22 January 2019

Course: Development of Animal Genetic Resources

1. **Type** : Study Program's Compulsory
2. **Code** : PTU 6007
3. **Credit** : 2/0
4. **Semester** : Odd and Even
5. **Description** :

   Students in this course will discuss various topics in the development of animal genetic resources, i.e. principal concepts of genetics, application of molecular genetics in livestock animals, selection based on one or multiple traits, cross breeding, animal's endocrine system, environmental effects on animal's physiology and reproduction, artificial insemination, in vitro fertilization, and embryo transfer.

6. **Course Outcomes (CO)**

   CO 1 : Able to comprehend the importance of animal genetic resources sustainability.

   CO 2 : Able to explain the role of animal breeding on animal genetic development.

   CO 3 : Able to master animal physiology and reproduction.

   CO 4 : Able to apply reproduction technology for animal genetic development.

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 4			✓			✓		✓					✓				

*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	CO 1	Introduction: - The importance of animal genetic resource development - References on animal genetic resource development - The importance of reproduction science on	Lecture and discussion	Quiz, assignment, discussion	2	Team

		supporting animal genetic resource development				
2	CO 1	The principle concepts of genetics - basic genetic dogma - DNA, RNA, protein - Phenotype and Genotype	Lecture and discussion	Quiz, assignment, discussion	2	Team
3	CO 2	Conservation of animal genetic resources - conservation of animal genetic resources in Indonesia - definition and methodology	Lecture and discussion	Quiz, assignment, discussion	2	Team
4	CO 1; CO 2	- development of animal genetic resources	Lecture, discussion, student presentation	Quiz, assignment, discussion	2	Team
5	CO 2; CO 3	Semen evaluation - fresh semen - frozen semen	Lecture and discussion	Quiz, assignment, discussion	2	Team
6	CO 3; CO 4	Artificial insemination - the advantages - AI techniques	Lecture and discussion	Quiz, assignment, discussion	2	Team
7	CO 1; CO 2; CO 3	Endocrine system - reproductive hormones - non-reproductive hormones	Lecture and discussion	Quiz, assignment, discussion	2	Team
Midterm Examination						

8	CO 1; CO 2	In vitro fertilization and embryo transfer - oocyte aspiration and maturation - semen preparation - fertilization - embryo transfer	Lecture, discussion, and student presentation	Quiz, assignment, discussion	2	Team
9	CO 1	Cloning and transgenic - cloning - transgenic	Lecture and discussion	Quiz, assignment, discussion	2	Team
10	CO 1; CO 2	Selection - one trait-selection - multiple traits-selection	Lecture and discussion	Quiz, assignment, discussion	2	Team
11	CO 1	Breeding system - cross breeding - line crossing - back crossing	Lecture and discussion	Quiz, assignment, discussion	2	Team
12	CO 1	Molecular genetic application on animal - male line-trait inheritance - female line-trait inheritance - association of genetic marker and economical value of animal	Lecture and discussion	Quiz, assignment, discussion	2	Team
13	CO 1	Capita selecta on the animal genetic resource development in Indonesia	Lecture, discussion, and student presentation	Quiz, assignment, and discussion	2	Team

		- development of animal genetic resources on large animal				
14		- development of animal genetic resources on small animal	Lecture, discussion, and student presentation	Quiz, assignment, and discussion	2	Team
Final Examination						

9. Assessment

Component	CO	Percentage (%) for final grade	Minimum Satisfactory Level
Midterm	1;2;3	40	70
Quiz	1	5	70
Presentation	1;2	5	70
Paper	1	10	70
Final Exam	1;2;3	40	70
Total		100	

10. Lecturer

1. Dr. Ir. Sigit Bintara, S.Pt., M.Si., IPM.
2. Prof. Dr. Ir. Sumadi, MS., IPU.
3. Ir. Diah Tri Widayati, S.Pt., MP., Ph.D., IPM.
4. Ir. Tety Hartatik, S.Pt., Ph.D., IPM.
5. Ir. Panjono, S.Pt., MP., IPM.

11. Reference