

Study Programme: Biotechnology
Course Unit Title: Beer Technology
Course Unit Code: PBO402
Name of Lecturer(s): Full Professor Jelena Pejin
Type and Level of Studies: Undergraduate Academic Degree
Course Status (compulsory/elective): Compulsory
Semester (winter/summer): Winter
Language of instruction: English
Mode of course unit delivery (face-to-face/distance learning): Face-to-face
Number of ECTS Allocated: 6
Prerequisites: Malt Technology
<p>Course Aims:</p> <p>Acquisition of basic scientific and academic abilities in the field of theory and beer technology, equipment used in beer technology and production procedures that are applied in order to able students to independently manage brewery departments as well as the whole brewery, and to improve theory and practice of beer technology.</p>
<p>Learning Outcomes:</p> <p>The student should show the knowledge of the production process characteristics and the equipment in order to be able to independently run individual brewery departments as well as the whole brewery and can independently design equipment and set technological process. Also, the student should be familiar with the latest trends in this field.</p>
<p>Syllabus:</p> <p><i>Theory</i></p> <p>Raw materials for beer production: malt, hops, water, unmated materials (cereals, sugars, syrups), and commercial enzymes. Stages of beer production process. Malt milling–process and equipment. Mashing-biochemical changes, procedures, mashing diagrams, and equipment. Wort separation- procedures, equipment, and spent grain. Hopped wort-biochemical and physical changes, working procedures, and equipment. Cooling, clarification, and aeration of hopped wort - changes, procedures, and equipment. Brewing yeast - properties, metabolism, growth, and multiplication. Primary and secondary fermentation - biochemical and physical changes, procedures, and equipment. Beer filtration - filtration media, processes, and equipment. Biological and colloidal beer stabilization. Beer filling and packaging. Beer quality control.</p> <p><i>Practice</i></p> <p>Laboratory practical lessons and calculation as well as the practical lessons in the brewery in order for students to get more familiar with raw materials control for beer production and technological stages of beer production and beer quality control.</p>
<p>Required Reading:</p> <ol style="list-style-type: none"> 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
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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.