

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

Course		Code	Weight (cre	edits)	Semester	С	ompilation Date
Reproduction Tecl	hnology			25/08/2020			
Authorization		Cours	se Coordinator		Undergraduate Stud of Animal Science		Vice Dean 1
		Dr. Ir. Sr M.Si	i Wahjuningsih,		Evanuarini, S.Pt, N		Dr.Ir. Halim Natsir, MP ASEAN Eng
Learning	PLO			•			
Outcome (LO)	2. 4 3. 4	science and with their or oduce ex Able to deviceld of the Able to descorrect decorrect decorrec	d technology that c expertise based on cellent solutions as velop comprehensi animal industry (I sign and conduct exisions in solving p	onsider and scientific produced the produced	development or imple apply humanities vinciples, procedure (25) and mindset according analyze and interpretable field of animal states.	values, ar	es in accordance and ethics to the science and ata to make
			nvironmental insig	ht (LO12)			
Brief Course Description	1. 2. 3. 4. 5. This cousynchron fertilizat reproductions are supported to the control of the course	Understand current and Understand quality of Knowing a and embry manipulati Able to ap correctly (Preparing urse begin nization, a ion, emb	d future (LO4) ding the role of rep livestock and lives and understanding to sexing technique ion (cloning), chim ply the principles of LO5) students for research s with Sexing technique multiple ovulation ryo manipulation hology. Besides, st	productive to tock produce the basic press, embryo the eras, transgoff gamete are chain the fiesthology that super over cloning, and conting,	cive technology that echnology in impro- ectivity (LO4) inciples and applications and embryonic enic and embryonic embryo manipulation transfer required to attendation techniques.	ving ation tiliza steration oduc r tha ferti- and prace	s the genetic as of spermatozoa ation, embryo am cells (LO5) a techniques etion (LO12) at includes estrus lization, in vitro l application of eticum to achieve
Sub-Course/Subj ect	1. Intro	duction The know technology Relation b The scope	v etween reproductiv	ve technolog	rned to ease in l gy Course and other course and its relat	r kno	owledge

- 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

	 Implementation of IVF 	
	Post IVF Embryo Culture	e
	9. Cryopreservation of oocytes a	•
	 Objective and Method of 	COocyte/Embryo Cryopreservation
	 Factors Affecting Oocyte 	and Embryo Cryopreservation Results
	 Oocyte Cryopreservation 	
	Embryo Cryopreservation	n
	 Oocyte and Embryo Cryo 	opreservation Stages
	10. Technology of ELISA, RIA a	nd USG for pregnancy detection and reproductive
	disorders	
	 Elisa, Ria and Ultrasound 	d 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
		1 0 1
	11. Embryo manipulation techno	logy
	* *	pose, Technique, Strengths and weaknesses)
	12. Embryo manipulation techno	logy
	•	Injection (ICSI) (Definition, Objective, Technique,
	Advantages and Disadva	
	<u> </u>	jective, Technique, Strengths and weaknesses)
	Types and Examples of C	
	Types with Enthingress of G	2
	 13 Reproductive technology app	lication strategy in people's farms and the livestock
	industry	meation strategy in people's familia and the investocit
	Determination of Reprod	Juctive Technology
	^	Insemination Technology
	Embryo Transfer Applica	
	Emoryo Transici Applica	mon
	14. Examples of research in the f	ield of livestock reproduction
	17. Examples of research in the f	icid of fivestock reproduction
References	1 Buku Ajar Teknologi Reprodul	ksi (Sri Wahjuningsih, at al., 2019)
11010101005	2. Farm Animal Reproduction (H	
Learning Media	Software	Hardware
	Software, Power Point, Video	Laptop, LCD, Whiteboard
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Teaching Team	1. Prof. Dr.Ir .Trinil Susilawati,M	IS, IPU, ASEAN Eng

Prerequisite Courses Week	Lea Out	3. Prof. I 4. Prof. I 5. Dr.Ir. I 6. Dr.Ir. I 7. Dr.Ac 8.Aulia I Reprodu Course	Or.Ir. Muhai Or.Ir. Woro Nurul Isnain Sri Wahyun hadiyah Rad Puspita Anu ction Sciend	mmad Ni busono,N ni,MP ingsih,M chmawat gra Yekt ce, Repro	isi i,Spt,MP i,Spt,MP,Msc oduction Managemen	nt and Artific Learning Method	Criteria & Form of Assess ment	Weighted Score (%)
(1)		(2)	(3)	T .	(4)	(5)	(6)	(7)
	its rela with o course	stand ope of urse and ation ther es	Able to understa nd	Introdu	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, Presentati ons and Discussio ns	Activen ess and Questio ns and Answer s	
2		stand finition, opment	Able to understa nd and apply	Sexing and em	of spermatozoa bryo: Definition and Basis of	Tutorials, Presentati ons and Discussio ns	Activen ess and Questio ns and	

