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| **Title and code** of the subject:**Oil and fat technology (MTBE7033A)** | **ECTS Credit Points: 3** |
| **Type** of the subject: compulsory  |
| **Ratio of theory and practice:** (33/66 %) |
| **Type and number of classes per semester**: 14 hour(s) lecture and 28 hour(s) practice per **semester** Number of teaching hours per week : 1 lecture + 2 practices |
| **Type of exam**: written exam  |
| **Subject in the curriculum:** semester 6 |
| Preliminary requirements:- |

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| **Summary of content - theory**:  |
| Course objectives: to provide practical up-to-date information on oil and fat processing including chemical structure, conventional and special raw materials, typical sources for the industry, processing techniques and technologies and economics and market aspects, tendencies. The course provides information to improve the knowledge and the practical skills of the students. **Schedule:**1. Exercise 1 - Raw materials of oil industry (plants, cereals, vegetables, fruits), properties of the oil (Chemical parameters)
2. Exercise 2 - Technology of oil production, oil refining
3. Exercise 3 - Oil groups, by-products of oil production
4. Exercise 4 - Quality and (physical and chemical) properties of oil
5. Exercise 5 - Special oil plants – pressed from different parts of plant (seed, pulp, flower, sprout, root, steam, leaf
6. Exercise 6 - Essential oils, aroma oils, oily extracts, squalene, other oils
7. Exercise 7 - Animal oils, plants/cereals//vegetables/fruits fat
8. Exercise 8 - Structure and classification of fat lipids
9. Exercise 9 - Animal fat as raw material and food ingredient
10. Exercise 10 - Fat processing technology
11. Exercise 11 - Fat types and by-products
12. Exercise 12 - Quality and properties of fat and oil
13. Exercise 13 - Special oils and fats
14. Exercise 14 - The oil and fat market (2018)

Practice: 28 hours/semester, we would like to make blocks (4x7 hours). Schedule:1. Practice block 1 – Oil processing technology (oil pressing)
2. Practice block 2 – Labor practice (qualification of oils)
3. Practice block 3 – Fat processing technology
4. Practice block 4 - Labor practice (qualification of fats)
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| **Literature, handbooks in English**  |
| 1. Diósi G., Sttündl L. (2019): Practical exercises for the course of Oil and fat technology. – Textbook. University of Debrecen, Faculty of Agricultural and Food Sciences, and Environmental Management
2. Talati, A: Extraction Methods Of Natural Essential Oils. Method. February 2017. DOI: 10.13140/RG.2.2.18744.34564
3. Anon: Production Of Lipids From Natural Sources. http://ocw.nagoya-u.jp/files/1/chap2.pdf
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| **Competencies gained** *(acc. to the Regulation on training and outcome requirements)* |
| 1. **Knowledge:**
* Knowledge of technical expressions of oil and fat processing.
* Knowledge of basic principle of oil and fat processing technologies.
* Knowledge of the methods of skill improvement and learning in the relevant field of study (oil and fat processing.
1. **Skills:**
* Capable of using oil and fat processing technologies
* Capable of improving his/her knowledge and to use various methods of obtaining knowledge and self-education
* Having good communication skills he/she is able to express his/her professional point of view in a debate
* Capable of using the on-line and printed literature in the relevant field.
* Capable to solve problems individually or in a team.
1. **Attitude:**
* Open for the opinion of others in the relevant field (oil and fat processing)
* Open for the plans and questions of economic actors
* Determined for the improvement of oil and fat processing technologies
1. **Autonomy and responsibility:**
* He/she has the sense of responsibility and reflects the consequences of his/her activities
* Expresses his/her opinion individually with full responsibility and based on professional knowledge
* Takes responsibility for the work of others
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| **Responsible lecturer: Dr. László Stündl, associate professor** |
| **Other lecturer(s): Dr. Gerda Diósi, assistant lecturer** |

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| **Terms of course completion:** |
| 1. exam
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| **Form of examination:** |
| writting exam |
| **Requirement(s) to get signature:** |
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| **Exam questions:** |
| 1. What do oil vegetable/cereals/plant mean?
2. List at least 5 oil vegetable/cereals/plant and their composition!
3. How do we group fatty acids?
4. Characterize saturated fatty acids!
5. Characterize unsaturated fatty acids!
6. How is vegetable/cereals/plant oil production done? Draw the oil production process!
7. What is the problem with the erucic acid, what markings are known for erucic acid?
8. What does oil refining mean, how is oil refining done?
9. What are the requirements for solvents?
10. How can we characterize the quality of the vegetable/cereals/plant oils?
11. Which are the products of the oil industry? Describe them!
12. Which are the by-products of the oil industry? Describe them!
13. How are margarine products made?
14. How can we classify oils?
15. What does ester mean?
16. Draw the structural formula of the stearic acid!
17. Draw the structural formula of the oleic acid!
18. Draw the structural formula of the palmitic acid!
19. What are the trans fatty acids and cis fatty acids? Characterize them!
20. How do you qualify oils and fats?
21. What are the processes of rancidity?
22. What do you know about the minor and the rare fatty acids? Write and characterize 5 examples!
23. What do you know about the special oils from the pulp? Write and characterize 5 examples!
24. What do you know about the special oils from the seeds? Write and characterize 5 examples!
25. What do you know about the special oils from the different plant parts (flower, root, stem, leaf, sprout etc.)? Write and characterize 5 examples!
26. Characterize the essential oils! What are the roles of essential oil in the pharmaceutical industry, food industry, beauty industry/cosmetology?
27. How are essential oils made? What are the extraction/production methods?
28. What does squalene mean? (properties and utilization)
29. What do you know other oils, special oils?
30. What do you know about vegetable/cereal/plant fats? Characterize them!
31. What do you know about animal oils? Characterize them!
32. What is the difference between lipids, fats and oils?
33. How can lipids be classified?
34. What are the lipids that are ester or amides of fatty acids?
35. What are the lipids that are not esters or amides?
36. What are the properties of triglycerols in natural fats and oils?
37. What are the main sources of animal fats?
38. For what ingredients are fats and oils used?
39. What is the process of settling and degumming?
40. What is the process of neutralization/refining with alkali?
41. What is the process of bleaching?
42. What is the process of deodorization?
43. What is the process of fractionation?
44. What is the process of hydrogenation?
45. What is the process of interesterification?
46. Explain the main features of tallow
47. Explain the main features of lard
48. Explain the main features of caul fat and leaf fat
49. Explain the main features of rendered pork fat
50. Explain the main features of inedible tallow and greases
51. Explain the main features of chicken fat
52. Explain the main features of blubber
53. Explain the meaning of free fatty acid
54. Explain the meaning of iodine number
55. Explain the meaning of peroxide test
56. Explain the meaning of smoke point
57. Explain the main features of saponification value
58. Explain the meaning of refractive index
59. Explain the meaning of melting point
60. Explain the meaning of unsaponifiable matter
61. What are the main features of fish oil?
62. What are the main features of single cell oil (algae oil)?
63. Elaborate on Global Fats and Oils Market!
64. What are the main findings of Global lard production, supply and demand?
65. What are the features of Global Lard Trade dynamics?
66. What are the features of lard utilization for biodiesel?
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