MODULE HANDBOOK DOCTORAL PROGRAM OF ANIMAL SCIENCE UNIVERSITAS BRAWIJAYA

## **COMPULSORY COURSES**

Modu Code PEF9		Student workload 352 hours	<b>Cre</b> 3 SC		Semes 1st Sen		<b>Frequency</b> Each Semester	<b>Duration</b> 1 semester			
1.	Types of c	ourses		<b>Contac</b> 48 hour	<b>t hours</b> rs	Inde study 304 h	pendent V	<b>Class size</b> 10-15 students			
						hour: Indep	nment 136				
2.	Prerequisi	tes for particip	ation	1				l			
3.	Learning o										
	<ul> <li>Students are able to think critically, creatively and analyze the truth of theories based on the philosophy of science.</li> </ul>										
		-				owledg	e gained and	d make deductiv			
		d inductive con				owieug	e gamea an				
	• Stu	idents are abl	e to p	orepare	proposals	and o	dissertation	research report			
		cording to their			•						
				•				pers, and have			
1.		nmitment to no	orms a	ind ethic	s in scient	tific stu	dies.				
1.	This course science an reasoned	d theory of tru deductively ar	uth, de nd ind	escribing uctively,	critical t understa	hinking anding	g-analysis of the nature	the philosophy of knowledge to b and meaning of			
		research, as well as strategies for preparing proposals and research reports that are reliable based on the principles of writing scientific papers that are good and right.									
2.	Teaching n		leipies	or writen	ig scientii	ic pape		oou and right.			
	1. Speech	l									
		t Base Learning	S								
		ase Learning									
5.		Discussion nt methods									
5.		lual work									
	2. Group										
6.	-	le/course is us	ed in t	he follov	ving study	/ progr	amme/s as v	vell			
7.		ility for module	e/cour	se							
		of.Dr.Ir.Hendra		-		_					
		of.Dr.Sc.Ir agr,I	-			Eng					
0		Ir. Osfar Sofjan				Math	ode and Teel	hniquog Nour A-			
8.		.Kothari. 2004 ernarional Lim					ous and Tec	hniques. New Ag			
							h Pengantar	· Populer.			
			umantri. 2007. Filsafat Ilmu: Sebuah Pengantar Populer. Harapan. Jakarta.								
		h. Nazir. 2014.			tian. Pene	erbit Gh	alia. Jakarta				

	ıle/Course	Student	Cred		Semes		Frequency		
Code	22001	workload	3 SC	U	1st Sen	nester	Each	1 semester	
	93001 Tomo o fo	352 hours		Carataat		Trada	Semester	Class size	
4.	<b>Types of courses</b> Compulsory Course			<b>Contact</b> 48 hours		study 304 h Struc assig hours Indep	nours tural nment 136	10-15 students	
5.	Prerequisit	tes for particip	ation						
6.	ILO 2: Mas intervene i ILO 3: Abl transdiscip mission of ILO 4: Able macro leve ILO 5: Fin- developme	e to intervene i ster the theore ts issues e to expand a plinary approa DAS. to contribute el through anin d or develop ent and apply	etical pl and de aches t in the f nal scie scientif of scie	hilosophy epen nev o contril ormulation nce deve ic theori nce and/	y of anim w anima oute to on of poli lopment es/conce or techn	nal scien l scien the acl icies in eptions iology	nce field wh ce theory th nievement o regard to soo /ideas, and o in the field o	ich is relevant t rough multi an f the vision an cial welfare at th contribute to th of animal science eative thinking	
3.	Subject ain		uologie	es, iogica	i, ci itical,	, syster	liatic, allu ci e		
	This course in the form reviewing supports h research p	e is presented n of short rese scientific articl nis dissertatio roposal, and [4 t for one semes	earch to es acco n resea ] analy	o improv rding to t arch, [3] zed the d	e their a the specific compile ata and c	bility t fied top ed the compile	o do the follo bic, [2] labora results of th ed a report. T	gram by researc owing things: [1 tory analysis tha ne review into his course will b pective promoter	
4.	Teaching n								
	9. Speech 10. Project	Base Learning	5						
13.	Assessmen	it methods lual work							
14.		le/course is us	ed in tl	ne follow	ing study	y progr	amme/s as w	<i>v</i> ell	
15.	Responsibi 4. Pro 5. Pro 6. Pro 7. Pro	ility for modul of. Dr. Ir. Siti Ch of. Dr. Ir. Kusm of. Dr. Ir. Hendu of. Dr. Ir. Hartu	nuzaem artono rawan S tik, MP	i, MS.IPU Soetanto,	M.Rur.So	с.			
16.		o <u>f. Dr. Ir. Ifar Su</u> urch D.C. and F				naimal	Nutrition and	d Feedingg	
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5.	Church, D.C. 1976. Digestive Physiology and Nutritin of Ruminant. Vol. 1:
	Digestive Physiology. 2nd Ed. Metropolitan Printing Co. Corvalilis, OR
6.	Chuzaemi, S. 2012. Fisiologi Nutrisi Ruminansia. Universitas Brawijaya Press.
	Malang
7.	Devendra, C. 1993. Sustainable animal production from small farm system in
	south-East asia FAO animal production and health paper 106. FAO Rome
8.	Hobson, P.N., C.S. Stewart, 1997. The Rumen Microbial Ecosystem. St.
	Edmundsbury Press Great Britain
9.	Ifar, S. 1996. Relevance of Ruminant Upland Mixed-Farming System in East
	Java. Indonesia. Animal Production System Department. Wageningen
	University. The Netherlands
10	. McDonald, P., R. Edwards and J. Greenhalgh. 2002. Animal Nutrition. 6th
	Edition. New York
11	. Orskov E.R., 1982. Protein Nutrition ini Ruminants, London. Academic Press
	Inc. 1982
12	Roeleved, 1998. Focusing Livestock Systems Research. KTLV. Amsterdam. The
	Netherlands
13	8. Van Soest, P.J. 1994. Nutritional Ecology of the Ruminant.

