

Course: Feed Fabrication

1. **Type** : Specialization's Elective
2. **Code** : PTN 6111
3. **Credit** : 1/1
4. **Semester** : Even
5. **Description** :

Indonesia is a tropical land with two seasons in a year: rainy and dry season. This occurrence causes fluctuation in the supply of feed. On the rainy season, there are huge numbers of crops harvested, but on dry season very limited harvest is available. And again, this still depends on the length the dry season. The supply of concentrated feedstuffs sourced from grains and crops by-products highly depends on harvest. The supply is abundant in the harvest season, but far less available on the post-harvest and during the seeding season.

The Feed Fabrication course is designed to provide students with some competencies in feed fabrication technology, design environmental-friendly feed mill, and process feedstuffs into finished feed product. For the above purposes, students are provided with methods in choosing grinder, mixer, and storing method both for feedstuffs and finished feed product. In addition to theory, students also practice to produce concentrated feed that will include grinding and mixing process.

6. Course Outcomes (CO)

- CO 1 : Students understand definition, basic principles in feed grinding, determine the grinding categories (fine, medium, coarse). In addition, students are expected to understand the principles in processing liquid and solid feed into finished feed.
- CO 2 : Students are capable in designing environmental-friendly feed mill and its storing system. Furthermore, students are able to define grinding products, and homogenous mixing products.
- CO 3 : Students master the aspects related to feed fabrication (equipment), taking the raw material, finished feed processing, and storage; able to compete or work interdisciplinary in relation to processing, finished feed production and concentrated feed storage; and then, able to communicate their ideas and opinion, especially related to feed fabrication.

7. The Alignment Between CO and ELO

CO*	ELO**																
	A				B			C				D					
	1	2	3	4	1	2	3	1	2	3	4	1	2	3	4	5	6
CO 1				✓	✓	✓											
CO 2				✓				✓			✓			✓			
CO 3				✓													✓

*CO refers to point 6.

**Expected Learning Outcomes (ELO) are written below,

A. Attitudes and Behaviors	
The graduates are able to behave well, correctly, and culturally as the result of internalization and actualization of values and norms, which is reflected in a spiritual and social life through learning process, experience, research, and/or community development in the animal husbandry.	
1	Piety to God and be able to show religious attitude and maintain the humanity values in carrying the task, which is based on religion, moral, and ethics.
2	Be proud and love the homeland show nationalism, and contribute to the improvement of the life quality in the community, nation and country, and the advancement of civilization according to Pancasila.
3	Showing the social sensitivity and attention to the community and environment by respecting the culture diversity, view, religious, beliefs, and other people's opinion, and also obey the rules.
4	Be accountable in carrying the professional practice that includes ability to accept accountability towards decision and professional action. It shall be according to the scope of the practice under their responsibility and laws.
B. Mastery in Sciences	
Master the theory of the current science in the animal husbandry and its application.	
1	Able to master the current animal science and its application theory.
2	Able to master the livestock production science, animal nutrition and fed science, animal products technology, and the livestock social economics in relation to food security and environment.
3	Able to master the design, management, and development of livestock research.
C. Special Skills	
The graduates are able to develop science, technology, and arts in the animal husbandry through interdisciplinary/multidisciplinary innovative and tested research.	
1	Able to make innovation in the animal husbandry based on the development of science and technology.
2	Able to design interdisciplinary and multidisciplinary research in the animal husbandry.
3	Able to formulate and solve problems in the national development especially in terms of animal husbandry.
4	Able to solve problems and anticipate issues in the development of animal science and industry.
D. General Skills	
The graduates are able to manage resources by utilizing science, technology, and arts to solve problems in the animal husbandry with current science and also conduct research with accountability and full responsibility.	
1	Able to develop logical, critical, systematic, and creative thought through scientific research, creation of design in the science and technology, which pays attention and applies humanity values according to their expertise. The graduates are able to arrange scientific concept and the study result based on the principles, procedures, and scientific ethics.
2	Able to identify the science that becomes their research object and position it to a research map by using information technology in the context of science development and expertise implementation developed through interdisciplinary or multidisciplinary approaches.
3	Able to make a decision in the context of solving problems in the development of science and technology, which pays attention and applies humanity values based on analysis study or experiment towards information and data.
4	Able to communicate the result of reasoning and scientific research in form of thesis and scientific writing responsibly based on academic ethics in the accredited national journal.
5	Able to maintain the academic integrity generally and avoid the plagiarism practice.
6	Able to communicate spoken and written English effectively by using the information technology for the development of animal science and its implementation.

