COURSE LEARNING PLAN

UNIVERSITY OF BRAWIJAYA

FACULTY OF ANIMAL SCIENCE

DEPARTMENT OF ANIMAL SCIENCE

UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE

LEARNING PLAN: Reproduction and Artificial Insemination Management

Course	Code	Weight (credits)	Semester	Compilation Date
Reproduction and Artificial Insemination Management	PEP60016	4 credits	4	25/08/2020

Authorization	Course Coordinator	Ka PS S1	Vice Dean 1
	Dr. Ir. Nurul Isnaini, MP	Dr. Herly Evanuarini, S.Pt, MP	Dr. Ir. Halim Natsir, MP, IPM, ASEAN Eng

Learning Outcomes (LO)

PLO

1. Able to develop comprehensive insight and mindset according to the science and field of the animal industry. (LO 4)
2. Able to examine the implications of the development or implementation of science and technology that consider and apply humanities values in accordance with their expertise based on scientific principles, procedures, and ethics to produce excellent solutions and ideas. (LO 5)
3. Able to apply biological science, physiology, nutrition science, breeding science, animal raising management to comprehend the concept and implement it in the field of animal science. (LO 6)
4. Able to apply animal technology that is oriented towards improving production, efficiency, quality, and sustainability based on mastery of animal science including breeding, feed, processing of products, marketing management and organizing a sustainable animal production system, and applying entrepreneurial concepts. (LO 13)

CLO

1. The students understand how to manage animals to achieve reproductive efficiency
2. The students understand the basic theoretical and technical principles of cement storage and perform cement quality tests, dilution, cooling, and freezing
3. The students understand AI techniques in various animals and evaluate the success of Artificial Insemination

Brief Course Description	This course discusses reproductive management in the field of animal science to increase reproductive efficiency and improve animal genetic quality. The discussions include management of accelerated puberty, mating management, management of male and female selection as donors and recipients, management of liquid and frozen semen production, management of artificial insemination in people's farms and the animal industry, management of recording results of marriage and IB, management of evaluation of successful marriages. In this course, students are also required to carry out laboratory practices to achieve competence in semen quality testing, the dilution process and the thawing of cow semen.
Topics	1. Introduction: ● The sciences that need to be learned to make it easier to study the course of Animal reproduction management ● Relationship between the course of Reproductive Management and Artificial Insemination with other sciences ● Scope of the course of Reproductive Management and Artificial Insemination and their relationship in improving reproductive efficiency 2. Artificial Insemination in animals ● Definition of artificial insemination ● Advantages and disadvantages of artificial insemination ● The history of the development of AI in the world and Indonesia ● Institutions and human resources related to and contributing to the success of Artificial Insemination 3. Male selection management and mating management: ● Selection of males to produce spermatozoa and characteristics of good males ● Raising management of males ● Selection of a parent to be used as a recipient ● Mating system in extensive and intensive raising ● Natural and Artificial Mating Management 4. Storage management and quality testing of cement: ● Equipment needed for storage and quality testing of cement

	● Cement collection techniques for various livestock and animals ● Routine quality testing of cement and for studies/research both macroscopic and microscopic including motility, viability, abnormalities. ● SNI for frozen cement 5. Cement dilution: ● Facilities and infrastructure required for cooling and freezing cement ● Diluent and cryoprotectant requirements ● Composition of various cement diluent in various animals (mammals and poultry) ● Diluent manufacturing techniques 6. Cement Cooling and Freezing Techniques ● Basic principles of cooling and freezing ● Cement cooling and freezing techniques ● Manufacture of liquid cement ● Evaluation of the success of making liquid cement and frozen cement ● Indonesian National Standard (SNI) for the quality of frozen and liquid cement for animals 7. AI technique in various animals: ● AI technique on various animals ● AI management using liquid and frozen cement. ● AI management in cattle, goat, sheep, buffalo, pig, and horse farms (smallholder and industrial farms) 8. Factors affecting the success of AI: ● Quality of liquid/frozen cement (frozen cement maintenance management) ● Female physiology (feed, disease, endocrine) ● Farmer (maintenance system, lust detection, providing information to inseminators) ● Inseminator (Thawing system, the accuracy of deposition, timeliness of AI)