Modu	ule/Course	Student		echnology dits	edits Semeste		Frequency	7	Duration	
Code		workload	3 SC		1 <sup>st</sup> sem		Each		1 semester	
PET 94001		352 hours				00001	semester		1 bennester	
1.	Types of c				hours	Independent		Cl	ass size	
	Compulsor			48 hours		study		10-15 students		
	<b>r</b>	<b>J</b>				304 ł				
2.	Prerequisi	tes for participa	ation							
	-	1 1								
3.	Learning o	utcomes								
	-	master the bas	sic cor	ncepts of a	animal pr	oduct	technology s	tud	ies Processin	
	and pr	oduct design								
	2. Able to	o apply strategi	ies in	optimizir	ng proces	sing p	rocesses, and	d u	nderstand the	
	mecha	nism of compor	nent ir	nteraction	to increa	ase pro	duct added v	valı	ıe	
		o communicate	e scie	ntific wo	rk relate	ed to t	he study of	f ar	nimal produc	
	techno									
4.	Subject aims/content									
	This course discusses about the basic concept of animal product technology and its									
	developme	ent includes the	imple	ementatio	n of hurd	lle tech	nology as th	e pi	rinciple of	
	developme preserving	ent includes the ganimal produc	imple ts. Th	ementatio e product	on of hurd develop	lle tech ment n	nology as th techanism in	e pi iclu	rinciple of des the basic	
	developme preserving concept of	ent includes the ganimal produc the occurrence	imple ts. Th of ba	ementatio e product sic pheno:	on of hurd develop mena of i	lle tech ment n interac	nology as th nechanism in tion of anima	e pi iclu al pi	rinciple of des the basic roduct	
	developme preserving concept of componen	ent includes the ganimal produc the occurrence ts so that an op	imple ts. Th of ba timal	ementatio e product sic pheno product is	n of hurd develop mena of i s produce	lle tech ment n interac ed, botl	nology as th nechanism in tion of anima n product an	e pr iclu al pr d pr	rinciple of des the basic roduct rocess. The	
	developme preserving concept of componen interaction	ent includes the ganimal produc the occurrence ts so that an op of bioactive co	imple ts. Th of bas timal mpon	ementatio e product sic pheno product is tents deriv	n of hurd develop mena of i s produce	lle tech ment n interac ed, botl	nology as th nechanism in tion of anima n product an	e pr iclu al pr d pr	rinciple of des the basic roduct rocess. The	
	developme preserving concept of componen interaction functional	ent includes the ganimal produc the occurrence ts so that an op of bioactive co success of the p	imple ts. Th of bas timal mpon	ementatio e product sic pheno product is tents deriv	n of hurd develop mena of i s produce	lle tech ment n interac ed, botl	nology as th nechanism in tion of anima n product an	e pr iclu al pr d pr	rinciple of des the basic roduct rocess. The	
5.	developme preserving concept of componen interaction functional Teaching n	ent includes the ganimal product the occurrence ts so that an op of bioactive co <u>success of the p</u> nethods	imple ts. Th of bas timal mpon	ementatio e product sic pheno product is tents deriv	n of hurd develop mena of i s produce	lle tech ment n interac ed, botl	nology as th nechanism in tion of anima n product an	e pr iclu al pr d pr	rinciple of des the basic roduct rocess. The	
5.	developme preserving concept of componen interaction functional Teaching n 1. Speech	ent includes the ganimal produc the occurrence ts so that an op of bioactive co success of the p nethods	imple its. Th of bas timal ompon oroduo	ementatio e product sic pheno product is tents deriv	n of hurd develop mena of i s produce	lle tech ment n interac ed, botl	nology as th nechanism in tion of anima n product an	e pr iclu al pr d pr	rinciple of des the basic roduct rocess. The	
5.	developme preserving concept of componen interaction functional Teaching n 1. Speech 2. Project	ent includes the ganimal produc the occurrence ts so that an op of bioactive co <u>success of the p</u> nethods t Base Learning	imple its. Th of bas timal ompon oroduo	ementatio e product sic pheno product is tents deriv	n of hurd develop mena of i s produce	lle tech ment n interac ed, botl	nology as th nechanism in tion of anima n product an	e pr iclu al pr d pr	rinciple of des the basic roduct rocess. The	
5.	developme preserving concept of componen interaction functional Teaching m 1. Speech 2. Project 3. Case B	ent includes the ganimal produc the occurrence ts so that an op of bioactive co <u>success of the p</u> nethods t Base Learning ase Learning	imple its. Th of bas timal ompon oroduo	ementatio e product sic pheno product is tents deriv	n of hurd develop mena of i s produce	lle tech ment n interac ed, botl	nology as th nechanism in tion of anima n product an	e pr iclu al pr d pr	rinciple of des the basic roduct rocess. The	
	developme preserving concept of componen interaction functional Teaching m 1. Speech 2. Project 3. Case B 4. Group	ent includes the ganimal product the occurrence ts so that an op of bioactive co success of the p nethods t Base Learning ase Learning Discussion	imple its. Th of bas timal ompon oroduo	ementatio e product sic pheno product is tents deriv	n of hurd develop mena of i s produce	lle tech ment n interac ed, botl	nology as th nechanism in tion of anima n product an	e pr iclu al pr d pr	rinciple of des the basic roduct rocess. The	
5.	developme preserving concept of componen interaction functional Teaching n 1. Speech 2. Project 3. Case B 4. Group	ent includes the ganimal produc the occurrence ts so that an op of bioactive co <u>success of the p</u> nethods t Base Learning ase Learning Discussion at methods	imple its. Th of bas timal ompon oroduo	ementatio e product sic pheno product is tents deriv	n of hurd develop mena of i s produce	lle tech ment n interac ed, botl	nology as th nechanism in tion of anima n product an	e pr iclu al pr d pr	rinciple of des the basic roduct rocess. The	
