

01S1-RSE

AGRICULTURAL ENERGY RAW MATERIALS

ECTS: 3.0

HOURS PER SEMESTER/WEEK: LECTURES: 15/1; CLASSES: 30/2

COURSE CONTENTS

LECTURES: Biomass and its characteristics. The use of biomass in the production of renewable energy and legal regulation. The state of the natural environment and environmental effects of the use of biofuels. Domestic demand for liquid biofuels. Possibilities of converting biomass into solid, liquid and gaseous fuels. Agricultural market energy resources and forecasting the cultivation area of plants for energy purposes. Types and characteristics of liquid biofuels: esters of higher fatty acids, bioethanol and raw materials for their production. Fuel properties of rapeseed oil and rapeseed oil esters. Bioethanol production from agricultural biomass for energy purposes. Gaseous biofuels and the use of crop biomass for their production. Straw and wood raw materials as solid biofuels and the balance and possibilities of their energy use in Poland.

CLASSES: Characteristics of annual crops as raw materials for the production of liquid, solid and biofuels gas (cereals, root crops, oil plants). Characteristics of perennial cultivated plants useful for energy purposes (shrub willow, mallow, giant miscanthus, miscanthus sugar, rose, Jerusalem artichoke, common reed, reed canary seed and others). Rating of usefulness species and varieties of crops for energy purposes in various habitat conditions. Agricultural, energetic and economic evaluation of various production technologies of annual and perennial agricultural plants for the production of solid, liquid and gaseous biofuels.

EDUCATIONAL PURPOSE: Acquainting with the possibilities of using biomass from annual and perennial agricultural plants for energy purposes, with technologies of agricultural biomass production as well as energy consumption and profitability of its production.

LEARNING OUTCOMES

Knowledge. The student identifies taxa of annual agricultural plants useful for the production of renewable energy. He knows the basic technologies of plant biomass conversion into energy raw materials

Skills. The student analyzes the impact of biomass production and energy production on the condition of the natural environment. Assesses the advantages and disadvantages of the technology for the production and use of liquid and gaseous biofuels from biomass. Prepares written studies in the field of renewable energy.

Social competences. The student predicts the agricultural and non-agricultural effects of activities in the field of the natural environment. Understands the need for training in the field of biomass production and renewable energy.

TEACHING FORMS AND METHODS

Lectures. Information lecture with multimedia presentation.

Classes. Auditorium exercises: presentation method, case study.

FORM AND CONDITIONS FOR VERIFICATION OF LEARNING OUTCOMES

Lectures. Written test - credit with a grade.

Classes. Presentation, written test - credit with grade.

BASIC LITERATURE

1) Kołodziej B. Matyka M., Odnawialne źródła energii Rolnicze surowce energetyczne, wyd. Państw.Wyd.Rolnicze i Leśne, Poznań, 2012, 2) Bocheński C. I, Biodiesel - paliwo rolnicze, wyd. SGGW, Warszawa, 2003, 3) Gradziuk P., Biopaliwa, wyd. Wieś Jutra, Warszawa, 2003, 4) Grzybek A. Gradziuk K., Słoma. Energetyczne paliwo, wyd. Wieś Jutra, Warszawa, 2001.

ADDITIONAL LITERATURE

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THE TEACHER/S CONDUCTING THE CLASSES:

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