	9. Artificial Insemination in Poultry (Chicken, Ducks, Birds): ● Cement storage for poultry ● Quality testing of cement in poultry ● Dilution of cement ● AI technique in poultry ● Evaluation of the success of AI in poultry 10.Pregnancy detection: ● Advantages of early pregnancy detection ● Palpation per rectally ● Non-return rate (NRR) 11.Evaluation of AI success and reproduction recording: ● Record of mating results ● Evaluation of the results of mating and pregnancy ● Non-Return Rate ● Conception Rate ● Service per conception ● Calving interval ● Calving Rate/ Calf crop ● Weaning Rate 12.Estrus Detection and Synchronization: ● Purpose of estrus detection ● Estrus detection methods (visual, hormonal, dan tools) ● Purpose of estrus synchronization ● Benefits of estrus synchronization (AI, embryo transfer) 13. Raising management and AI application strategy: Raising management on; ● Newborn child care ● Off-weaning to stop puberty ● Approaching mating to increase the success of AI

	● Raising management from pregnancy to delivery ● Raising management during breastfeeding and pre-weaning 14.AI strategy for breeding ● Intensification of Natural Mating in the animal industry ● AI strategy for animal breeding and growing ● Population dynamics in goat and cow breeding business ● Planning for goat and cow breeding businesses ● Application of AI in waterfowl, land fowl, and birds
References	1. Farm Animal Reproduction (Hafez and Hafez, 2000) 2. Pedoman Inseminasi Buatan (Trinil Susilawati, 2016) 3. Inseminasi Buatan menggunakan semen cair (Trinil Susilawati, 2018)
Learning Media	Software: Software, PowerPoint, Video Hardware: Laptop, LCD, Whiteboard
Teaching Team	1. Prof. Dr.Ir .Trinil Susilawati,MS, IPU, ASEAN Eng 2. Prof. Dr. Agr. Ir. Suyadi, MS, IPU, ASEAN Eng 3. Prof. Dr.Ir. Muhammad Nur Ihsan,MS 4. Prof. Dr.Ir. Woro busono,MS 5. Dr.Ir. Nurul Isnaini ,MP 6. Dr.Ir. Sri Wahyuningsih ,Msi 7. Dr. Achadiah Rahmawati, S.Pt, M.Si 8. Aulia Puspita Anugra Yekti,Spt,MP,Msc
Prerequisite Course	Reproductive Science Course

Week	Sub-CLO	Indicator	Learning Materials / Topics	Learning Methods	Criteria & Form of Assessment	Weighted Score (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	The students understand the scope of the course and its relationship with other courses	Able to understand	Introduction: ● The sciences that need to be learned to make it easier to study the course of Animal reproduction management ● Relationship between the course of Reproductive Management and	Tutorials, Presentations, and Discussions	Activeness and Questions and Answers	

			Artificial Insemination with other sciences ● Scope of the course of Reproductive Management and Artificial Insemination and their relationship in improving reproductive efficiency			
2	The students are able to understand the definitions, advantages, and disadvantages of AI, the history of AI, and the institutions that contribute to the success of AI	Able to understand	Artificial Insemination in animals ● Definition of artificial insemination ● Advantages and disadvantages of artificial insemination ● The history of the development of AI in the world and Indonesia ● Institutions and human resources related to and contributing to the success of Artificial Insemination	Tutorials, Presentations, and Discussions	Activeness and Questions and Answers	
3	The students are able to identify the characteristics of good males and parent in various animals and be able to apply the appropriate mating	Able to apply	Male selection management and mating management: ● Selection of males to produce spermatozoa and characteristics of good males ● Raising management of males ● Selection of a parent			

	system in the location/ animal industry		to be used as a recipient ● Mating system in extensive and intensive raising ● Natural and Artificial Mating Management			
4	Able to carry out storage and quality test for various animals	Able to understand	Storage management and quality testing of cement: ● Equipment needed for storage and quality testing of cement ● Cement collection techniques for various livestock and animals ● Routine quality testing of cement and for studies/research both macroscopic and microscopic including motility, viability, abnormalities. ● SNI for frozen cement			
5	The students are able to understand diluent requirements and apply diluent making	Able to carry out	Cement dilution: ● Facilities and infrastructure required for cooling and freezing cement ● Diluent and cryoprotectant requirements ● Composition of various cement diluent in various animals (mammals and poultry) ● Diluent			

			manufacturing techniques			
6	The students are able to carry out the process of cooling, freezing on various animals and knowing the SNI quality of frozen cement and liquid cement in animals	Able to understand and carry out	Cement Cooling and Freezing Techniques ● Basic principles of cooling and freezing ● Cement cooling and freezing techniques ● Manufacture of liquid cement ● Evaluation of the success of making liquid cement and frozen cement ● Indonesian National Standard (SNI) for the quality of frozen and liquid cement for animals			
7	The students are able to carry out AI on goats and sheep and understand to do so in other animals	Able to carry out and understand	AI technique in various animals: ● AI technique on various animals ● AI management using liquid and frozen cement. ● AI management in cattle, goat, sheep, buffalo, pig, and horse farms (smallholder and industrial farms)			
8	The students are able to identify factors affecting the success of AI	Able to carry out and understand	Factors affecting the success of AI: ● Quality of liquid/frozen cement (frozen cement maintenance management) ● Female physiology			