	developme preserving concept of componen interaction functional Teaching m 1. Speech 2. Project 3. Case B 4. Group Assessmen 1. Scienti	ent includes the ganimal product the occurrence ts so that an op of bioactive co success of the p nethods t Base Learning Discussion nt methods fic article(s)	imple its. Th of bas timal ompon oroduo	ementatio e product sic pheno product is tents deriv	n of hurd develop mena of i s produce	lle tech ment n interac ed, botl	nology as th nechanism in tion of anima n product an	e pr iclu al pr d pr	rinciple of des the basic roduct rocess. The	
5.	developme preserving concept of componen interaction functional Teaching m 1. Speech 2. Project 3. Case B 4. Group Assessmen 1. Scienti 2. Presen	ent includes the ganimal product the occurrence ts so that an op of bioactive co success of the p nethods t Base Learning Discussion t methods fic article(s) tation	imple its. Th of bas timal ompon oroduc	ementatio e product sic pheno: product is nents deriv ct	n of hurd develop mena of i s produce ved from	lle tech ment n interac ed, botl food a	nology as th nechanism in tion of anima n product an dditives so a	e pr nclu al p d pr s to	rinciple of des the basic roduct rocess. The support the	
	developme preserving concept of componen interaction functional Teaching n 1. Speech 2. Project 3. Case B 4. Group Assessmen 1. Scienti 2. Presen This modu	ent includes the ganimal product the occurrence ts so that an op of bioactive co success of the p nethods t Base Learning ase Learning <u>Discussion</u> nt methods fic article(s)	imple its. Th of bas timal ompon oroduc	ementatio e product sic pheno: product is nents deriv ct	n of hurd develop mena of i s produce ved from	lle tech ment n interac ed, botl food a	nology as th nechanism in tion of anima n product an dditives so a	e pr nclu al p d pr s to	rinciple of des the basic roduct rocess. The support the	
5.	developme preserving concept of componen interaction functional Teaching m 1. Speech 2. Project 3. Case B 4. Group Assessmen 1. Scienti 2. Presen This modu N/A	ent includes the ganimal product the occurrence ts so that an op of bioactive co success of the p nethods t Base Learning Discussion at methods fic article(s) tation le/course is use	imple ts. Th of ba timal mpon oroduc	ementatio e product sic pheno product is tents deriv ct	n of hurd develop mena of i s produce ved from	lle tech ment n interac ed, botl food a	nology as th nechanism in tion of anima n product an dditives so a	e pr nclu al p d pr s to	rinciple of des the basic roduct rocess. The support the	
5.	developme preserving concept of componen interaction functional Teaching m 1. Speech 2. Project 3. Case B 4. Group Assessmen 1. Scienti 2. Presen This modu N/A Responsib	ent includes the ganimal product the occurrence ts so that an op of bioactive co success of the p nethods t Base Learning Discussion nt methods fic article(s) tation le/course is use	imple its. Th of bas timal oroduc	ementatio e product sic pheno: product is nents deriv ct	n of hurd develop mena of i s produce ved from	lle tech ment n interac ed, botl food a	nology as th nechanism in tion of anima n product an dditives so a	e pr nclu al p d pr s to	rinciple of des the basic roduct rocess. The support the	
5. 6. 7.	developme preserving concept of componen interaction functional Teaching m 1. Speech 2. Project 3. Case B 4. Group Assessmer 1. Scienti 2. Presen This modu N/A Responsib Prof. Dr.Ir.	ent includes the ganimal product the occurrence ts so that an op of bioactive co success of the p nethods t Base Learning Discussion at methods fic article(s) tation le/course is use ility for module Lilik Eka Radia	imple its. Th of bas timal ompon oroduc	ementatio e product sic pheno product is nents deriv ct 	n of hurd develop mena of i s produce ved from	lle tech ment n interac ed, botl food a	nology as th nechanism in tion of anima n product an dditives so a	e pr nclu al p d pr s to	rinciple of des the basic roduct rocess. The support the	
5.	developme preserving concept of componen interaction functional Teaching m 1. Speech 2. Project 3. Case B 4. Group Assessmen 1. Scienti 2. Presen This modu N/A Responsib Prof. Dr.Ir. Other infor	ent includes the ganimal product the occurrence ts so that an op of bioactive co success of the p nethods t Base Learning Discussion nt methods fic article(s) tation le/course is use ility for module Lilik Eka Radia rmation (Refere	imple its. Th of bas timal oroduc oroduc ed in t /cour ti MS. ences)	ementatio e product sic pheno product is ients deriv ct ct ct	ing study	lle tech ment n interac ed, botl food a	nology as th nechanism in tion of anima product an dditives so a	e pi iclu al p d pi s to vell	rinciple of des the basic roduct rocess. The support the	
5. 6. 7.	developme preserving concept of componen interaction functional Teaching m 1. Speech 2. Project 3. Case B 4. Group Assessmen 1. Scienti 2. Presen This modu N/A Responsib Prof. Dr.Ir. Other infor 1. Am	ent includes the ganimal product the occurrence ts so that an op of bioactive co success of the p nethods t Base Learning Discussion at methods fic article(s) tation le/course is use ility for module Lilik Eka Radia	imple its. Th of bas timal mpon produce ed in t /cour ti MS. ences) et al.	ementatio e product sic pheno product is tents deriv ct the follow rse , IPU 2020. Con	ing study	lle tech ment n interac ed, botl food a progr Hurdle	nology as th nechanism in tion of anima product an dditives so a amme/s as w Technology f	e pi al p d pi s to vell	rinciple of des the basic roduct rocess. The support the support description Food Safety of	

