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| | **UNIVERSITY OF EAST SARAJEVO**<br>Faculty of Technology Zvornik | |
| | ***Study programme:*** *Chemical Engineering and Technology* | |
| | Cycle I / Year IV | |

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| **Course title** | Technology of Dairy Products |
| **Department** | Department for Food Technology – Faculty of Technology Zvornik |

| **Course code** | **Course status** | **Semester** | **ECTS** |
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| 04-1-117-8 | Compulsory | VIII | 7 |

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| **Teacher** | Milenko Smiljanić, PhD, associate professor |
| **Teaching assistant** | Milenko Smiljanić, PhD, associate professor |

| **Number of hours/ teaching workload (per week)** | | | **Individual student workload (in hours per semester)** | | | **Student workload coefficient $S_o$** |
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| **Lectures** | **Auditory exercises** | **Laboratory exercises** | **Lectures** | **Auditory exercises** | **Laboratory exercises** | **$S_o$** |
| 3 | 0 | 3 | 60 | 0 | 60 | 1.33 |
| 3*15+0*15+3*15=90 hours | | | (3*15*1.33+0*15*1.33+3*15*1.33)=120 hours | | | |
| Total course workload 90 + 120 =210 hours per semester | | | | | | |

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| **Learning outcomes** | After finishing the course, students will be able to:<br>1. demonstrate and utilize the new theoretical and practical knowledge about the chemical composition and physico-chemical properties of milk and milk components, formation and secretion of milk, as well as the influence of various factors on the composition and properties of milk<br>2. demonstrate and utilize new theoretical and practical knowledge about the technological process of production of pasteurized and sterilized milk and milk drinks, as well as condensed and concentrated sweetened and unsweetened milk<br>3. demonstrate and utilize new theoretical and practical knowledge about the technological process of production of sour milk products, starting with selection and standardization of raw materials, homogenization and heat treatment of milk, selection of starter cultures and fermentation of milk, cooling and cold storage<br>4. demonstrate and utilize knowledge about the classification of ice cream and the characteristics of individual categories ice cream and ice cream desserts, the skill of selecting and combining raw materials and adequate additives for production of ice cream or ice cream desserts, calculation of ice cream mixture, monitoring and control of the technological process of ice cream production<br>5. demonstrate and utilize knowledge for understanding and distinguishing technological production procedures and properties of different grs of cheeses; noticing potential defects of different groups of cheeses as well as determining the causes for their occurrence, defining and analyzing the influence of different factors (raw materials quality, technological operations during the production process) on the properties of cheeses and the application of appropriate technological solutions<br>6. demonstrate and utilize knowledge about the role and importance of by-products in the milk industry, the basic principles of modern technological procedures in the processing of by-products, and possibilitie of application of concentrated and dried milk products,<br>7. demonstrate the skills of a more complete and effective utilization of the dry matter of milk in the technological procedures in which secondary products are created in the milk products<br>8. work in milk processing plants, as well as laboratories for testing milk and milk products. |
| **Prerequisites** | |
| **Teaching methods** | Lectures, auditory and laboratory exercises, mid-term tests (colloquia). |
| **Syllabus outline per week** | 1. Production and consumption of milk. Importance of milk in nutrition.<br>2. Macrocomponents and microcomponents of milk.<br>3. Physico-chemical properties of milk. Casein and albumin types of milk.<br>4. Technological processes of production (classification, theoretical foundations, process, equipment, parameters, quality and process control): pasteurized milk, sterilized milk and milk drinks.<br>5. Technological processes of production (classification, theoretical foundations, process, equipment, parameters, quality and process control): fermented milk and cream.<br>6. Technological processes of production (classification, theoretical foundations, process, equipment, parameters, quality and process control): products based on milk fat, milk desserts, |

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| | ice cream and frozen desserts.<br>7. Methods of sampling and sensory evaluation of milk and milk products. Qualitative and quantitative analysis of milk components. Physical and chemical analyses of milk. Control of pasteurization and sterilization of milk. Laboratory production of fermented beverages, ice cream and milk pudding.<br>8. Analysis of: fermented milk drinks, cream, butter, milk pudding, ice cream and frozen dessert. Knowledge test.<br>9. Technological processes of production (classification, theoretical foundations, process, equipment, parameters, quality and process control): cheeses, cheese spreads and processed cheeses).<br>10. Technological processes of production (classification, theoretical foundations, process, equipment, parameters, quality and process control): condensed unsweetened milk and sweetened condensed milk, concentrated dairy products.<br>11. Technological processes of production (classification, theoretical foundations, process, equipment, parameters, quality and process control): milk powder, instant milk powder.<br>12. Technological processes of production (classification, theoretical foundations, process, equipment, parameters, quality and process control) of milk protein products (casein, caseinates, co-precipitates).<br>13. Technological processes of production (classification, theoretical foundations, process, equipment, parameters, quality and process control): modified dairy products, imitation dairy products, infant formula, reconstituted milk powder and whey processing.<br>14. Quality criteria, technological operations and hygiene of milk production and processing (GHP, GMP and CCP). Laboratory production of cheese, casein and whey-based beverages.<br>15. Physico-chemical and sensory analyses: cheese, milk powder, other dried dairy products, casein and caseinate, whey and whey powder. Technological calculations procedures in the production processes of various milk products. Knowledge test.<br>Final test. Certification of the semester and registration of earned points.<br><br>Mid-term tests are taken after the 8th week and the 15th week. Semester verification is required after the 15th week. |

**Obligatory reading**

| Author | Title, publisher | Year | Pages |
|---|---|---|---|
| Tratnik Lj., Božančić R. | Mlijeko i mliječni proizvodi, Hrvatska mljekarska udruga, Zagreb. | 2012 | |
| Early R. | The technology of Dairy Production, Blackie Academic and Professional, London. | 1998 | |
| Carić M., Milanović S., Vucelja D. | Standardne metode analize mleka i mlečnih proizvoda, Prometej, Novi Sad. | 2000. | |

**Additional reading**

| Author | Title, publisher | Year | Pages |
|---|---|---|---|
| Smit G. | Dairy Processing, Improving Quality, CRC/Woodhead Publishing Litited. | 2003 | |
| Đorđević J. | Mleko, NIRO Tribina, Beograd. | 1982 | |
| Carić M., Milanović S. | Topljeni sir, Nauka, Beograd. | 1997 | |

| | Type of student evaluation | Grade points | Percentage |
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| **Obligations, assessment methods and grading system** | Pre-exam obligations | | |
| | Attendance | 6 | 6 % |
| | Mid-term test I | 17 | 17 % |
| | Mid-term test II | 17 | 17 % |
| | Laboratory exercises | 15 | 15 % |
| | Seminar paper | 15 | 15 % |
| | Final examination | | |
| | Final examination (oral) | 30 | 30 % |
| | Total | 100 | 100 % |
| **Web page** | www.tfzv.ues.rs.ba | | |