8. Course Content

Week	CO	Topic/Subtopic	Learning Activity	Assessment Tools	Allocated Time	Lecturer
1 – 3	CO 1	Introduction and Production Equipment: <ul style="list-style-type: none"> • Course introduction • Learning contract • Introduction, objective, historical view, fabrication, grinder, mixer, and extruder 	Lecture and discussion	Exam	4	Ristiano Utomo
4-6	CO 2	Feedstuffs processing: <ul style="list-style-type: none"> • Grinding • Mixing, pelleting, crumbling 	Lecture and discussion	Exam	6	Andriyani Astuti
7-9	CO 2	Feedstuff handling management: <ul style="list-style-type: none"> • Solid and liquid feedstuffs reception • Solid and liquid feedstuffs storing • Pest control spraying, fogging, fumigation 	Lecture and discussion	Exam	6	Cuk Tri Noviandi
10-11	CO 2/ CO 3	Feed mill plan <ul style="list-style-type: none"> • Design and construction • Labelling 	Lecture and discussion	Writing and presentation	2	Ristiano Utomo

9. Practicum

Week	Activity	Methods	Total Hours
1	Grinding	Grinding some feedstuffs using hammer mill	2
2	Mixing	Mixing some feedstuffs using mixer	2
3	Pelleting	Making pellet from various ingredients	2
4	Durability pellet	Testing commercial pellet's durability	2
5	Feed mill visitation	Study visit	4

10. Assessment

Component	CO	Percentage (%) for final grade	Minimum Satisfactory Level
Class participation	CO 1; CO 2; CO 3	20	70
Discussion	CO 3	10	70
Midterm	CO 1; CO 2	30	70
Final Exam	CO 1; CO 2	40	70
Total		100	

11. Lecturer

1. Ir. Cuk Tri Noviandi, S.Pt., M.Anim.St., Ph.D., IPM.
2. Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU.
3. Prof. Dr. Ir. Ristiano Utomo, S.U., IPM.
4. Ir. Andriyani Astuti, S.Pt., M.Sc., Ph.D., IPM.
5. Ir. Cuk Tri Noviandi, S.Pt., M.Anim.St., Ph.D., IPM.
6. Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU.
7. Prof. Dr. Ir. Ristiano Utomo, S.U., IPM.
8. Ir. Andriyani Astuti, S.Pt., M.Sc., Ph.D., IPM.

12. Reference

1. American Feed Industry Association. 1985. Feed Manufacturing Technology III. R.R. McElhiney (ed.), 1701 North Fort Myer Drive, Alington, Virginia USA 22209.
2. American Soybean Association. 2000. Feed Technology and Nutrition Workshop. R.A
3. Cullison, A.E and R.S. Lowrey. 1987. Feeds and Feeding. 4th ed. A Reston Book. Prentice Hall, Englewood Cliffs, New Jersey.

4. Ensminger M.E. and C.G. Oletine. 1978. Feeds and Nutrition : Complete. First Edition The Ensminger Publishing Company, 3699 East Sierra Avenue, Clovis, California 93612.
5. Galleti, G.C. 1991. Production and Utilization of Lignocellulosics. Elsevier Applied Science, London and New York.
6. Kellems, R.O. and D.C. Church. 1998. Livestock Feeds and Feeding. Prentice Hall, New Jersey.
7. Snelson G.P. 1987. Grain Protectants. Australian Center for International Agricultural Research (ACIAR). Canberra.
8. Hasil-hasil penelitian dan jurnal yang berkaitan dengan bahan pakan dan formulasi.