			(feed, disease, endocrine) ● Farmer (maintenance system, lust detection, providing information to inseminators) ● Inseminator (Thawing system, the accuracy of deposition, timeliness of AI)			
9	The students are able to understand AI management in poultry	Able to understand	Artificial Insemination in Poultry (Chicken, Ducks, Birds): ● Cement storage for poultry ● Quality testing of cement in poultry ● Dilution of cement ● AI technique in poultry ● Evaluation of the success of AI in poultry			
10	The students are able to select pregnancy detection techniques	Able to select	Pregnancy detection: ● Advantages of early pregnancy detection ● Palpation per rectally ● Non-return rate (NRR)			
11	The students are able to carry out an evaluation of AI success		Evaluation of AI success and reproduction recording: ● Record of mating results ● Evaluation of the results of mating and			

			pregnancy ● Non-Return Rate ● Conception Rate ● Service per conception ● Calving interval ● Calving Rate/ Calf crop ● Weaning Rate			
12	The students are able to carry out estrus synchronization	Able to identify	Estrus Detection and Synchronization: ● Purpose of estrus detection ● Estrus detection methods (visual, hormonal, dan tools) ● Purpose of estrus synchronization ● Benefits of estrus synchronization (AI, embryo transfer)			
13	The students are able to understand raising affecting reproductive efficiency	Able to understand	Raising management and AI application strategy: Raising management on; ● Newborn child care ● Off-weaning to stop puberty ● Approaching mating to increase the success of AI ● Raising management from pregnancy to delivery ● Raising management during breastfeeding and pre-weaning			
14	The students are able to	Able to decide	AI strategy for breeding ● Intensification of			

	decide on feeding		Natural Mating in the animal industry ● AI strategy for animal breeding and growing ● Population dynamics in goat and cow breeding business ● Planning for goat and cow breeding businesses ● Application of AI in waterfowl, land fowl, and birds			

ASSESSMENT RUBRIC

	UNIVERSITY OF BRAWIJAYA FACULTY OF ANIMAL SCIENCE DEPARTMENT OF ANIMAL SCIENCE UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE		
Course	Reproduction and Artificial Insemination Management		
Score Level	PLO and CLO	Conversion	PLO Score
Program Learning Outcomes 4: Able to apply animal technology that is oriented towards improving production, efficiency, quality, and sustainability based on mastery of animal science including breeding, feed, processing of products, marketing management and organizing a sustainable animal production system, and applying entrepreneurial concepts (LO 13) Course Learning Outcomes 1: The students understand how to manage animals to achieve reproductive efficiency			
Very Good (4)	Showing a **comprehensive** understanding of concepts related to reproductive management to achieve reproductive efficiency in the animal science sector	>80-100	1
Good (3)	Showing a **good** understanding of concepts related to reproductive management to achieve reproductive efficiency in the animal science sector	>70-80	0.75
Moderate (2)	Showing a **limited** understanding of concepts related to reproductive management to achieve reproductive efficiency in the animal science sector	>60-70	0.5
Poor (1)	Showing a **very limited** understanding of concepts related to reproductive management to achieve reproductive efficiency in the animal science sector	≤60	0.25
Score Level	PLO and CLO	Conversion	PLO Score
Program Learning Outcomes 1: Able to develop comprehensive insight and mindset according to the science and field of the animal industry (LO 4)			

Program Learning Outcomes 2: Able to examine the implications of the development or implementation of science and technology that consider and apply humanities values in accordance with their expertise based on scientific principles, procedures, and ethics to produce excellent solutions and ideas (LO 5) Course Learning Outcomes 2: The students understand the basic theoretical and technical principles of cement storage and perform cement quality tests, dilution, cooling, and freezing			
Very Good (4)	Showing a **comprehensive** understanding of concepts related to technical cement storage, cement quality test, dilution, cooling, and freezing	>80-100	0.5
Good (3)	Showing a **good** understanding of concepts related to technical cement storage, cement quality test, dilution, cooling, and freezing	>70-80	0.375
Moderate (2)	Showing a **limited** understanding of concepts related to technical cement storage, cement quality test, dilution, cooling, and freezing	>60-70	0.25
Poor (1)	Showing a **very limited** understanding of concepts related to technical cement storage, cement quality test, dilution, cooling, and freezing	≤60	0.125
Score Level	PLO and CLO	Conversion	PLO Score
Program Learning Outcomes 3: Able to apply biological science, physiology, nutrition science, breeding science, animal raising management to comprehend the concept and implement it in the field of animal science (LO 6) Course Learning Outcomes 3: The students understand AI techniques in various animals and evaluate the success of Artificial Insemination			
Very Good (4)	Showing a **comprehensive** understanding of concepts related to AI techniques in various animals and evaluate the success of Artificial Insemination	>80-100	1
Good (3)	Showing a **good** understanding of concepts related to AI techniques in various animals and evaluate the success of Artificial Insemination	>70-80	0.75

