COURSE LEARNING PLAN

	UNIVERSITY OF BRAWIJAYA FACULTY OF ANIMAL SCIENCE DEPARTMENT OF ANIMAL SCIENCE UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE LEARNING PLAN: Reproduction Technology

Course	Code	Weight (credits)	Semester	Compilation Date
Reproduction Technology		3	6	25/08/2020

Authorization	Course Coordinator	Head of Undergraduate Study Program of Animal Science	Vice Dean 1
	Dr. Ir. Sri Wahjuningsih, M.Si	Dr. Herly Evanuarini, S.Pt, MP	Dr.Ir. Halim Natsir, MP, ASEAN Eng

Learning Outcome (LO)	PLO 1. 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 (LO5) 2. Able to develop comprehensive insight and mindset according to the science and field of the animal industry (LO4) 3. Able to design and conduct experiments, analyze and interpret data to make correct decisions in solving problems in the field of animal science, meet ethics, and have environmental insight (LO12)
	Course Learning Outcome/CLO 1. Understanding about livestock reproductive technology that have developed for current and future (LO4) 2. Understanding the role of reproductive technology in improving the genetic quality of livestock and livestock productivity (LO4) 3. Knowing and understanding the basic principles and applications of spermatozoa and embryo sexing techniques, embryo transfer, in vitro fertilization, embryo manipulation (cloning), chimeras, transgenic and embryonic steam cells (LO5) 4. Able to apply the principles of gamete and embryo manipulation techniques correctly (LO5) 5. Preparing students for research in the field of livestock reproduction (LO12)
Brief Course Description	This course begins with Sexing technology then embryo transfer that includes estrus synchronization, multiple ovulation/ super ovulation, in vivo fertilization, in vitro fertilization, embryo manipulation, cloning, nuclear transfer and application of reproductive technology. Besides, students are required to attend practicum to achieve competence regarding gamete and embryo manipulation techniques and research in the field of livestock reproduction.
Sub-Course/Subject	1. Introduction ● The knowledge that need to be learned to ease in learning reproductive technology ● Relation between reproductive technology Course and other knowledge ● The scope of reproductive technology course and its relation in improving the genetic quality of livestock

- Recent developments in livestock reproduction technology

2. Sperm Sexing and embryo:
   - Definition and Basis of Spermatozoa and Embryo Sexing
   - Sperm Sexing Techniques
   - Sexing Using the Percoll Density Gradient Centrifugation Method (SGDP)
   - Sexing Using the Sephadex Filtration Method
   - Sexing Using Egg White Sedimentation Method
   - Embryo Sexing Method
   - Sexing Method in Chickens

3. Embryo Transfer
   - Definition, advantages and disadvantages of embryo transfer
   - History of embryo transfer
   - Selection of parent donors and recipients
   - Embryo Transfer Stages

4. Synchronization of estrus, superovulation and artificial insemination
   - Estrus Synchronization mechanism
   - The technique uses various hormones to synchronize estrus
   - The Principle of Multiple Ovulation
   - Multiple ovulation technique using GnRH
   - Multiple Ovulation Technique Using FSH and LH
   - Multiple Ovulation Technique Using PMSG and HCG
   - Artificial insemination for donors

5. Technique of collection and evaluation of embryo quality
   - Surgical Method Embryo Collection
   - Non-Surgical Method Embryo Collection
   - Embryo Quality Evaluation

6. Technique of Embryo Transfer
   - Embryo Transfer Technique
   - Problems and Constraints
   - Embryo Transfer Method
   - Implementation of Embryo Transfer

7. Embryo Transfer Implementation
   - Embryo Transfer Preparation
   - Implementation of embryo transfer in the field
   - Factors Affecting the Success of Embryo Transfer

8. In vitro oosiite maturation technology and in vitro fertilization technique
   - Objective and Principles of In Vitro Oocyte Maturation
   - In Vitro Oocyte Maturation Stages
   - Advantage of IVF in Livestock
   - Preparation of Spermatozoa

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Implementation of IVF
Post IVF Embryo Culture