		tle Animal Pro									
Module/Cours				its	Semest	er	Frequency				
Code		workload	3 SCU	ſ	1 <sup>st</sup>		Each	1 semester			
PEP 91		352 hours			semester		Semester				
1.	Types of c			Contact			ependent	Class size			
	Compulsor	y Course		iours		stud		10-15 students			
			4	48 hours		304 hours					
						(structural					
							gnment				
							hours and				
							earning				
						168	hours)				
2.	Prerequisi	tes for particip	ation								
3.	Intended Learning Outcomes:										
	<ul> <li>Able to intervene in livestock problems at the macro level.</li> </ul>										
	• Able to expand and deepen new livestock theory through a multi and										
	tra	nsdisciplinary	approa	ach to c	ontribut	e to tl	ne achieveme	ent of the vision and			
		ssion of PSDIT									
								as, and contributing			
		-					,	logy in the field of			
	ani	mal husbandr	y based	l on sci	entific m	ethod	lologies, logio	cal, critical,			
	sys	tematic, and c	reative	thinkiı	ng.						
		velop a researd									
	app	proach, based o	on a stu	ıdy of t	he main	objec	tives of the r	esearch as well as it			
	rela	ationship to br	oader o	objectiv	ves.						
	Course Le	arning Outcor	nes:								
	Able to	formulate pro	blems,	formu	late hypo	othese	es, and resea	rch methods of			
	livesto	ck production	accord	ing to t	he field o	of scie	ence that is o	ccupied.			
	Able to	conduct a wri	tten stu	udy of t	the policy	y of th	ie livestock p	roduction system ir			
		-	t which	n aims t	to fulfill t	he ad	equacy of foo	od originating from			
	livesto										
							erpret the res	sults logically and			
	system	atically writte	n in sci	entific	language	).					
4.	Subject ain	ns/content									
					-			nding of livestock			
	production system policies as an aspect of national development studies in terms of										
	0	od adequacy o		0							
	-							Discussion and			
	•				0		•	epts, scientific			
	-	eeded as a bas									
						and fo	ollow-up on v	veaknesses and			
_	ě	of livestock pro	ductio	n syste	ms.						
5.	Teaching n										
	• Speech										
	-	Base Learning	5								
	Case Base Learning										
	*	Discussion									
6.	Assess	ment methods									
	• Individ	lual work									
	Group work										
7.	This modu	le/course is us	ed in t	he follo	wing stu	dy pr	ogramme/s	as well			
	This module/course is used in the following study programme/s as well N/A										