					1		,
	techniques in			Spermatozoa and		Answer	
	the world and			Embryo Sexing		S	
	the		•	Spermatozoa			
	development			Sexing			
	of sexing			Techniques			
	technology		•	Sexing Using the			
	carried out at			Percoll Density			
	Brawijaya			Gradient			
	University,			Centrifugation			
	sexing			Method (SGDP)			
	techniques in		•	Sexing Using the			
	poultry and			Sephadex			
	the			Filtration Method			
	application of		•	Sexing Using			
	sexing in			Egg White			
	farms and			Sedimentation			
	applying			Method			
	sexing		•	Embryo Sexing			
	techniques			Method			
	with egg		•	Sexing Method in			
	white			Chickens			
	gradient.						
3	Able to	Able to	Embry	o Transfer	Tutorial,	Activen	
	understand	understa	•	Definition,	Presentati	ess and	
	the definition,	nd		advantages and	on and	Questio	
	advantages,			disadvantages of	Discussio	ns and	
	disadvantages			embryo transfer	n	Answer	
	, history and		•	History of		S	
	stages of			embryo transfer			
	Embryo			Selection of			
	Transfer, as						
	11			parent donors and			
1				recipients			
1	selection of		•	Embryo Transfer			
	parent donors			Stages			
	and recipients						
4	Able to		Synchr	onization of estrus,			
	understand		-	vulation and			
	about Embryo			al insemination			
	Transfer, the			Estrous			
	principle of			Synchronization			
	multiple			Mechanism			
			•	The technique			
	ovulation,			uses various			
	know and			hormones to			
	understand			synchronize			
	multiple			estrus			
	ovulation		•	The Principle of			
	techniques			Multiple			
L	1			L .			l .

	using different hormones		Ovulation Multiple ovulation technique using GnRH Multiple Ovulation Technique Using FSH and LH Multiple Ovulation Technique Using FSH and LH Autiple 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 understa nd, visualize and apply	Collection technique and evaluation of embryo quality • Surgical Method Embryo Collection • Non-Surgical Method Embryo Collection • Embryo Quality Evaluation	Tutorial, Presentati on and Discussio n	Activen ess and Questio ns and Answer s	
6	Able to understand the techniques or methods of embryo transfer and preparation of donor or recipient cattle	Able to understa nd	Embryo Transfer Technique	Tutorial, Presentati on and Discussio n	Activen ess and Questio ns and Answer s	

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 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 EX	AM (Writte	en 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 understa nd	ELISA, RIA and USG technologies for detection of pregnancy and reproductive disorders	Tutorial, Presentati on and Discussio n	Activen ess and Questio ns and Answer s	
12	Able to understand the definition,	Able to understa	Embryo manipulation technology	Tutorial, Presentati on and	Activen ess and Questio	

	objectives, techniques, advantages and disadvantages of cloning in livestock		Cloning (Definition, Purpose, Technique, Strengths and Weakness)	Discussio n	ns and Answer s	
13	Able to understand about the definition, objective, techniques, advantages and disadvantages of ICSI and Chimera in livestock	Able to understa nd	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, Presentati on and Discussio n	Activen ess and Questio ns and Answer s	
14	Able to understand about reproductive technology application strategies in producing superior breeds, germplasm preservation, biopharmaceu tical and medical therapy	Able to understa nd	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, Presentati on and Discussio n	Activen ess and Questio ns and Answer s	

