UNIVERSITY OF WARMIA AND MAZURY
Faculty of Agriculture and Forestry

Course description

01S1-PRZEPRORO **STORAGE OF AGRICULTURAL CROPS** **ECTS: 2.5**

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

COURSE CONTENTS

LECTURES: Physiological and biochemical changes occurring in agricultural crops during storage. Methods of storage and preservation of cereal grains, oilseeds and legumes, potatoes, beetroots and grassland fodder. Storage of usable parts of other crops. Changes in the seeds, nutritional and processing value of agricultural crops during their storage. Types and technical devices of granaries, storages and warehouses. Machines and devices used for drying and preserving cereal grains and plant seeds. Shelf life extenders - chemical, physical and biological methods. Factors influencing the storage of crops - temperature, O_2, CO_2, ethylene, volatile substances, relative humidity and air circulation. Storage of crops in the normal atmosphere (NA), controlled atmosphere (CA), and ultra-low oxygen atmosphere (ULO). Safety during work in gas-tight chambers. Influence of fertilization, harvesting method and external conditions on the value and quality of stored crops.

CLASSES: Assessment of stored cereal grains with the use of organoleptic indicators. Determination of grain moisture: industrial and appeal method. Determining the effect of storage on the quantity and quality of gluten in grains. Determining the quality characteristics of fat as an indicator of the quality of oilseeds. Assessment of sugar beet roots stored in various thermal conditions. Characteristics of storage facilities for the storage of agricultural crops. Qualitative changes occurring in potatoes during storage - enzymatic and non-enzymatic darkening of products, changes in the health quality of food during storage process - $N\text{-}NO_3$ content determination of in stored agricultural crops. Qualitative changes during storage - determination of the sum of vitamin C and other organic acids, and the sugar content. Determining the harvest maturity date of agricultural crops. Field classes - visiting storage facilities.

EDUCATIONAL PURPOSE: Getting to know the methods of storage, factors influencing the resistance to changes in storage, and technical solutions used in the storage of agricultural crops. Acquiring the ability to manage the process of storage in practice, the ability to recogni

LEARNING OUTCOMES

Knowledge. The student knows what biochemical and physiological transformations occur in agricultural crops during storage, and knows their influence on product properties. Knows how to choose the storage method depending on the usable parts of the plants stored. Knows ways to minimize negative changes occurring during storage (drying, cleaning, modifying the gas composition of the atmosphere in the storage room, preservation, use of chemicals, radiation methods).
Skills. The student is able to identify critical points in the production process that affect the effects of storage of agricultural crops, indicate storage methods, can prepare a storage plan and design storage, and use computational, simulation and experimental methods in practical operation.
Social competences. The student is aware of the importance of the effects of proper and improper handling of crops before, during and after harvesting. He is responsible for the health and safety of food. Understands the need to follow the principles of the Code of Good Practice. He understands the need to broaden his knowledge in the context of changing production methods. He can inspire to work and work in a team, interprets the results and formulates conclusions.

TEACHING FORMS AND METHODS

Lectures. Information lecture with multimedia presentation.
Classes. Lab exercises, auditorium classes.

FORM AND CONDITIONS FOR VERIFICATION OF LEARNING OUTCOMES

Lectures. Written test - credit with a grade.
Classes. Lab classes reports and written tests - credit with a grade.

BASIC LITERATURE

1) Ciećko Z., Ocena jakości i przechowalnictwo produktów rolnych. UWM Olsztyn, 2003, 2) Thompson A.K. Controlled Atmosphere Storage of Fruits and Vegetables. CAB International 2010. 3) Hall C.W. Drying and storage of agricultural crops. AVI Publishing Company, 1980. 4) Grzesiuk S., Kulka K., Fizjologia i biochemia nasion. PWRiL Warszawa, 1981. 5) Reykdal Ó, Drying and Storage of Harvested Grain. A Review of Methods. Matís ohf / Matis - Food Research, Innovation & Safety, 2018. 6) Doijode S.D. Seed Storage of Horticultural Crops. Food Products Press. An Imprint of The Haworth Press, Inc. New York-London- Oxford, 2001.

ADDITIONAL LITERATURE

1) https://ahdb.org.uk/knowledge-library, 2) Shejbal J. Controlled Atmosphere Storage of Grains. Elsevier 1980

THE TEACHER/S CONDUCTING THE CLASSES:

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