8.	Responsibility for module/course
	Prof.Dr.Ir. Veronica Margareta Ani Nurgiartiningsih , M.Sc.
9.	Other information (References)
	1. Ciptadi, G. A. Budiarto, Aulani'am, Y Oktanella. 2019. Genetika dan Pemuliaan :
	Peternakan-Veteriner. UB Press. Malang. ISBN 978-602-432-950-1
	2. Nurgiartiningsih, V. M. A. 2017. Pengantar Parameter Genetik pada Ternak. UB
	Press.
	3. Schultz, B. et al. 2020. Genetic improvement of livestock, from conventional
	breeding to biotechnological approaches in Animal Agriculture. Academic Press
	4. Thiagarajan, R. 2014. Text book of Animal Breeding.
	5. Van der Werf, J. H. J. 2019. Genetic Evaluation and Breeding Program Design.
	University of New England
	6. Gondro, C. J.H.J. van der Werf and B.J. Hayes (Eds). 2013. Genome-Wide
	Association Studies and Genomic Prediction. ISBN 978-1=62703-446-3

		tle Animal Repr										
	le/Course			dits	Semest		Frequency		Duration			
Code		workload	3 SC	CU	1 <sup>st</sup> seme	ester	Each	1	semester			
PER 92		352 hours			ļ		semester					
1.	Types of c			Contact		-	pendent		s size			
	Compulsor	ry Course		48 hours	5	study		10-1	5 students			
2	Decementation	f				304 h	iours					
2.	-	tes for participa	ation									
3.	Learning outcomes											
	• Able to master the basic concepts of the study of Animal Reproduction and Breeding											
	<ul> <li>Able to apply strategies for utilizing reproductive technology and animal breeding for livestock development</li> </ul>											
		<ul> <li>for livestock development</li> <li>Able to communicate concepts and studies in scientific writing in the field of animal</li> </ul>										
					udies in s	cientif	ic writing in t	the fie	ld of anima			
		uction and bree	eding.									
4.		ns/content				_		_				
	This course discusses about the concept of Animal Reproduction and Breeding includes the implementation of Reproduction in the development and population of											
		e role of Reprod					•	-	-			
		ig reproductive esigns/program										
	•	0 / 1 0						-				
	role of breeding programs in resource management. animal genetic resources, genetic quality improvement strategies for several important traits in animal and											
	implementation of biotech in animal breeding											
5.	Teaching methods											
_	• Speech											
	<ul> <li>Project Base Learning</li> </ul>											
	Case Base Learning											
	<ul> <li>Group Discussion</li> </ul>											
6.	Assessment methods											
	Scientific article(s)											
	<ul> <li>Presentation</li> </ul>											
7.	This modu	le/course is use	ed in t	he follow	ing study	progr	amme/s as w	vell				
	N/A				0	1 0						
8.	Responsib	ility for module	/cour	se								
	Prof.Dr.Sc.	Agr.Ir. Suyadi, N	AS. IP	U. ASEAN	Eng							
9.	Other infor	rmation (Refere	ences)									
	• B.	Hafez, E.S.E Hat	fez. 20	000. Anim	al Reproc	luctin	of Farm Anin	nals. I	Lippincott			
		lliams & Wilkin										
		Walsh and M. Ly		2018. Evo	lution an	d Seleo	ction of Quan	ititati	ve Traits.			
	Ox	ford Univ Press										
	• Cin	tadi, G. A. Budi	arto	Aulani'am	Y Oktan	ella 20	)19 Genetika	a dan	Pemuliaan			
	-	ernakan-Veteri							. emunaali			
		rgiartiningsih, V			-				Ternak. III			
	Pre				ountur		Geneen	ruuu	01			
		ultz, B. et al. 20	)20. G	enetic im	provemen	nt of liv	vestock. from	l conv	entional			
		eding to biotec		-								
	Pre	-		5 - FF-			0		-			
		iagarajan, R. 20	14. Te	ext book o	f Animal	Breedi	ing.					
		n der Werf, J. H.					-	rogra	m Design.			
		iversity of New	-				0	0 -	0			