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

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	FACULTY OF ANIMAL SCIENCE						
	DEPARTMENT OF ANIMAL SCIENCE	E ANIMAI SCIENC	E				
Course	UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE Population Technology						
Score Level	Reproduction Technology CLO and PLO	Conversion	PLO Score				
	ning Outcome 2: Able to develop comprehe		PLO Score				
	ling to the science and field of the animal ind						
illinuset accord	ing to the science and field of the animal ind	iustry (LO4)					
Course Learn	ning Outcome 1: Understanding anir	mal reproductive					
	at have developed today and in the future	nai reproductive					
Very Good		>80-100	1				
(4)	of concepts related to livestock	7 00-100	1				
(4)	reproduction technologies that have						
	developed today and in the future						
Good (3)	Showing a good understanding of	>70-80	0.75				
3004 (3)	concepts related to livestock reproduction	70 00	0.75				
	technologies that have developed today						
	and in the future						
Moderate (2)	Showing limited understanding of	>60-70	0.5				
(-)	concepts related to livestock reproduction						
	technologies that have developed today						
	and in the future						
Poor (1)	Showing very limited understanding of	≤60	0.25				
	concepts related to livestock reproduction						
	technologies that have developed today						
	and in the future						
Score Level	CLO and PLO	Conversion	PLO Score				
Program Learn	ing Outcome 2: Able to develop comprehe	nsive insight and					
mindset accord	ling to the science and field of the animal ind	lustry (LO4)					
Course Learn	ing Outcome 2: Understand the role	of reproductive					
<i>C</i> 3	improving the genetic quality of livestoe	ck and livestock					
productivity							
Very Good	Showing a comprehensive	>80-100	1				
(4)	understanding of concepts related to the						
	role of reproductive technology in						
	improving the genetic quality of livestock						
	and livestock productivity						
Good (3)	Showing a good understanding of	>70-80	0.75				
	concepts related to the role of						
	reproductive technology in improving the						
	genetic quality of livestock and livestock						
	productivity						

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
development of apply humaniscientific principles and embryo transf	r implementation of science and technology ties values in accordance with their experiples, procedures, and ethics to produce experiples, procedures, and ethics to produce experiples. So in a Court of St. Knowing and understate applications of spermatozoa and embryo se in vitro fertilization, embryo maniput agenic and embryonic steam cells.	that consider and pertise based on scellent solutions anding the basic exing techniques,	
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

		1	1
	embryo sexing techniques, embryo		
	transfer, in vitro fertilization, embryo		
	manipulation (cloning), chimeras,		
	transgenic and embryonic steam cell.		
	ning Outcome 1: Able to examine the im		
	r implementation of science and technology		
	ties values in accordance with their exp		
-	ciples, procedures, and ethics to produce ex	xcellent solutions	
and ideas (LOS	o)		
		C 1	
	ng Outcome 4: Able to apply the principle	es of gamete and	
	ulation techniques correctly	. 00 100	1
Very Good	1 1	>80-100	1
(4)	understanding of the principles of gamete		
C 1(2)	and embryo manipulation techniques	. 70.00	0.75
Good (3)	Showing a good conceptual	>70-80	0.75
	understanding of the principles of gamete		
M - 1 - 1 - (2)	and embryo manipulation techniques	> (0.70	0.5
Moderate (2)	Showing limited conceptual	>60-70	0.5
	understanding of the principles of gamete		
D (1)	and embryo manipulation techniques	<0	0.25
Poor (1)	Showing very limited conceptual	≤60	0.25
	understanding of the principles of gamete		
Dragram I sam	and embryo manipulation techniques	lust averaging anta	
	ning Outcome 3: Able to design and condeterpret data to make correct decisions in sol	± '	
	nimal science, meet ethics, and have envir		
(LO12)	minar science, meet etines, and have envir	Omnemai msigni	
(LO12)			
Course Learnin	ng Outcome 5: Preparing students for resear	ch in the field of	
livestock repro		en in the neta of	
Very Good		>80-100	1
(4)	of concepts related to research in the field	> 00-100	
	of livestock reproduction		
Good (3)	Showing good understanding of concepts	>70-80	0.75
0004 (3)	related to research in the field of	, 0 00	0.75
	livestock reproduction		
Moderate (2)	Showing limited understanding of	>60-70	0.5
(=)	concepts related to research in the field of		
	livestock reproduction		
Poor (1)	Showing very limited understanding of	≤60	0.25
	concepts related to research in the field of		
	livestock reproduction		

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:	-	Code:	RMK:	Semester: 6		
Reproduction						
Technology						
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. Pr	of. 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 (H		the description needed a	• •	ces that have been		
conducted)		1	, 1			

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)			
l	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)			
0	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			
11	transfer.			
11	Score Distribution (provide the score distribution along with the learning achievements			
ļ	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				
	Laboratory facilities addition				
	2. Funding for practicum on time				
	3. Procurement of livestock facilities for practicum				
	Appendices:				
	1.				
	2.				
	etc.				