9. Cryopreservation of oocytes and embryos

Objective and Method of Oocyte/Embryo Cryopreservation
Factors Affecting Oocyte and Embryo Cryopreservation Results
Oocyte Cryopreservation
Embryo Cryopreservation
Oocyte and Embryo Cryopreservation Stages

10. Technology of ELISA, RIA and USG for pregnancy detection and reproductive disorders

Elisa, Ria and Ultrasound Technology Principles for pregnancy detection
ELISA technology
RIA technology
Elisa and Ria Technology Application for Pregnancy Examination and Reproductive Disorders
Ultrasound technology
Utilization of ultrasound for pregnancy examination and reproductive disorders

11. Embryo manipulation technology

Cloning (Definition, Purpose, Technique, Strengths and weaknesses)

12. Embryo manipulation technology

Intracytoplasmic Sperm Injection (ICSI) (Definition, Objective, Technique, Advantages and Disadvantages)
Chimera (Definition, Objective, Technique, Strengths and weaknesses)
Types and Examples of Chimera Technologies

13. Reproductive technology application strategy in people's farms and the livestock industry

Determination of Reproductive Technology
Application of Artificial Insemination Technology
Embryo Transfer Application

14. Examples of research in the field of livestock reproduction
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<tr><td>References</td><td colspan="2">1. Buku Ajar Teknologi Reproduksi (Sri Wahjuningsih, at al., 2019)
2. Farm Animal Reproduction (Hafez and Hafez, 2000)</td></tr>
<tr><td rowspan="2">Learning Media</td><td>Software</td><td>Hardware</td></tr>
<tr><td>Software, Power Point, Video</td><td>Laptop, LCD, Whiteboard</td></tr>
<tr><td>Teaching Team</td><td colspan="2">1. Prof. Dr.Ir .Trinil Susilawati,MS, IPU, ASEAN Eng</td></tr>
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	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.Achadiyah Rachmawati,Spt,MP 8.Aulia Puspita Anugra Yekti,Spt,MP,Msc					
Prerequisite Courses	Reproduction Science, Reproduction Management and Artificial Insemination Courses					
Week	Sub-Course Learning Outcome	Indicator	Learning Material/Topic	Learning Method	Criteria & Form of Assessment	Weighted Score (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Students understand the scope of the course and its relation with other courses	Able to understand	Introduction ● The sciences that need to be learned to ease in learning reproductive technology Course ● Relations between course of reproductive technology and other sciences ● The scope of reproductive technology course and the relation in improving the genetic quality of livestock ● Recent developments in livestock reproduction technology	Tutorials, Presentations and Discussions	Activeness and Questions and Answers	
2	Able to understand the definition, development of sexing	Able to understand and apply	Sexing of spermatozoa and embryo: ● Definition and Basis of	Tutorials, Presentations and Discussions	Activeness and Questions and	

	techniques in the world and the development of sexing technology carried out at Brawijaya University, sexing techniques in poultry and the application of sexing in farms and applying sexing techniques with egg white gradient.		Spermatozoa and Embryo Sexing ● Spermatozoa Sexing Techniques ● Sexing Using the Percoll Density Gradient Centrifugation Method (SGDP) ● Sexing Using the Sephadex Filtration Method ● Sexing Using Egg White Sedimentation Method ● Embryo Sexing Method ● Sexing Method in Chickens		Answers	
3	Able to understand the definition, advantages, disadvantages, history and stages of Embryo Transfer, as well as selection of parent donors and recipients	Able to understand	Embryo Transfer ● Definition, advantages and disadvantages of embryo transfer ● History of embryo transfer ● Selection of parent donors and recipients ● Embryo Transfer Stages	Tutorial, Presentation and Discussion	Activeness and Questions and Answers	
4	Able to understand about Embryo Transfer, the principle of multiple ovulation, know and understand multiple ovulation techniques		Synchronization of estrus, superovulation and artificial insemination ● Estrous Synchronization Mechanism ● The technique uses various hormones to synchronize estrus ● The Principle of Multiple			

