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| **STUDY PROGRAMME:** | **Professional Undergraduate Study Programme *Agriculture*** Specific field of study: Course foundations |
| **Course:** | **BASICS OF AGRICULTURAL ENGINEERING** |
| **Course code:** 273280**Course status**: compulsory | **Semester: I** | **ECTS credits: 3,5** |
| **Course holder:**  | **Miomir Stojnović,** M. Sc., senior lecturer |
| **Course associates:**  | **Marija Jakuš Hrestak**, mag. ing. agr., assistant |
| **Modes of delivery:** | **Number of hours**  |
| **Lectures** | 30 |
| **Excersises** | 30 |
| **Practical training** | 8 |

**Course objectives:** To acquaint students with the basics of agricultural engineering so that they can acquire knowledge and skills in the rational selection and use of agricultural machinery in modern agricultural production technology.

**Course content**

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|  |  | **Modes of delivery:** | **Places of delivery** |
|  | **Course units**  | **L**  | **E** | **PT** |
|  | ***Introductory lecture -*** importance of mechanical engineering in agriculture, specifics of agricultural engineering, conditions of exploitation of agricultural machinery, measurement units, SI – system. | 2 | 2 |  | Classroom |
|  | ***Machine materials -*** properties, division, metals - ferrous and non-ferrous, cast iron, steel, alloys, non-metals. | 2 | 2 |  | Classroom, practicum |
|  | ***Elements of machines*** – joint elements, fasteners, power and motion transmission, liquid, steam and gas flow elements | 2 | 2 |  | Classroom, practicum |
|  | ***Friction, lubricants and lubrication*** - dry and wet friction, types of lubricants and their properties, SAE and API classifications | 2 | 2 |  | Classroom, practicum |
|  | ***Working machines*** - pumps, compressors, fans, types of pumps, capacity, drive power, types of compressors and fans, vacuum pumps, Colloquium I.  | 4 | 2 |  | Classroom, practicum |
|  | ***Driving machines*** - engines, classification and types of engines, engine efficiency | 2 | - |  | Classroom |
|  | ***Internal combustion engines*** - classification, principle of operation, Otto and Diesel 2-stroke and 4-stroke engines, engine fuels, external features of IC engines, calculations | 2 | 2 |  | Classroom, practicum |
|  | ***IC engine construction*** – fixed and moving engine parts, fuel supply system, lubrication, engine cooling, Otto engine ignition system, engine starting system, intake and exhaust system, air preheating (heaters). | 3 | 7 |  | Classroom, practicum |
|  | ***Electric motors*** – types, DC motors, AC motors, application of electric motors in agriculture. | 2 | 2 |  | Classroom, practicum |
|  | ***Agricultural tractor*** - function of tractors in agricultural production, types and classification of tractors. | 3 | 1 |  | Classroom, practicum |
|  | ***Tractor construction*** - power transmission, traction system, steering and braking, wheels and crawlers, hydraulic lift system, electrical equipment, equipment for coupling and drive of tractor implements, additional equipment. | 3 | 5 |  | Classroom, practicum |
|  | ***Traction characteristics of tractors in operating conditions*** - balance of power and balance of traction, principles of connecting tractor with implements, work productivity, technical maintenance of tractors, Colloquium II. | 3 | 3 |  | Classroom,practicum |
|  | ***Practical training and integrated project assignement IPA) -***, work on an integrated project assignment, preparation of report and ppt presentation, defense of IPA |  |  | 8 | Practicum |
| **In total** | 30+30+8 (L+E+PT) |  |

L=Lectures, E=Excersises, S=Seminars, PT=Practical training

**Learning outcomes (LO)**

LO 1. Evaluate the significance and specifics of agricultural engineering.

LO 2. Valorize the properties of machine materials in mechanical engineering.

LO 3 Calculate material stress and dimensions of machine elements.

LO 4. Determine the working principle and construction of working and driving machines in agricultural engineering.

LO 5. Evaluate the power balance and work balance of the tractor.

LO 6. Critically assess the rationality of using tractors and machines for agricultural operations.

Course holder:

Miomir Stojnović, M. Sc., senior lecturer

Križevci, July 2024