Moderate (2)	Showing a **limited** understanding of concepts related to AI techniques in various animals and evaluate the success of Artificial Insemination	>60-70	0.5
Poor (1)	Showing a **very limited** understanding of concepts related to AI techniques in various animals and evaluate the success of Artificial Insemination	≤60	0.25

Formula to Calculate PLO Score: $\frac{Level\ Skor}{\sum level\ skor} \times \frac{\sum CLO}{\sum PLO}$

Lecture Portfolio

UNIVERSITY OF BRAWIJAYA **FACULTY OF ANIMAL SCIENCE** **STUDY PROGRAM OF ANIMAL SCIENCE**			
Course: Reproduction and Artificial Insemination Management	Code: PEP60016	RMK:	Semester: 4
Lecturers	1. Prof. Dr.Ir .Trinil Susilawati,MS, IPU, ASEAN Eng 2. Prof. Dr. Agr. Ir. Suyadi, MS, IPU, ASEAN Eng 3. Prof. Dr.Ir. Muhammad Nur Ihsan,MS 4. Prof. Dr.Ir. Woro busono,MS 5. Dr.Ir. Nurul Isnaini ,MP 6. Dr.Ir. Sri Wahyuningsih ,Msi 7. Dr. Achadiah Rahmawati, S.Pt, M.Si 8.Aulia Puspita Anugra Yekti,Spt,MP,Msc		

Introduction (Describe the explanation needed about this course, the experiences that have been encountered)

This course discusses reproductive management in the field of animal science to increase reproductive efficiency and improve animal genetic quality. The discussions include management of accelerated puberty, mating management, management of male and female selection as donors and recipients, management of liquid and frozen semen production, management of artificial insemination in people's farms and the animal industry, management of recording results of marriage and IB, management of evaluation of successful marriages. In this course, students are also required to carry out laboratory practices to achieve competence in semen quality testing, the dilution process and the thawing of cow semen.

1	**Objectives** (Describe general and specific course objectives)
	1. The students understand how to manage animals to achieve reproductive efficiency 2. The students understand the basic theoretical and technical principles of cement storage and perform cement quality tests, dilution, cooling, and freezing 3. The students understand AI techniques in various animals and evaluate the success of Artificial Insemination

2	**Learning Strategies** (Describe the strategy used to achieve the course objective - CLO)
	The learning strategies carried out in the lectures include lectures, discussions, structured assignments, quizzes, and group presentations
3	**Lecture Management** (Describe the lecture management: lectures, tutorials, practicum, assignments, major assignments, etc.)
	1) Lecture: 100 minutes/meeting (14 meetings) 2) Practicum of 50 minutes/meeting (14 meetings) 3) Structured assignments/quizzes/group presentation 4) Attendance: 80% of total attendance
4	**Lecture Contents** (explain its suitability with the applicable curriculum)
	1. Introduction: ● The sciences that need to be learned to make it easier to study the course of Animal reproduction management ● Relationship between the course of Reproductive Management and Artificial Insemination with other sciences ● Scope of the course of Reproductive Management and Artificial Insemination and their relationship in improving reproductive efficiency 2. Artificial Insemination in animals ● Definition of artificial insemination ● Advantages and disadvantages of artificial insemination ● The history of the development of AI in the world and Indonesia ● Institutions and human resources related to and contributing to the success of Artificial Insemination 3. Male selection management and mating management: ● Selection of males to produce spermatozoa and characteristics of good males ● Raising management of males ● Selection of a parent to be used as a recipient ● Mating system in extensive and intensive raising ● Natural and Artificial Mating Management 4. Storage management and quality testing of cement:

- Equipment needed for storage and quality testing of cement
- Cement collection techniques for various livestock and animals
- Routine quality testing of cement and for studies/research both macroscopic and microscopic including motility, viability, abnormalities.
- SNI for frozen cement