	using different hormones		Ovulation ● Multiple ovulation technique using GnRH ● Multiple Ovulation Technique Using FSH and LH ● Multiple Ovulation Technique Using PMSG and HCG ● Artificial insemination for donors			
5	Able to know and understand embryo collection techniques in live and dead cattle, evaluate embryo quality and visualize embryos according to the stages. Besides, it is also possible to apply oocyte collection, handling and evaluation techniques.	Able to understand, visualize and apply	Collection technique and evaluation of embryo quality ● Surgical Method Embryo Collection ● Non-Surgical Method Embryo Collection ● Embryo Quality Evaluation	Tutorial, Presentation and Discussion	Activeness and Questions and Answers	
6	Able to understand the techniques or methods of embryo transfer and preparation of donor or recipient cattle	Able to understand	Embryo Transfer Technique ● Embryo Transfer Technique ● Problems and Obstacle ● Embryo Transfer Method	Tutorial, Presentation and Discussion	Activeness and Questions and Answers	

			• Implementation of Embryo Transfer			
7	Able to understand about embryo transfer techniques and the factors that affect the success of TE in the field	Able to understa nd	Implementation of embryo transfer • Embryo Transfer Preparation • implementation of embryo transfer in the field • Factors Affecting the Success of Embryo Transfer	Tutorial, Presentati on and Discussio n	Activen ess and Questio ns and Answer s	
8	Able to understand the principles of in vitro oocyte maturation, the working stages of in vitro oocyte maturation, and various in vitro oocyte maturation media and the principles of implementing each of the in vitro fertilization stages.	Able to understa nd	In vitro oosiite maturation technology and in vitro fertilization technique • Objectives and Principles of In Vitro Oocyte Maturation • In Vitro Oocyte Maturation Stages • Advantages of IVF in Livestock • Preparation of Spermatozoa • Implementation of IVF • Post IVF Embryo Culture	Tutorial, Presentati on and Discussio n	Activen ess and Questio ns and Answer s	
9	MIDTERM EXAM (Written Test)					30%
10	Able to understand about the objectives and methods of Oocyte /Embryo cryopreservati on	Able to understa nd	Cryopreservation of oocytes and embryos • Objectives and Methods of Oocyte/Embryo Cryopreservation • Factors that affect Oocyte and Embryo	Tutorial, Presentati on and Discussio n		

			Cryopreservation Results ● Oocyte Cryopreservation ● Embryo Cryopreservation ● Oocyte and Embryo Cryopreservation Stages			
11	Able to understand the development of pregnancy detection technology and the basic principles and applications of pregnancy detection techniques using ELISA, RIA and USG.	Able to understand	ELISA, RIA and USG technologies for detection of pregnancy and reproductive disorders ● Elisa, Ria and Ultrasound Technology Principles for pregnancy detection ● ELISA technology ● RIA technology ● Elisa and Ria Technologies Application for Pregnancy Examination and Reproductive Disorders ● Ultrasound technology ● Utilization of ultrasound for pregnancy examination and reproductive disorders	Tutorial, Presentation and Discussion	Activeness and Questions and Answers	
12	Able to understand the definition,	Able to understand	Embryo manipulation technology	Tutorial, Presentation and	Activeness and Questio	

	objectives, techniques, advantages and disadvantages of cloning in livestock		Cloning (Definition, Purpose, Technique, Strengths and Weakness)	Discussion	ns and Answers	
13	Able to understand about the definition, objective, techniques, advantages and disadvantages of ICSI and Chimera in livestock	Able to understand	Embryo manipulation technology ● Intracytoplasmic Sperm Injection (ICSI) (Definition, Objective, Technique, Advantages and Disadvantages) ● Chimera (Definition, Objective, Technique, Strengths and weaknesses) ● Types and Examples of Chimera Technologies	Tutorial, Presentation and Discussion	Activeness and Questions and Answers	
14	Able to understand about reproductive technology application strategies in producing superior breeds, germplasm preservation, biopharmaceutical and medical therapy	Able to understand	Reproductive technology application strategy in people's farms and the livestock industry ● Determination of Reproductive Technology ● Application of Artificial Insemination Technology ● Embryo Transfer Application	Tutorial, Presentation and Discussion	Activeness and Questions and Answers	

