

**UNDERGRADUATE PROGRAM**

**MODULE HANDBOOK**

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| Module designation  | Feed Biotechnology   |
| Semester(s) in which the module is taught                     | 6 <sup>th</sup> semester   |
| Person responsible for the module                             | Dr. Ir. Sitti Wajizah, M.Si  |
| Language  | Indonesia, English   |
| Relation to curriculum  | Elective module  |
| Teaching methods  | Tutorials, presentations, discussions, group assignments, individual assignments   |
| Workload  | <ul style="list-style-type: none"> <li>● 100 minutes of lecture and discussion per week</li> <li>● 120 minutes of structured tasks per week</li> <li>● 120 minutes learn to be independent per week</li> </ul>   |
| Credit Points   | 2 SKS = 3.2 ects   |
| Required and recommended prerequisites for joining the module |  |
| Module objectives/intended learning outcomes                  | <ul style="list-style-type: none"> <li>● Students can understand the concept of biotechnology approaches and the use of artificial intelligence in biotechnology to optimize the use of by-products as animal feedstuffs, improve digestibility and nutrient availability, enhance the health and efficiency of livestock production, and minimize waste production.</li> <li>● Students can explain the use of fermentation and enzymatic technology in the processing and utilization of feedstuffs to increase digestibility, improve nutrient availability, and minimize anti-nutrient content in feedstuffs, ensuring they are safe for livestock consumption.</li> <li>● Students can understand the use of organic waste to produce single-cell protein as a potential protein source for livestock to improve health, immune response, and livestock productivity.</li> <li>● Students understand the concept of genetic engineering to produce animal feed crops that are resistant to pests, herbicides, and drought, while increasing nutritional value, minimizing antinutrient content, and producing high yields.</li> </ul> |
| Content   | Feed Biotechnology is a course that studies the application of molecular engineering to biological reactions in animal feed to improve its quality and functionality. The topics include feed components (water, organic compounds, and inorganic compounds), types of feed based on their sources (fiber, energy, protein, minerals, and vitamins), and feed classification (basal feed, feed supplements, and feed additives). This course also covers the application of biotechnology to enhance feed productivity, nutritional value, digestibility, and detoxification, leading to the production of superior or functional feed that supports improved  |

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|                                    | reproductive performance and livestock production (meat, milk, eggs, and hides) in a sustainable and environmentally friendly manner.   |
| Exams and assessment formats       | Group assignments, presentation, individual assignments, and an Exam  |
| Study and examination requirements | Presence 10%<br>Group assignment 20%<br>Individual assignment 20%<br>Presentation 20%<br>Exam 30%   |
| Reading list                       | <ol style="list-style-type: none"> <li>1. Oussama, S., &amp; Chaima, B. (2023). Biotech meets Artificial Intelligence to Enhance the Value of By Products in Animal Nutrition. <i>Biological Sciences</i>, Vol. 03(01), Pp. 353-365</li> <li>2. Abraham, S., Kechero, Y. (2024). Biotechnology in animal nutrition and feed utilization. <i>Biotechnology in animal nutrition and feed utilization</i>. J. Livestock Sci. 15: 120-124</li> <li>3. Umami, N., Suhartanto, B., Suwignyo, B., Prasojo, Y. S., Nasution, M. D., &amp; Runingtyas, L. 2024. <i>Bioteknologi dalam Pengembangan Hijauan Pakan Ternak di Indonesia</i>. Yogyakarta: Deepublish.</li> <li>4. Siswoyo, P., Rusdhi, A., Lubis, H. P., Abdilla Yahya, I., &amp; Sembiring, A. C. 2024. <i>Komposisi Pakan Ternak dengan Menggunakan Limbah Tani</i>. Jakarta: Tri Selaras Cendekia.</li> <li>5. Rasad, S. D., &amp; Solihat, N. 2023. <i>Bioteknologi Reproduksi Ternak</i>. Bandung: Unpad Press.</li> <li>6. Pakpahan, B. M. T., Suprapto, S., Jubaidah, S. P. D., Batumahadi, I., Dharma, S., Damanik, M., &amp; Eswanto, S. 2025. <i>Teknologi Pakan Ternak: Inovasi dan Implementasi untuk Produksi Ternak Berkelanjutan</i>. Padang: Get Press Indonesia.</li> </ol> |