program lasts 2 years (4 semesters) and includes 120 credits (ECTS).

One semester includes 20 weeks, of which the learning process takes place over a period of 15 weeks. The rector of the GTU issues an academic calendar before the beginning of the semester, which is published on the website.

Educational component - 75 credits; this includes courses on specialty - 60 credits, elective courses - 5 credits, industrial practice - 10 credits; Research component - 45 credits, this includes: Master's research project/prospectus - 5 credits, theoretical/experimental research/colloquium - 10 credits, fulfillment and defense of Master's thesis - 30 credits.

The first semester of the first year includes six required courses for 5 credits each: Biodiversity, Plant Biology and Physiology, Plant Biochemistry, Technology of Cultivation of Medicinal Plants, Agrotechnology of Soil and Water Resources Utilization, Business Communication (English); Business Communication (French); Business Communication (German); Business Communication (Russian).

The second semester of the first year includes four compulsory courses of 5 credits each: Genetic Resources of Medicinal Plants, Plant Biotechnology, Phytoclimatology, Theory and Practice of Industry-Specific Text Translation (English), Theory and Practice of Industry-Specific Text Translation (French), Theory and Practice of Industry-Specific Text Translation (German), Theory and Practice of Industry-Specific Text Translation (Russian); 1st part of industrial internship - Ecologically safe cultivation of medicinal plants - spring industrial internship - 5 credits.

The first semester of the second year includes two compulsory courses of 5 credits each: Medicinal Plants and Alcoholic Beverages and Phytopharmaceutical Studies; One elective course of 5 credits selected from the following courses: Medicinal Plants and Organic Farming; Natural Phytocompounds and Biologically Active Food Supplements; Folk Phytomedicine; 2nd part of industrial internship - Modern technologies of cultivation of medicinal plants - fall industrial internship - 5 credits; Also theoretical/experimental research/colloquium comprising 10 credits.

The student will undergo industrial internship in the Biotechnology Center of Georgian Technical University, Agricultural Research Center of the Ministry of Agriculture of Georgia and National Academy of Agricultural Sciences of Georgia. Industrial internship in the educational program is represented by a course of two-5 credits: 2nd semester of the first course - Ecologically safe cultivation of medicinal plants - spring industrial internship - 5 credits and 1st semester of the second course - Modern technologies of cultivation of medicinal plants - fall industrial internship - 5 credits.

In the second semester of the second year, the master's student completes and defends a master's thesis - 30 credits.

The order on appointment of the Master's supervisor and the Title of Master's thesis is established by the Dean's Office and approved by the Faculty Council in accordance with the personal work plan of the Master's student.

See the personal work plan of the Master's student.

Research Component - The research component of the Master's degree program includes 45 credits. Its mandatory elements are: - Master's research project/prospectus (5 credits); - Theoretical/experimental research/colloquium (10 credits); - Completion and defense of the Master's thesis (30 credits).

Master's research project/prospectus - it should mention the relevance of the research topic, theoretical and practical value of the chosen topic. It should include the results of the relevant literature review and the necessary bibliography, as well as the history of the research on the issue.

Master's research project/prospectus is assessed with a maximum of 100 points. Criteria and scales of evaluation of Master's research project/prospectus are given in the rules of evaluation of the research component of the Master's educational program on the GTU website.

Theoretical/experimental research - a Master's student starts the colloquium in the second year of study, in the third semester, and it implies the submission and presentation of material related to the Master's topic/separate part of it. At the colloquium he/she should demonstrate the scope and depth of research on a particular issue, present the results obtained.

The main purpose of the colloquium is to systematize the master's knowledge, to present the results of the work done, to master modern research methods, to independently formulate and solve the issues raised during the work. To develop skills necessary for communication with the professional community.

In the seventh and fourteenth week of the third semester, the Master's student presents in writing to the supervisor the results obtained at this stage of theoretical/experimental research. The supervisor evaluates them (first and second interim assessments, the maximum score for each interim assessment is 30) according to five components.

To evaluate the colloquium, the results of the research will be submitted in writing to the Dean of the Faculty before the end of the relevant academic semester (no later than the 15th academic week), who will form a commission of 3-5 people. The commission should include representatives of the academic staff of the relevant area/direction. The colloquium is evaluated according to 5 criteria: relevance of the conducted research methods and orientation to the problem, quality of the conducted research, drawing a conclusion on the basis of the conducted research, determining the further direction of the research, ability to present the topic.

Criteria and scales of colloquium evaluation are given in the rules of evaluation of the research component of the educational program of Master's degree on the GTU website.

Completion and defense of the qualification work - when the completed qualification work is submitted and publicly defended, the qualification work is evaluated with 100 points. It is necessary to publicly defend it. Public defense of the qualification work is evaluated by the examination commission consisting of 5-7 members according to the 100-point evaluation system according to the following criteria: description of the research problem and relevance, practical significance - score up to 4 points; analysis of literature on the topic of research - score up to 4 points; use of research methods - score up to 4 points; judgment of the results of the research - score up to 4 points; conclusion on the basis of the research - score up to 4 points; quality of work design and quality of its presentation - score up to 5 points.

Program Objective

The objective of the program is to prepare in accordance with the requirements of the labor market, a highly qualified and competitive specialist with the necessary knowledge of modern technologies of cultivation of ecologically safe medicinal plants with a high content of biologically active substances and parameters for the creation of an expensive seed bank, which will contribute to the creation of an intellectual base for the development of phytoindustry, protection of unique biodiversity - conservation and sustainable use.