15	Students are able to understand examples of research in the field of reproduction	Able to understa nd	Examples of research in the field of livestock reproduction	Discussio n	Activen ess and Questio ns and Answer s	
16	FINAL EXAM					30%

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	UNIVERSITY OF BRAWIJAYA FACULTY OF ANIMAL SCIENCE DEPARTMENT OF ANIMAL SCIENCE UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE		
Course	Reproduction Technology		
Score Level	CLO and PLO	Conversion	PLO Score
Program Learning Outcome 2: Able to develop comprehensive insight and mindset according to the science and field of the animal industry (LO4) Course Learning Outcome 1: Understanding animal reproductive technologies that have developed today and in the future			
Very Good (4)	Showing a **comprehensive** understanding of concepts related to livestock reproduction technologies that have developed today and in the future	>80-100	1
Good (3)	Showing a **good** understanding of concepts related to livestock reproduction technologies that have developed today and in the future	>70-80	0.75
Moderate (2)	Showing **limited** understanding of concepts related to livestock reproduction technologies that have developed today and in the future	>60-70	0.5
Poor (1)	Showing **very limited** understanding of concepts related to livestock reproduction technologies that have developed today and in the future	≤60	0.25
Score Level	CLO and PLO	Conversion	PLO Score
Program Learning Outcome 2: Able to develop comprehensive insight and mindset according to the science and field of the animal industry (LO4) Course Learning Outcome 2: Understand the role of reproductive technology in improving the genetic quality of livestock and livestock productivity			
Very Good (4)	Showing **a comprehensive** understanding of concepts related to the role of reproductive technology in improving the genetic quality of livestock and livestock productivity	>80-100	1
Good (3)	Showing **a good** understanding of concepts related to the role of reproductive technology in improving the genetic quality of livestock and livestock productivity	>70-80	0.75

Moderate (2)	Showing **limited** understanding of concepts related to the role of reproductive technology in improving the genetic quality of livestock and livestock productivity	>60-70	0.5
Poor (1)	Showing **very limited** understanding of concepts related to the role of reproductive technology in improving the genetic quality of livestock and livestock productivity	≤60	0.25
Score Level	CLO and PLO	Conversion	PLO Score
Program Learning Outcome 1: 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 (LO5) Course Learning Outcome 3: Knowing and understanding the basic principles and applications of spermatozoa and embryo sexing techniques, embryo transfer, in vitro fertilization, embryo manipulation (cloning), chimeras, transgenic and embryonic steam cells.			
Very Good (4)	Showing **a comprehensive** understanding of concepts related to the basic principles and applications of spermatozoa and embryo sexing techniques, embryo transfer, in vitro fertilization, embryo manipulation (cloning), chimeras, transgenic and embryonic steam cell.	>80-100	1
Good (3)	Demonstrate **a good** understanding of concepts related to the basic principles and applications of spermatozoa and embryo sexing techniques, embryo transfer, in vitro fertilization, embryo manipulation (cloning), chimeras, transgenic and embryonic steam cell.	>70-80	0.75
Moderate (2)	Demonstrate **limited** understanding of concepts related to the basic principles and applications of spermatozoa and embryo sexing techniques, embryo transfer, in vitro fertilization, embryo manipulation (cloning), chimeras, transgenic and embryonic steam cell.	>60-70	0.5
Poor (1)	Demonstrate **very limited** understanding of concepts related to the basic principles and applications of spermatozoa and	≤60	0.25

