

SUBJECT OUTLINE

1. Information on the study programme

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|-----------------------------------|--------------------------------------------|
| 1.1 Academic institution | UNIVERSITY OF ORADEA |
| 1.2 Faculty | FACULTY OF ENVIRONMENTAL PROTECTION |
| 1.3 Department | AGRICULTURE, HORTICULTURE |
| 1.4 Field of study | HORTICULTURE |
| 1.5 Cycle of study | BACHELOR |
| 1.6 Study programme/Qualification | LANDSCAPE / ENGINEER |

2. Information on the discipline

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|---------------------------------------|-----------------------------------------------------|--------------|---|------------------------|---|--------------------------|---|
| 2.1 Name of discipline | Energetic Basis and Agricultural Machinery I | | | | | | |
| 2.2 Course holder | PhD. eng. DONCA Gheorghe | | | | | | |
| 2.3 Seminar/Laboratory/Project holder | PhD. eng. DONCA Gheorghe | | | | | | |
| 2.4 Year of study | I | 2.5 Semester | I | 2.6 Type of evaluation | E | 2.7 Regime of discipline | C |

(C) Compulsory; (O) Optional; (E) Elective

3. Total estimate time (hours per semester of didactic activities)

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|-----------------------------------------------------------------------------------------------|------------|--------------------------|----|---------------------------------------------|-------|
| 3.1 Number of hours per week | 4 | out of which: 3.2 course | 2 | out of which 3.3 seminar/laboratory/project | 2 |
| 3.4 Total hours in the curriculum | 56 | out of which: 3.5 course | 28 | out of which 3.6 seminar/laboratory/project | 28 |
| Time allotment | | | | | hours |
| Study assisted by manual, course support, bibliography and notes | | | | | 31 |
| Additional documentation in the library/ on specialised electronic platforms and in the field | | | | | 30 |
| Preparation of seminars/laboratories/ topics/reports, portfolios and essays | | | | | 30 |
| Tutorship | | | | | 1 |
| Examinations | | | | | 2 |
| Other activities | | | | | 0 |
| 3.7 Total hours of individual study | 94 | | | | |
| 3.9 Total hours per semester | 150 | | | | |
| 3.10 Number of credits | 6 | | | | |

4. Prerequisites (where appropriate)

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| 4.1 curriculum | |
| 4.2 competences | |

5. Conditions (where appropriate)

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| 5.1. related to course | |
| 5.2. related to seminar/laboratory/ project | Compliance with Labour Safety and Emergency Standards in laboratory. |

| 6. Specific competences acquired | |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Professional competences | <p>C1.1. Description of the scientific, theoretical and practical fundamentals underpinning the development and application of sustainable horticultural production technologies.</p> <p>C1.2. Explaining the need to use different technological links, correlated with environmental factors and the requirements of cultivated plants; explaining and interpreting the interrelationships between the adopted horticultural production systems and the environment.</p> <p>C1.3. Apply appropriate methods, techniques and procedures for customizing and optimizing sustainable horticultural production process technologies.</p> <p>C1.4. Qualitative and quantitative analysis of the effects of the technologies used (physico-chemical analyses of the obtained productions, physical, chemical and biological analyses on the environmental components that may be affected by applied horticultural technologies, the use of specific methods for assessing the impact of applied technologies on biodiversity).</p> <p>C1.5. Development of sustainable technological solutions for conventional horticultural production systems; the design of alternative production systems (ecological horticulture) and new technologies for particular cases (sloping land, sandy land, land with temporary excess of humidity, etc.)</p> |
| Transversal competences | <p>CT1. Elaboration and observance of a work program and accomplishment of its own attributions with professionalism and rigor.</p> |

7. Objectives of discipline (coming from the specific competences acquired)

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| 7.1 General objective | The course aims to familiarize students with the issues of the energy base and agricultural and horticultural machinery. The first part summarizes the basics of technical engineering (mechanical and electrical engineering). Students have the opportunity to familiarize themselves with the main types of tractors and machines, the practical skills of construction, sizing, operation and possibilities of their construction, maintenance, operation and repair. |
| 7.2 Specific objectives | Laboratory work is designed to provide future engineers practical skills in design, development, research, exploitation, repair and maintenance of technical equipment. The contents of the presented works are based on the need to deepen the problems presented in the course. Students have the opportunity to identify component parts and to understand the operation of machines, to familiarize themselves with the modern means of measuring their parameters. They will understand their complexity and usefulness and treat them as such. Knowledge is useful in forming skills to address specific production problems faced by one skilled in the art. |