	• Gondro, C. J.H.J. van der Werf and B.J. Hayes (Eds). 2013. Genome-Wide Association Studies and Genomic Prediction. ISBN 978-1=62703-446-3
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1.100	lule/Course	e Title Animal Hı			5100105							
mod	ule/	Student	Credits	Semester	Frequency	Duration						
course code PES 94001		work-load	3 SCU	1 <sup>st</sup> Sem.								
		352 hours			Each Semester	1 semester						
1		f courses	Contac	t hours	Independent study	Class size						
	Compuls	ory Course	48 hou	rs	304 hours	10-15 students						
					Structural							
					assignment 136							
					hours							
					Independence study							
					168 hours							
2	Prerequ	isites for partio	cipation (if a	pplicable)								
	-											
3	Loarnin	goutcomes										
3		•	sic concents	of Livestock	Socio-Economic Studio	e bacad on Inductry						
		1. Understanding the basic concepts of Livestock Socio-Economic Studies based on Industry 4.0 technology										
	<ul><li>4.0 technology</li><li>2. implementing strategies in optimizing the application of Industry 4.0 technology in the</li></ul>											
	socio-economic field of livestock, and understanding the mechanism of component											
	interaction to improve Precision Livestock Farming (PLF).											
	<b>3.</b> Skilled in communicating scientific work related to the socio-economic study of livestock											
		based on industry 4.0.										
4	Subject aims/Content											
	This course aims to provide an understanding of the socio-economic concept of animal science											
	and its development including the implementation of industrial technology 4.0 which can											
	assist in the decision-making process to optimize the production and performance of the											
	livestock industry through the interaction between cost-effective and environmentally											
		s to support the	success of the	e livestock in	dustry business.							
5		Teaching methods										
	1. Spee											
		ect Based Learnin	ng									
		based learning										
		4. Group Discussion										
6	Assessment methods											
	1. Individual work											
7	2. Group work This module (course is used in the following study programme (s as well											
'	-	This module/course is used in the following study programme/s as well										
8	Respons	Responsibility for module/course										
		i Dwi Utami, MS.		h.D., IPM., AS	EAN Eng							
9		formation										
					jo-Saucedo, J.A.; Salais-							
		-	-	ement and op	erations: A review. J. A	mbient. Intell.						
		z. Comput. 2018,										
					ndustry of the future: A							
	trends, research challenges and opportunities in Industry 4.0. J. Ambient Intell. Smart Enviro											
	2017, 9, 287-298.											

	3. Kovacs, G.; Kot, S. New Logistics and Production Trends as the Effect of Global Economy
	Changes. Pol. J.Manag. Stud. 2016, 14, 115–126.
	4. Sanders, A.; Elangeswaran, C.; Wulfsberg, J. Industry 4.0 implies lean manufacturing:
	Research activities in industry 4.0 function as enablers for lean manufacturing. J. Ind. Eng.
	Manag. 2016, 9, 811–833.

## **ELECTIVE COURSES**

Modul	e/Course Ti	tle Animal Repr	oduc	tion Biolo	gy				
	le/Course	Student		dits	Semest	er	Frequency	7	Duration
Code		workload	2 SC	CU 1 <sup>st</sup> se		ester	Each	1 semester	
PER 92	2002	234.67					semester		
		hours							
1.	51				Contact hours Independent				ass size
	Elective Course			36 hours	S	study	·	10	)-15 students
						198.6	67 hours		
2.	Prerequisit	tes for participa	tion						
3.	Learning o	utcomes							
	-	master the bas	ic cor	ncepts of a	nimal re	produ	ctive biology	stu	dies
		apply strategie		-		-			
		communicate t				-	-		
		reproductive b		-			-	5	
4.	Subject ain	ns/content							
		e discusses abou				-	-		
		ating, pregnanc	y, bir	th and po	stnatal ce	ellular	and molecula	ar ir	n animal
5.	Teaching m								
	• Speech								
		Base Learning							
		ase Learning							
		Discussion							
6.	Assessmen								
		fic article(s)							
	Presen		1	1 ( 1)			,	11	
7.		le/course is use	ed in t	che follow	ing study	progr	amme/s as v	vell	
8.	N/A Responsibi	ility for module	/	20					
0.	-	Nurul Isnaini, M		30					
9.		mation (Refere							
		E.S.E. 2008. Rep			'arm Anir	nal. 7 <sup>th</sup>	edition. Lin	nico	t Philadelpia :
		ns and Wilkins	Jui				carcon up	-100	······································
		ı, S., T. Susilawa	ti dar	n A. Soewo	ondo. Bio	logi Re	produksi Ka	jian	Seluler dan
	Moleku						1	,	
	• Susilaw	vati, T. 2011. Sp	erma	tologi. Ma	ılang. UB	Press			
	• Jurnal	Theriogenology							
	• Jurnal Fertility and Infertility								

