Course Unit Descriptor

Study Programme: Biotechnology

Course Unit Title: Malt Technology

Course Unit Code: PBO304

Name of Lecturer(s): Full Professor Jelena Pejin

Type and Level of Studies: Undergraduate Academic Deegre

Course Status (compulsory/elective): Compulsory

Semester (winter/summer): Summer

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 6

Prerequisites: None

Course Aims:

Acquisition of basic scientific and academic skills in the field of the theory and malt technology, equipment used in malt technology and working procedures that are applied in order to enable student to independently manage individual departments of malting plant as well as the whole malting plant, or to improve the theory and practice of malt production.

Learning Outcomes:

The student should show knowledge about the production process and the equipment in order to be able to independently manage individual departments of malting plant, as well as the whole malting plant and can independently lead and improve the malt production process. Also, a student should be familiar with the latest knowledge in this field.

Syllabus:

Theory

Raw materials for malt production – brewer's barley and water. Brewer's barley and water quality assessment. Stages of the malting process. Barley intake and cleaning - tasks, procedures, and equipment. Barley storage. Barley steeping - tasks, changes, procedures, and equipment. Barley germination. Morphological and biochemical changes during germination. Germination procedures. Types of germination vessels. Kilning of green malt - tasks, changes, procedures, and equipment. Processing and storage of malt. Malt quality. Standard and special types of malt.

Practice

Laboratory practical lessons, calculation, and practical lessons in malting plant in order for students to get more familiar with barley control for malt and beer production and stages of malt production as well as quality control of beer malt.

Required Reading:

1. C. Bamforth: Brewing: New Technologies, CRC Press and Woodhead Publishing Ltd., Cambridge, 2006.

2. K. Ockert, Raw Materials and Brewhouse Operations, MBBA Practical Handbook for the Speciality Brewer, The Master Brewers Association of the Americas, St. Paul, Minnesota, USA, 2006.

3. K. Ockert, Fermentation, Cellaring, and Packaging Operations, MBBA Practical Handbook for the Speciality Brewer, The Master Brewers Association of the Americas, St. Paul, Minnesota, USA, 2006.

4. Analytica-EBC (2008) European Brewery Convention, Verlag Hans Carl Getränke-Fachverlag, Nürnberg, Germany.

5. Mitteleuropäischen Brautechnischen Analysenkommission (MEBAK) (2011) Collection of Brewing Analysis Methods, Raw Materials: Barley, adjuncts, malt, and hops and hops Products, Self-published by MEBAK, 85350 Freising-Weihenstephan, Germany.

6. Mitteleuropäischen Brautechnischen Analysenkommission (MEBAK) (2013) Collection of Brewing Analysis Methods, Wort, Beer, Beer-based Beverages, Self-published by MEBAK, 85350 Freising-Weihenstephan, Germany.

Weekly Contact Hours: 6	**Lectures: 3**	**Practical work: 3**

Teaching Methods:

Interactive lectures using video presentations, individual laboratory practical lessons and consultations.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Active class participation	5	written exam	
Practical work	25	oral exam	30
Preliminary exam(s)	20+20	…….	
Seminar(s)			

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.