8. Content*/

| 8.1 Course | Methods of teaching | No. of hours / Remarks |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------|
| 1. Introduction. 1.1. General considerations. 1.2. Recapitulative drawings of technical drawing. 1.3. Materials used in the construction and operation of machinery, equipment and installations in horticulture. | Oral presentation, demonstration and discussions | 2 |
| 1.4. Manufacture of parts for use in the construction of machinery, equipment and installations. 1.5. Machine parts used in the construction of machinery, equipment and installations | Idem | 2 |
| 2. Energy sources used in horticultural units. 2.1. Internal combustion engines. 2.1.1. Classification. Theoretical cycle. Power indices. Reduction of pollution. | Idem | 2 |
| 2.1.2. Components of internal combustion engines. | Idem | 2 |
| 2.2. Other sources of classical energy (thermal energy, mechanical) used in horticulture. 2.3. Renewable energy sources (wind, solar, geothermal, hydropower and biomass). | Idem | 2 |
| 2.4. Electricity utilization in machinery and machinery (power generation, transport and distribution, electrical equipment and machines). 2.5. Automation used in horticultural units. 2.6. Hydraulic drive systems used in horticulture | Idem | 2 |
| 3. Machinery and facilities for water supply and microclimate. 3.1. Installations for water supply. 3.2. Lighting systems. 3.3. Heating installations. 3.4. Ventilation installations. 3.5. Refrigeration installations | Idem | 2 |
| 4. Tractors. 4.1. Classification of tractors. 4.2. The main parts of the tractors. 4.3. Transmissions used on tractors. 4.4. Tractor clutch | Idem | 2 |
| 4.5. Tractor gearboxes. 4.6. Rear axle of tractors. 4.7. Work equipment | Idem | 2 |
| 4.8. Rolling system, 4.9. Braking system. 4.10. Steering mechanism. 4.11. The tractor's electrical installation | Idem | 2 |
| 5. Machinery for transporting and handling products used in horticultural farms. 5.1. Trailed and self-propelled transport equipment | Idem | 2 |
| 5.2. Machines and installations for loading - unloading operations | Idem | 2 |
| 5.3. Transporters with flexible traction. 5.4. Conveyors without flexible traction | Idem | 2 |
| 6. Machinery and equipment for land improvement. | Idem | 2 |
| Bibliography | | |
| 1. Blaga V. – <i>Motoare pentru automobile și tractoare</i> , Editura Universității din Oradea, 2007 | | |
| 2. Blaga V. – <i>Baza energetică pentru agricultură</i> , Editura Universității din Oradea, 2006 | | |
| 3. Ciocîrlan A., Constantin M. – <i>Asamblarea, întreținerea și repararea mașinilor și instalațiilor</i> , Editura ALL Educational, București, 2002 | | |
| 4. Donca Gh. – <i>Baza energetică pentru agricultură</i> , Editura Universității din Oradea, 2012 | | |
| 5. Donca Gh. – <i>Baza energetică și mașini agricole</i> , Îndrumător de laborator, Editura Universității din Oradea, 2013 | | |
| 6. Donca Gh. – <i>Mic dicționar de inginerie tehnică pentru domeniul agrozootehnic și agroturistic</i> , Editura Universității din Oradea, 2012 | | |
| 7. Donca Gh. – <i>Bazele utilajelor și instalațiilor pentru alimentația publică și turism</i> , Editura Universității din Oradea, 2009 | | |
| 8. Donca Gh. – <i>Mentenanța utilajelor și instalațiilor agroalimentare</i> , Editura Universității din Oradea, 2011 | | |
| 9. Donca Gh. – <i>Utilaje și instalații pentru alimentația publică și agroturism</i> , Editura Universității din Oradea, 2010 | | |