Modu	le/Course Ti	tle <b>Small Proj</b> e	ect of	Non-Run	ninant					
Code	ile/Course	Student workload	<b>Cre</b> 2 SC		Semest 1 <sup>st</sup> seme		Frequency	7	Duration	
	PEM 93002 234.67 hours						Each Semester		1 semester	
1.	<b>Types of courses</b> Elective Units			36 hours stu		stud	1		<b>Class size</b> 10-15 students	
2.	Prerequisit	tes for participa	ation							
3.	Learning outcomes ILO 5 : Find or develop scientific theories/conceptions/ideas, and contribute to the development and apply of science and/or technology in the field of animal science based on scientific methodologies, logical, critical, systematic, and creative thinking ILO 6 : Develop a research roadmap with an inter, multi, or transdisciplinary approach, based on a study of the main research objectives and relationships with broader objectives ILO 9 : Choose appropriate, current and advanced research and provide benefits to mankind through an inter, multi, or trans disciplinary approach, to develop and/or produce problem solving in the fields of science, technology, and art ILO 10 : Demonstrate academic leadership and develop collegial relationships in managing, developing and fostering resources and organizations under their									
1.	Subject ain The aim profession be equipp discussion terms of l problems,	lity as well as c ns/content of this course s in non-rumin ed with know s and small pro knowledge, sci hypotheses, an ollected and pro	e pro ant liv ledge ojects, ence d rese	vides a vestock nu and skill which wi and philo arch desig	collabora utrition r s throug ll be supe osophy a gns follov	tive le esearc h inte ervised nd eth ving th	earning exp h. In this cou ractive lectu and guided nics in resea e methods us	irse, ires, by s arch sed.	students will small group supervisors in , formulating Furthermore,	
2.	Teaching n 1. Speech 2. Project 3. Case Ba									
5.	Assessmen	t methods lual work								
6.	1	le/course is use	ed in t	he follow	ing study	r progr	amme/s as w	vell		
7.	Responsibi 1. Dr. 2. Pro	ility for module Ir.Osfar Sjofjan of. Dr. Ir. M. Hal Ir. Eko Widodo	, MSc. im Na	IPU tsir, SPt.M	IP.IPM					
8.	<ol> <li>Rick Kl</li> <li>Barach</li> </ol>	-	cken I 019. F	res) en Nutrition. Packington. England 9. Factors Affecting Broiler Production: A Meta Analys						

3. Remus A. 2014. A meta-analysis of the feed intake and growth performance of
broiler chickens challenged by bacteria. Poultry Science. 93 :1149–1158 .
http://dx.doi.org/ 10.3382/ps.2013-03540
4. Azmat Khan et al. 2018. Advances in Nutrigenomics and its Application in Poultry .
Article in International Journal of Current Microbiology and Applied Sciences $\cdot$
5. Liuting Wu., et al. Dec 2020. The mutual interaction between gut microbiota and
protein/amino acid metabolism for host mucosal immunity and health. J, Animal
Nutrition. https://doi.org/10.1016/j.aninu.2020.11.003
6. NasrinNoohi, et al . Dec. 2020. Screening for probiotic characters in lactobacilli
isolated from chickens revealed the intra-species diversity of Lactobacillus brevis.
Animal Nutrition, J. https://doi.org/10.1016/j.aninu.2020.07.005
7. Sujuan, D. et al. Dec 2020. The impact of probiotics on gut health via alternation of
immune status of monogastric animals. Animal Nutrition, J.
https://doi.org/10.1016/j.aninu.2020.11.004

Modu	le/Course Ti	itle Small Proj	ect of	Ruminar	nts and F	orage	Science		
Code	Module/CourseStudentCrCodeworkload2 3PEM 93003234.67hours				Semest 1 <sup>st</sup> seme	-		7	<b>Duration</b> 1 semester
1.	<b>Types of c</b> Elective U			<b>Contact</b> 36 hour		stud	<b>pendent</b> y 67 hours		a <b>ss size</b> 1-15 students
2.	Prerequisi	tes for participa	ation			1			
3.	<ul> <li>Learning outcomes         <ul> <li>Able to intervene in animal science issues at the macro level (ILO 1)</li> <li>Find or develop scientific theories/conceptions/ideas, and contribute to the development and apply of science and/or technology in the field of animal sciencebased on scientific methodologies, logical, critical, systematic, and creative thinking (ILO 5)</li> <li>Develop a research roadmap with an inter, multi, or transdisciplinary approach, based on a study of the main research objectives and relationships with broader objectives (ILO 6)</li> <li>Choose appropriate, current and advanced research and provide benefits to mankind through an inter, multi, or trans disciplinary approach, to develop and/or</li> </ul> </li> </ul>								
1.	Subject air The aim profession will be equ discussion terms of problems,	oduce problem so ns/content of this course is in ruminant n uipped with kn s and small pro knowledge, sci hypotheses and ollected and pro	e pro nutriti owled ojects, ence d resea	vides a on and for lge and sk which wi and philo arch desig	collabora rage scier kills throu ll be supe osophy a gns follow	tive l nce res igh int ervised nd etl ving th	earning exp earch. In this eractive lect l and guided nics in resea e methods us	erie s co ures by s arch sed.	ence between urse, students s, small group supervisors in a, formulating Furthermore,
2.	Teaching methods 1. Speech 2. Project Base Learning 3. Case Base Learning								
5.	Assessmer	Discussion nt methods lual work work							
6.	This modu N/A	lle/course is us	ed in t	the follow	ing study	progr	amme/s as v	vell	
7.	Responsibility for module/course1.Prof. Dr. Ir. Kusmartono2.Prof. Dr. Ir. Siti Chuzaemi, MS.IPU3.Prof. Dr. Ir. Hendrawan Soetanto, M.Rur.Sc.4.Prof. Dr. Ir. Hartutik, MP5.Prof. Dr. Ir. Ifar Subagiyo, MAgr.St1.Church D.C. and Pond W.G. , 1982. Basic anaimal Nutrition and Feedingg,						eedingg,		
	<ul> <li>Second Edition. Canada. John Wiley and `Sons, 1982.</li> <li>Church, D.C. 1976. Digestive Physiology and Nutritin of Ruminant. Vol. 1: Digestive Physiology. 2nd Ed. Metropolitan Printing Co. Corvalilis, OR</li> </ul>								