Learning Outcomes and Competences (general and sectoral)

Knowledge and Understanding - the student has a deep knowledge of creating a bio model of highly productive industrial plantations of medicinal plants, taking into account the interaction of ecosystem parameters and modern technologies, deep and systemic knowledge of the role of medicinal plants in modern phyto industry; understands the scientific basis of plant raw materials and their production; technologies of growing industrial plantations of medicinal plants; has a deep knowledge of in vitro cultivation methods used in plant biotechnology, which is necessary to obtain environmentally friendly phytorecycled materials, realizes the priority areas of modern phyto industry: mechanisms for obtaining environmentally safe bio raw materials and creating expensive seed bank, can create economically viable bio models.

Ability to apply knowledge in practice - thanks to the ability to conduct research independently and knowledge of innovative cultivation technologies, the student can link rational, sustainable schemes of utilization of the most important species (endemics, relics) of the unique and richest plant gene pool of the country with mechanisms of creation of industrial plantations of economically profitable plants; can independently run an organic farm to create sustainable raw materials and a valuable seed bank.

Ability to make conclusions - the student is able to formulate reasonable conclusions on the basis of critical analysis; As a result of synthesis of modern technologies and available information to make appropriate conclusions to improve the quality of phytoproducts; to take socially and economically sound action to solve a problem; organize a discussion and draw conclusions from the results.

Communication skills - given the advances in information and communication technologies, the student is able to communicate his/her findings, arguments and research methods in Georgian and foreign languages to both the academic and professional community and others involved in the field of biodiversity conservation and medicinal plant utilization, as well as to demonstrate modern technologies of medicinal plant cultivation.

Ability to learn - the student can carry out learning independently, has a high level of understanding of the characteristics of learning process and strategic planning with the inclusion of medicinal plants in the management of phyto industry development, on the basis of which they can navigate the professional space; can learn research methods based on current technology.

Values - the student will form and develop high standards of professional ethics, academic integrity, harmonious interaction and cooperation with the environment, commitment to protection-conservation and sustainable development of the unique plant gene pool of the country. The student can also contribute to the process of establishing new values for the phyto industry.

Methods of Achieving Learning Outcomes (teaching-learning)

☒ Lecture ☒ Seminar (group work) ☒ Practical ☒ Laboratory ☒ Practice
☐ Course work/Project ☒ Master's Thesis ☒ Consultation ☒ Independent work

In the learning process, depending on the specifics of a particular study course program, teaching methods are used, which are outlined in the relevant study course programs (syllabi):

1. **Discussion/debate** – this is the most widely spread method of interactive teaching. A discussion process greatly increases the quality of students' involvement and their activity. A discussion may turn into an argument and this process is not merely confined to the questions posed by the teacher. It develops students' skills in reasoning and substantiating their own ideas.

2. **Cooperative learning** - this is a teaching strategy in which each group member is required not only to learn independently, but also to help his teammate learn the subject better. Each group member works on a problem until everyone has mastered it.

3. **Collaborative work** - using this method implies dividing students into separate groups and giving each group its own task. The group members work at their issues individually and at the same time share their opinions with the rest of the group. According to the problem raised, it is possible to shift the functions among the group members in this process. This strategy ensures the students' maximum involvement in the learning process.

4. **Case study** - the teacher discusses specific cases with students and they study the issue comprehensively and thoroughly. For example, in the area of environmental security, this could be discussion of the specific issue of monitoring genetic resources.

5. **Demonstration method** - this method implies a visual presentation of information. It is quite effective in terms of achieving results. In many cases, it is better to present the material to students in both audio and visual form simultaneously. The material being studied can be demonstrated by both the teacher and the student. This method helps to make visible the different stages of understanding the learning material, to clarify what students will have to do independently; At the same time, this strategy visualizes the essence of the issue/problem. The demonstration can take a simple form.

6. **Method of analysis** - helps to break down the learning material as a whole into its component parts. This facilitates detailed coverage of individual issues within a complex problem.

7. **Synthesis method** - involves grouping separate issues into a whole. This method helps to develop the ability to see the problem as a whole.

8. **Verbal or oral method**. This method includes lecture, narration, conversation, etc. In the above process, the teacher conveys and explains the learning material through words, and students actively perceive and internalize it by listening, memorizing, and understanding.

9. **Writing work method -** implies the following forms of activity: copying, taking notes, making a synopsis of the material, composing theses, writing an abstract or essay, etc.

10. **Explanatory method** - is based on discussing a given issue. In the process of explaining the material, the teacher brings concrete examples, the detailed analysis of which is made in the framework of the given topic.

11. **Activity-based learning** - requires the active involvement of the teacher and the student in the learning process, where the practical interpretation of theoretical material is especially important.

Student's Knowledge Assessment System

The student's knowledge is assessed on a 100-point scale.

Positive grades are:

- (A)-Excellent - 91-100 points;
- (B)-Very Good – 81-90 points;
- (C)-Good – 71-80 points;
- (D)-Satisfactory – 61-70 points;
- (E)-Sufficient – 51-60 points.

Negative grades are:

- (FX) - Failed to pass – 41-50 points, which means that the student needs more work to pass and is allowed to take an additional exam once with independent work;

- (F) - Failed - 40 points or less, which means that the work done by the student is insufficient and he/she will have to study the subject again.

Fields of employment

Ministry of Environment and Natural Resources Protection of Georgia;
Ministry of Agriculture of Georgia, relevant regional agencies under its jurisdiction;
Agricultural Research Center of the Ministry of Agriculture of Georgia;
Large and small phyto-farms;
Non-governmental organizations working in the field of agriculture.

Opportunities for continuing education

PhD educational programs

Human and material resources needed to implement the program

The program is provided with adequate human and material resources. For additional information, please find the attached documentation

Number of attached syllabi: **23**