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| 10. Donca Gh. – <i>Mașini și instalații zootehnice</i> , Editura Universității din Oradea, 2015 | | |
| 11. Dumitru M. – <i>Tractoare agricole</i> , Editura Alma Mater, Sibiu, 2006 | | |
| 12. Naghiu Al. – <i>Baza energetică pentru agricultură și silvicultură</i> , Editura Risoprint, Cluj-Napoca, 2008 | | |
| 8.2 Seminar | | |
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| 8.3 Laboratory | Methods of teaching | No. of hours / Remarks |
| 1. Training on work safety and emergency rules. Basics of machine, machine and plant study. Measuring the size of the parts | Demonstration, experimentation, discussions, problem-solving and teamwork | 2 |
| 2. Apparatus for measuring electrical and non-electric parameters | idem | 2 |
| 3. Study of chain transmissions, belt and gear wheels | idem | 2 |
| 4. Basic elements of electrical drives | idem | 2 |
| 5. The study of electric machines. Short-circuit three-phase asynchronous motor | idem | 2 |
| 6. Drawing of characteristic internal curves to axial and centrifugal fans | idem | 2 |
| 7. Component of hydrostatic drive systems. Analysis of pressure regulating equipment | idem | 2 |
| 8. Organism of internal combustion piston engines, gas turbines and compressors | idem | 2 |
| 9. Thermal balances of four-stroke diesel engines | idem | 2 |
| 10. Determination of the speed characteristics of internal combustion piston engines | idem | 2 |
| 11. Determination of constructive and functional parameters of tractors | idem | 2 |
| 12. Transmission and braking study of tractors | idem | 2 |
| 13. Parameters of tractors working equipment | idem | 2 |
| 14. Determination of constructive and functional parameters in worm and spiromatic conveyors | idem | 2 |
| 8.4 Project | | |
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| Bibliography | | |
| 1. Blaga V. – <i>Motoare pentru automobile și tractoare</i> , Editura Universității din Oradea, 2007 | | |
| 2. Blaga V. – <i>Baza energetică pentru agricultură</i> , Editura Universității din Oradea, 2006 | | |
| 3. Ciocîrlan A., Constantin M. – <i>Asamblarea, întreținerea și repararea mașinilor și instalațiilor</i> , Editura ALL Educational, București, 2002 | | |
| 4. Donca Gh. – <i>Baza energetică și mașini agricole</i> , Îndrumător de laborator, Editura Universității din Oradea, 2013 | | |
| 5. Donca Gh. – <i>Baza energetică pentru agricultură</i> , Editura Universității din Oradea, 2012 | | |
| 6. Donca Gh. – <i>Mic dicționar de inginerie tehnică pentru domeniul agrozootehnic și agroturistic</i> , Editura Universității din Oradea, 2012 | | |
| 7. Donca Gh. – <i>Mașini și instalații zootehnice</i> , Îndrumător lucrări practice de laborator, Editura Universității din Oradea, 2017 | | |
| 8. Donca Gh. – <i>Utilaje și instalații pentru alimentația publică și agroturism</i> , Îndrumător pentru lucrări de laborator, Editura Universității din Oradea, 2013 | | |
| 9. Dumitru M. – <i>Tractoare agricole</i> , Editura Alma Mater, Sibiu, 2006 | | |
| 10. Naghiu Al. – <i>Baza energetică pentru agricultură și silvicultură</i> , Editura Risoprint, Cluj-Napoca, 2008 | | |
| 11. Năstăsoiu M. – <i>Tractoare: determinarea performanțelor de tracțiune și economice</i> , Editura | | |

Universității Transilvania, Brașov, 2004

12. Tonea C. ș.a. – Baza energetică pentru agricultură, Îndrumător de lucrări practice, Editura Agroprint, Timișoara, 2004

* The content, respectively the number of hours allocated to each course / seminar / laboratory / project will be detailed during the 14 weeks of each semester of the academic year.

9. Corroboration of discipline content with the expectations of the epistemic community, professional associations and representative employers from the field corresponding to the study programme

The content of the discipline is adapted and satisfies the requirements imposed by the labour market, being agreed by social partners, professional associations and employers in the field of the bachelor's program. The content of the discipline is found in the curriculum of the landscape specialization of other academic centres in Romania that have accredited this specialization, so knowing the basic notions is a stringent requirement of the employers in the field.

10. Evaluation

| Type of activity | 10.1 Evaluation criteria | 10.2 Evaluation methods | 10.3 Share in the final grade |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 10.4 Course | For the pass mark (5), all subjects must be treated to the minimum standards. Larger notes are in proportion to the correctness of the fixes. | Exam written 2 hours (It consists of 4 subjects from the course. For the passing of the exam, each subject should be treated for minimum 5.). | 60% |
| 10.5 Seminar | | | |
| 10.6 Laboratory | All laboratory work must be done. Recovering only an outstanding laboratory (in the last week of the semester) allowed. | Monitoring the activity and the results obtained. | 40% |
| 10.7 Project | | | |
| 10.8 Minimum standard of performance | | | |
| Elaborate and apply economically efficient production technology with positive ecological and social impact depending on specific ecological conditions. | | | |

Date of completion

26.09.2020

Signature of course holder

1. PhD. eng. DONCA Gheorghe
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Signature of seminar

laboratory/project holder
1. PhD. eng. DONCA Gheorghe
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Date of approval in the department

Signature of the Head of Department
Prof. PhD. eng. BANDICI Gheorghe Emil

Dean signature
Prof. PhD. eng. CHEREJI Ioan