5. Cement dilution:
   - Facilities and infrastructure required for cooling and freezing cement
   - Diluent and cryoprotectant requirements
   - Composition of various cement diluent in various animals (mammals and poultry)
   - Diluent manufacturing techniques

6. Cement Cooling and Freezing Techniques
   - Basic principles of cooling and freezing
   - Cement cooling and freezing techniques
   - Manufacture of liquid cement
   - Evaluation of the success of making liquid cement and frozen cement
   - Indonesian National Standard (SNI) for the quality of frozen and liquid cement for animals

7. AI technique in various animals:
   - AI technique on various animals
   - AI management using liquid and frozen cement.
   - AI management in cattle, goat, sheep, buffalo, pig, and horse farms (smallholder and industrial farms)

8. Factors affecting the success of AI:
   - Quality of liquid/frozen cement (frozen cement maintenance management)
   - Female physiology (feed, disease, endocrine)
   - Farmer (maintenance system, lust detection, providing information to inseminators)
   - Inseminator (Thawing system, the accuracy of deposition, timeliness of AI)

	9. Artificial Insemination in Poultry (Chicken, Ducks, Birds): ● Cement storage for poultry ● Quality testing of cement in poultry ● Dilution of cement ● AI technique in poultry ● Evaluation of the success of AI in poultry 10.Pregnancy detection: ● Advantages of early pregnancy detection ● Palpation per rectally ● Non-return rate (NRR) 11.Evaluation of AI success and reproduction recording: ● Record of mating results ● Evaluation of the results of mating and pregnancy ● Non-Return Rate ● Conception Rate ● Service per conception ● Calving interval ● Calving Rate/ Calf crop ● Weaning Rate 12.Estrus Detection and Synchronization: ● Purpose of estrus detection ● Estrus detection methods (visual, hormonal, dan tools) ● Purpose of estrus synchronization ● Benefits of estrus synchronization (AI, embryo transfer) 13. Raising management and AI application strategy: Raising management on; ● Newborn child care ● Off-weaning to stop puberty ● Approaching mating to increase the success of AI

	● Raising management from pregnancy to delivery ● Raising management during breastfeeding and pre-weaning 14.AI strategy for breeding ● Intensification of Natural Mating in the animal industry ● AI strategy for animal breeding and growing ● Population dynamics in goat and cow breeding business ● Planning for goat and cow breeding businesses ● Application of AI in waterfowl, land fowl, and birds
5	**Lecture Participants** (provide an overview of the lecture participants)
	The course participants are 4th semester students who have passed the Reproductive Science course
6	**Attendance Percentage** (% lecturer attendance; % student attendance)
	% lecturer attendance: 100% % student attendance: 80%
7	**Evaluation System** (explain the homework, quizzes, group assignments, practicum, etc.)
	Midterm Exam: 30% Final Exam: 30% Pass the Practicum Exam: 20% Structured Assignment/quiz: 20%
8	**Class Observation** (explain important and interesting things that were encountered during the lecture)
	Activeness in following discussions
9	**Learning Outcomes** (explain the achievement of the objectives that have been set, also include the learning achievements that can be explained)
	1. Able to develop comprehensive insight and mindset according to the science and field of the animal industry. (LO 4) 2. Able to examine the implications of the development or implementation of science and technology that consider and apply humanities values in accordance with their expertise based on scientific principles, procedures, and ethics to produce excellent solutions and ideas. (LO 5) 3. Able to apply biological science, physiology, nutrition science, breeding science, animal raising management to comprehend the concept and implement it in the field of animal science. (LO 6)

	4. Able to apply animal technology that is oriented towards improving production, efficiency, quality, and sustainability based on mastery of animal science including breeding, feed, processing of products, marketing management and organizing a sustainable animal production system, and applying entrepreneurial concepts. (LO 13)
10	**Obstacles** (provide an overview of the main obstacles in the learning process)
	Facilities for practicum are inadequate so that the practicum is mostly carried out in demonstrations, delays in disbursing practicum funds, and there are no animal facilities for practicum, especially for AI
11	**Score Distribution** (provide the score distribution following the learning achievements of this course)
	Midterm Exam: 30% Final Exam: 30% Pass the Practicum Exam: 20% Structured Assignment/quiz: 20%
12	**Conclusion**
	In general, the implementation of teaching and learning of the MRIB course can run well in accordance with the plan, but it is necessary to improve laboratory facilities and funding to support practicum activities.
13	**Improvement Recommendations**
	1. Addition of laboratory facilities 2. On-time funding for practicum 3. Procurement of animal facilities for practicum
	Appendices:
	1. 2. etc.