

Study Programme: Biotechnology		
Course Unit Title: Selected Chapters in Beer Technology		
Course Unit Code: DSBI15		
Name of Lecturer(s): Full Professor Jelena Pejin		
Type and Level of Studies: Doctoral Academic Degree		
Course Status (compulsory/elective): Elective		
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: 10		
Prerequisites: None		
Course Aims: Acquiring scientific abilities and academic skills in the field of the beer production and the use of equipment, detailed understanding the individual stages of production, as well as their techno-economic impact on the efficiency of the entire beer production.		
Learning Outcomes: Students' competence for independent scientific and professional work on solving practical and theoretical problems in the field of beer technology as well as a more detailed understanding of specific biochemical processes and equipment in beer technology.		
Syllabus: <i>Theory</i> Specificity of brewer's yeast of top and bottom fermentation. Top and bottom fermentation. Metabolic pathways of major and minor fermentation products formation: ethanol, carbon dioxide, higher alcohols, esters, aldehydes, sulfur compounds, vicinal diketones, etc. The influence of process parameters on the production of main and secondary products of fermentation. Fermentation methods in beer technology: discontinuous, semi-continuous and continuous. Fermentation by immobilized yeast cells. Taste and aroma of beer - how they originate and how can they be controlled. Components of aging of the taste and smell of beer and their metabolic pathways. Biological and colloidal instability of beer. Instability of beer taste. The effect of oxygen on beer components. The influence of production parameters on beer foam. Gushing. <i>Practice</i> Study research.		
Required Reading: 1. C. Boulton, D. Quain: Brewing Yeast and Fermentation, Blackwell Science, United Kingdom, 2001. 2. C. Bamforth: Brewing: New Technologies, CRC Press and Woodhead Publishing Ltd., Cambridge, 2006. 3. C. Bamforth: Scientific Principles of Malting and Brewing, American Society of Brewing Chemists, St. Paul, MN, USA, 2006. 4. 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. 5. 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.		
Weekly Contact Hours:	Lectures: 4	Practical work: 2

Teaching Methods:

Theoretical and practical lessons will be organized throughout interactive teaching and consultation in group or independently, depending on the number of students; work on the computer, use of the internet, presentation of the term paper.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	Final exam	points
Active class participation	10	written exam	
Practical work		oral exam	50
Preliminary exam(s)		
Seminar(s)	40		

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