## Module Handbook of Post-harvest Microbiology

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| Module designation | This course is a course for students from the Agricultural Microbiology study program, Faculty of Agriculture. This course discusses various post-harvest activities and methods of processing various agricultural products involving microbiology. In this lecture there is also lab work where students will conduct various activities of processing and management of agricultural raw materials by utilizing microorganisms. |
| Semester(s) in which the module is taught | Fifth Semester |
| Person responsible for the module | Ir. Donny Widianto, Ph.D. |
| Language | Bahasa Indonesia/Indonesian Language |
| Relation to curriculum | *Elective Course* |
| Teaching methods | Lecture are conducted in the class with 30-40 students. In every meeting, there will be delivered interactive lecture and discussion. In some topics there will be quizzes, individual and/or group assignment.<br><br>Details:<br>1. Lectures<br>2. Assignment (Individual and Group)<br>3. Discussion<br>4. Midterm<br>5. Final Exam<br>6. Laboratory Work |
| Workload (incl. contact hours, self-study hours) | - Lectures = 2 SKS x 50 minutes x 16 meetings = 1.600 minutes<br>= 26,67 hours<br>= 26,67 hours/27,1 hours<br>= 0,98 ECTS<br>- Assignment = 2 SKS x 60 minutes x 16 meetings = 1.920 minutes<br>= 32 hours<br>= 32 hours/27,1 hours<br>= 1,18 ECTS<br>- Self Study = 2 SKS x 60 minutes x 16 meetings = 1.920 minutes<br>= 32 hours<br>= 32 hours/27,1 hours<br>= 1,18 ECTS<br>- Practicum = 1 SKS x 170 minutes x 16 meetings = 2.720 minutes<br>= 45,33 hours<br>= 45,33 hours/27,1 hours<br>= 1,67 ECTS<br>Total Workload = 5,01 ECTS |
| Credit points | *2/1 Credit Points* |
| Required and recommended prerequisites for joining the module | *Biology of Microorganisms, Agro-industrial Microbiology* |

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<tr><td>Module objectives/intended learning outcomes</td><td>Program Learning Outcomes (PLO):<br>PLO1: Able to explain theoretical concepts regarding plant production technology by giving attention to economic and social-humanitarian aspects to achieve quality, sustainable and profitable agriculture.<br>PLO2: Able to identify, design, implement, and solve problems that arise in the implementation of agricultural businesses.<br>PLO3: Able to select, utilize and manage the potential of microbes and microbiomes to build industrial and agricultural systems.<br><br>Course Learning Outcomes (CLO):<br>CLO1: Students are able to explain the roles and utilization of microorganisms in the food industry.<br>CLO2: Skillful in processing and producing agricultural products by utilizing microbial.<br>CLO3: Students are capable of controlling and analyzing microbes in food processing.</td></tr>
<tr><td>Content</td><td><ol><li>Introduction (1 meeting)</li><li>Microbes in food and their sources of origin (1 meeting)</li><li>Microbial growth and factors that affect their growth in food (1 meeting)</li><li>Diseases caused by foodborne microbes (1 meeting)</li><li>Food damage caused by microbes (1 meeting)</li><li>Microbial control in food (2 meetings)</li><li>Utilization of microbes in food (3 meeting)</li><li>Microbiological Quality of Food (1 meeting)</li><li>Food Safety (1 meeting)</li><li>Group presentation (1 meeting)</li><li>Materials Review (1 meeting)</li></ol></td></tr>
<tr><td>Examination forms</td><td>High Order Thinking Skills Examination<br><table><tr><th colspan="4">Grade and Score</th></tr><tr><th>Grade</th><th>Score</th><th>Grade</th><th>Score</th></tr><tr><td>A</td><td>≥ 85</td><td>C+</td><td>64,0-66,9</td></tr><tr><td>A-</td><td>82,0-84,9</td><td>C</td><td>61,0-63,9</td></tr><tr><td>A/B</td><td>79,0-81,9</td><td>C-</td><td>58,0-60,9</td></tr><tr><td>B+</td><td>76,0-78,9</td><td>C/D</td><td>55,0-57,9</td></tr><tr><td>B</td><td>73,0-75,9</td><td>D+</td><td>52,0-54,9</td></tr><tr><td>B-</td><td>70,0-72,9</td><td>D</td><td>49,0-51,9</td></tr><tr><td>B/C</td><td>67,0-69,9</td><td>E</td><td><49</td></tr></table></td></tr>
<tr><td>Study and examination requirements</td><td>To be able to take the final exams, the minimum of student attendance is 70% out of effective meetings. From 14 meetings, students must take a minimum of 10 meetings to take the exam.</td></tr>
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| Reading list | *Main References:*<br>1. *Bevilacqua, A., Corbo, M.R., and Sinigaglia, M. 2017. The Microbiological Quality of Food. Woodhead Publishing. London, UK.*<br>2. *Erkmen, O. And Bozoglu, T.F. 2016. Food microbiology: principles into practice. John Wiley & Sons, Ltd.*<br>3. *Ray, B. and Bhunia, A. 2014. Fundamental Food Microbiology 5th Edition. CRC Press, New York, USA.*<br>4. *Adams, M.R. and Moss, M.O. 2008. Food Microbiology 3rd Edition. RSC Publishing, Cambridge, UK.*<br>5. *Jay, J.M., Lossner, M.J., and Golden, D.A. 2005. Modern Food Microbiology 7th Edition. Springer, New York, USA.*<br>6. *Roberts, D. and Greenwood, M. 2003. Practical Food Microbiology 3rd Edition. Blackwell Publishing, Massachusetts, USA.*<br><br>*Additional references:*<br>1. *Post-Harvest Microbiology Practical Book*<br>2. *Interactive video on post-harvest production on YouTube* |