	embryo sexing techniques, embryo transfer, in vitro fertilization, embryo manipulation (cloning), chimeras, transgenic and embryonic steam cell.		
Program Learning Outcome 1: 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 (LO5) Course Learning Outcome 4: Able to apply the principles of gamete and embryo manipulation techniques correctly			
Very Good (4)	Showing a **comprehensive** conceptual understanding of the principles of gamete and embryo manipulation techniques	>80-100	1
Good (3)	Showing a **good** conceptual understanding of the principles of gamete and embryo manipulation techniques	>70-80	0.75
Moderate (2)	Showing **limited** conceptual understanding of the principles of gamete and embryo manipulation techniques	>60-70	0.5
Poor (1)	Showing **very limited** conceptual understanding of the principles of gamete and embryo manipulation techniques	≤60	0.25
Program Learning Outcome 3: Able to design and conduct experiments, analyze and interpret data to make correct decisions in solving problems in the field of animal science, meet ethics, and have environmental insight (LO12) Course Learning Outcome 5: Preparing students for research in the field of livestock reproduction			
Very Good (4)	Showing a **comprehensive** understanding of concepts related to research in the field of livestock reproduction	>80-100	1
Good (3)	Showing **good** understanding of concepts related to research in the field of livestock reproduction	>70-80	0.75
Moderate (2)	Showing **limited** understanding of concepts related to research in the field of livestock reproduction	>60-70	0.5
Poor (1)	Showing **very limited** understanding of concepts related to research in the field of livestock reproduction	≤60	0.25

Counting 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 Technology	Code:	RMK:	Semester: 6

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 (Explain the description needed about this course, experiences that have been conducted)

This course discusses sexing technology then embryo transfer that includes estrus synchronization, multiple ovulation/super ovulation, in vivo fertilization, in vitro fertilization, embryo manipulation, cloning, nuclear transfer and the application of reproductive technology. In addition, students are required to take part in practice to achieve competency regarding gamete and embryo manipulation techniques.

1	**Objectives** (Describe general and specific course objectives)
	1. To understand about livestock reproduction technologies that have developed today and in the future 2. To understand the role of reproductive technology in improving the genetic quality of livestock and livestock productivity 3. To know and understand the basic principles and applications of spermatozoa and embryo sexing techniques, embryo transfer, in vitro fertilization, embryo manipulation (cloning), chimeras, transgenic and embryonic steam cells. 4. Able to apply the principles of gamete and embryo manipulation techniques correctly 5. To prepare the students to make research in the field of livestock reproduction
2	**Learning Strategy** (Describe the strategies used to achieve course objectives - Course Learning Outcome/CLO)
	The learning strategies conducted in lectures are giving lectures, discussions, structured assignments, quizzes, and group presentations
3	**Lecture Management** (Explain the lecture management: lectures, tutorials, practicum, assignments, major assignments, etc.)

	1) Lecture: 100 minutes/ meeting (14 meetings) 2) Practicum 50 minutes/ meeting (14 meetings) 3) Structured Assignments and quiz/Group Presentation *4)* Attendance: 80% of total attendance
4	**Lecture Materials** (explain the suitability with the applicable curriculum)
	1. Introduction ● The sciences that need to be learned to ease in learning reproductive technology course ● Relation between reproductive technology Course and other sciences ● The scope of reproductive technology course and its relation in improving the genetic quality of livestock ● Recent developments in livestock reproduction technology 2. Sexing of spermatozoa and embryos: ● Definition and Basis of Spermatozoa and Embryo Sexing ● Spermatozoa Sexing Techniques ● Sexing Using the Percoll Density Gradient Centrifugation Method (SGDP) ● Sexing Using the Sephadex Filtration Method ● Sexing Using Egg White Sedimentation Method ● Embryo Sexing Method ● Sexing Method in Chickens 3. Embryo Transfer ● Definition, advantages and disadvantages of embryo transfer ● History of embryo transfer ● Selection of parent donors and recipients ● Embryo Transfer Stages 4. Synchronization of estrus, superovulation and artificial insemination ● Estrous Synchronization Mechanism ● The technique uses various hormones to synchronize estrus ● The Principle of Multiple Ovulation ● Multiple ovulation technique using GnRH ● Multiple Ovulation Technique Using FSH and LH ● Multiple Ovulation Technique Using PMSG and HCG ● Artificial insemination for donors 5. Collection technique and evaluation of embryo quality ● Embryo Collection of Surgical Method ● Non-Surgical Method Embryo Collection ● Embryo Quality Evaluation 6. Embryo Transfer Technique ● Embryo Transfer Technique

