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| <b>Subject name</b>                                 | <b>Cereal Processing</b>  |                          |
| <b>Subject code</b>                                 | <b>T.KTW.CEPR.SM.TTZT</b>   |                          |
| <b>Department</b>                                   | <b>Department of Carbohydrates Technology</b>   |                          |
| <b>Faculty</b>                                      | <b>Food Technology</b>  |                          |
| <b>Subject supervisor/Lecturer</b>                  | <b>Krzysztof Buksa Ph.D</b>   |                          |
| <b>General information</b>                          | <b>Semester</b>   | <b>summer semester</b>   |
|   | <b>ECTS credits</b>   | <b>2</b>                 |
|   | <b>Lectures total</b>   | <b>15</b>                |
|   | <b>Laboratories</b>   | <b>Lab practicals 15</b> |
| <b>Prerequisites (required knowledge or skills)</b> | <p>Students should be familiar with basic knowledge of organic chemistry, laboratory working, measuring and working on a computer.</p> <p>Additionally, their ability to work with patience, collaboratively with peers and as an individual should be evident.</p>   |                          |
| <b>Objective and general description</b>            | <p>The aim of the course is to teach students about technology of cereals and cereal based products and modern techniques of their analysis which are up-to-date and actually used in laboratories on the world. Techniques of examination of interesting compounds present in cereal grain and their analysis will be shown with emphasis on chromatography.</p> <p>Students will gain special analytical abilities in examination of cereal products and their components and the knowledge about impact of their properties on technology of cereals and cereal-based products.</p>  |                          |
| <b>Lectures 6x 2h + 1x 3h</b>                       | <ol style="list-style-type: none"> <li>1. Chemical composition of cereal grain. Bioactive components in cereals. Effect of milling process on soluble and insoluble dietary fiber content. Analysis of the composition of dietary fiber. An impact of dietary fiber on technological properties in food production.</li> <li>2. How big are cereals polysaccharides? Methods of determination of molecular mass of cereal polysaccharides and practical application of the knowledge of polysaccharide molecular structure in technology of cereals and cereal-based products.</li> <li>3. Cereal proteins – what is their role in cereal products? Methods of isolation of proteins and examination of their structure and properties.</li> <li>4. Wheat bread baking and evaluation of its quality.</li> <li>5. Baking of rye bread and sourdough bread and evaluation of its quality.</li> <li>6. Controlling of bread quality. Substances affecting smell, taste and appearance of cereal food products.</li> <li>7. Future prospects for technology of cereals and cereal-based products.</li> </ol> |                          |
| <b>Classes 3x 5h</b>                                | <ol style="list-style-type: none"> <li>1. TLC and HPLC chromatography – modern, accurate,</li> </ol>  |                          |

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|  | <p>simple and fast methods for determination of sugar composition in cereal grains.</p> <ol style="list-style-type: none"> <li>2. SEC chromatography as a tool for determination of molecular mass of flour polysaccharides such as: starch, inulin, water soluble arabinoxylans, beta-glucans and proteins.</li> <li>3. Wheat bread making and evaluation of its quality by 3D scanning, texture analysis and HPLC.</li> <li>4. Baking of rye bread and sourdough bread and evaluation of its quality by 3D scanning, texture analysis and HPLC.</li> <li>5. Determination of substances affecting smell, taste and appearance of food products by means of HPLC.</li> </ol>   |
| <p><b>Assessment method</b><br/><b>Specify: oral/written examination</b></p> | <p>Written examination</p>  |
| <p><b>References</b></p>   | <ol style="list-style-type: none"> <li>1. Ambroziak Z. 1998. Produkcja piekarsko-ciastkarska cz. I WSP.</li> <li>2. Ambroziak Z. 1999. Produkcja piekarsko-ciastkarska cz. II WSP.</li> <li>3. AOAC. Official methods of analysis. 18th edn. Gaithersburg Association of Official Analytical Chemists International (2006).</li> <li>4. Chaplin M.F. Kennedy J.F. (1994). Carbohydrate Analysis. Oxford University Press</li> <li>5. Cui S.W. (2005). Food carbohydrates: chemistry, physical properties and applications. 1<sup>st</sup> ed. CRC Press.</li> <li>6. Eliasson A.C. (2006). Carbohydrates in food, 2<sup>nd</sup> edition. Taylor &amp; Francis, New York.</li> <li>7. Ito R., Matsuo Y. (2010). Handbook of carbohydrate polymers: development, properties and applications. Nova Science Pub Inc.</li> <li>8. Jakubczyk T., Haber T. 1983. Analiza zbóż i przetworów zbożowych. Wyd. SGGW, W-wa.</li> <li>9. Jankowski S. 1982. Zarys technologii młynarstwa i kaszarstwa. WNT, W-wa.</li> <li>10. Jurga R. 1994. Przetwórstwo zbóż. cz. I i II. WSiP, Warszawa.</li> <li>11. Kamerling J.P. (2007). Comprehensive Glycoscience. From Chemistry to Systems Biology. Elsevier Ltd.</li> <li>12. Obuchowski W. 1997. Technologia przemysłowej produkcji makaronu. Wyd. AR Poznań</li> <li>13. Standard Methods of the ICC – International Association for Cereal Science and Technology. ICC – Vienna (2007).</li> </ol> |