	● Problems and Constraints ● Embryo Transfer Method ● Implementation of Embryo Transfer 7. Implementation of embryo transfer ● Embryo Transfer preparation ● Implementation of embryo transfer in the field ● Factors Affecting the Success of Embryo Transfer 8. Technology of In vitro oosiite maturation and in vitro fertilization technique ● Objectives and Principles of In Vitro Oocyte Maturation ● In Vitro Oocyte Maturation Stages ● Benefits of IVF in Livestock ● Preparation of Spermatozoa ● Implementation of IVF ● Post IVF Embryo Culture 9. Cryopreservation of oocytes and embryos ● Objectives and Methods of Oocyte/Embryo Cryopreservation ● Factors Affecting Oocyte and Embryo Cryopreservation Results ● Oocyte Cryopreservation ● Embryo Cryopreservation ● Oocyte and Embryo Cryopreservation Stages 10. Technology of ELISA, RIA and USG for detection of pregnancy and reproductive disorders ● Technology OF Elisa, Ria and Ultrasound Principles for pregnancy detection ● ELISA technology ● RIA technology ● Elisa and Ria Technologies Application for Pregnancy Examination and Reproductive Disorders ● Ultrasound technology ● Utilization of ultrasound for pregnancy examination and reproductive disorders 11. Embryo Manipulation Technology ● Cloning (Definition, Objectives, Techniques, Strengths and Weaknesses) 12. Embryo Manipulation Technology ● Intracytoplasmic Sperm Injection (ICSI) (Definition, Objective, Technique, Advantages and Disadvantages) ● Chimera (Definition, Objective, Technique, Strengths and weaknesses) ● Types and Examples of Chimera Technologies 13. Reproductive technology application strategy in people's farms and the livestock industry ● Determination of Reproductive Technology

	● Application of Artificial Insemination Technology ● Embryo Transfer Application 14. Examples of research in the field of livestock reproduction
5	**Lecture Participants** (provide an overview of the lecture participants)
	The course participants are 6th semester students who have passed the Reproduction Management and AI courses
6	**Attendance Percentage** (% attendance of lecturers; % attendance of students)
	Lecturer attendance percentage: 100% Student attendance percentage: at least 80%
7	**Evaluation System** (explain homework, quizzes, group assignments, practicum, etc.)
	Midterm-test: 35% Final Exam:35 % Practicum Exam: 20% Structured Assignment/quiz: 20%
8	**Class Observation** (explain important and interesting things encountered during the lecture)
	The activeness in discussion
9	**Learning Outcome** (explain the outcome of the goals that have been set, including learning outcome that can be explained)
	1. 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 (LO5) 2. Able to develop comprehensive insight and mindset according to the science and field of the animal industry (LO4) 3. Able to design and conduct experiments, analyze and interpret data to make correct decisions in solving problems in the field of animal science, meet ethics, and have environmental insight (LO12)
10	**Obstacles** (give an overview of the main obstacles to learning)
	Facilities for practicum are inadequate, thus, practicum is mostly conducted on a demonstration basis. Besides, there are no adequate facilities to carry out embryo maturation and IVF practicum, delay in disbursement of practicum funds. Also, there are no livestock facilities for practicum, especially for cement storage and embryo transfer.
11	**Score Distribution** (provide the score distribution along with the learning achievements of this course)
	Midterm-test: 35% Final Exam:35 % Practicum Exam: 20% Structured Assignment/quiz: 20%
12	**Conclusion**

	In general, the implementation of the Reproductive Technology course learning can run well according to plan, but it is necessary to increase laboratory facilities, funding and availability of livestock to support practicum activities.
13	**Improvement Recommendations**
	1. Laboratory facilities addition 2. Funding for practicum on time 3. Procurement of livestock facilities for practicum
	Appendices:
	1. 2. etc.