3.	Chuzaemi, S. 2012. Fisiologi Nutrisi Ruminansia. Universitas Brawijaya Press.
	Malang
4.	Devendra, C. 1993. Sustainable animal production from small farm system in
	south-East asia FAO animal production and health paper 106. FAO Rome
5.	Hobson, P.N., C.S. Stewart, 1997. The Rumen Microbial Ecosystem. St.
	Edmundsbury Press Great Britain
6.	Ifar, S. 1996. Relevance of Ruminant Upland Mixed-Farming System in East
	Java. Indonesia. Animal Production System Department. Wageningen
	University. The Netherlands
7.	McDonald, P., R. Edwards and J. Greenhalgh. 2002. Animal Nutrition. 6th
	Edition. New York
8.	Orskov E.R., 1982. Protein Nutrition ini Ruminants, London. Academic Press
	Inc. 1982
9.	Roeleved, 1998. Focusing Livestock Systems Research. KTLV. Amsterdam. The
	Netherlands
10	. Van Soest, P.J. 1994. Nutritional Ecology of the Ruminant

Mod	ule/Course 1	Гitle Animal Pro	duct	Bioproces	s Tecnolo	ogy			
Mod	ule/Course	Student	Cree	dits	Semest	er	Frequency		Duration
Code	e e	workload	2 SC	U	1 <sup>st</sup> seme	ester	Each		1 semester
PET	95003	234.67					semester		
		hours				-			
1.	Types of co			Contact h		-	endent		ass size
	Departmen			36 hours		study		10	-15 students
		on and Breeding	g			198.6	7 hours		
	Elective Un								
2.	Prerequisit	es for participat	tion						
	-								
3.	Learning ou								
		o master the ba		-	-		-		
		to optimize the	use	of microbi	al techno	ology a	nd fermenta	tior	n of processed
		l products			• .				
		o develop analy	tical	methods fo	or biopro	cess re	sults.		
4.	Subject aim	,					1 . 1 .		
		e discusses abou	-		0		-		
		products techn							
		s of animal product							
5.	Teaching m	ctional product	s, pre	servation	of microi	bes tha	t are useful a	s pi	obiotics
э.	Speech	ietilous							
	-	Base Learning							
		ise Learning							
		Discussion							
6.	Assessmen								
0.		ual work							
	Discuss								
7.		e/course is use	d in tl	he followir	ng study	progra	mme/s as we	ell	
	N/A								
8.		lity for module/	cours	se					
	Dr.Ir., Agus	Susilo, Spt. MP.	IPM.	ASEAN En	g				
9.									

Modul	e/Course Ti	tle Animal Prod	uct T	echnology	/ Develop	ment				
Module/Course Code PET 95002		Student workload 234.67 hours	Cre 2 SC	dits	Semest 1 <sup>st</sup> seme	1 1		7	<b>Duration</b> 1 semester	
1.		it of Animal ion and Breedin	g	<b>Contact</b> 36 hours		study	p <b>endent</b> 7 57 hours		<b>iss size</b> -15 students	
2.		tes for participa	tion	I						
3.	• Able to	utcomes esign the concer implement and design the doce	l harr	nonize pr	oduct saf	ety sup	porting regu	ulati	ons	
4.	Subject aim This cours developme handling te mechanism factors tha Products a track the s		out 1 elopri aintai basic t dam ave r e dam	the the b nent inclu n the fres concept c nage so th records an nage to fre	asic cond ides the hness of of the occ at a prod id adhere esh produ	cept o imple produc urrend luct th e to the	f animal pro mentation o cts. The proc ce of the bas at remains f e process, sc	oduc f an luct sic p resh o the	ct technology imal product development henomena of is produced. by are able to	
5.	Teaching m <ul> <li>Speech</li> <li>Project</li> <li>Case Ba</li> </ul>	nethods								
6.	Assessmen Individ Discuss	ual work								
7.	This modul N/A	le/course is use	d in t	the follow:	ing study	progr	amme/s as v	vell		
8.	Responsibi	lity for module, Djalal Rosyidi, I			Eng.					
9.	Other infor	mation (Refere	nces)							
	and 2. Edi 3. 1st Lav Cop 4. 1st By 5. Cop 6. 2nd	ocessing Techno I Energy Usage ted By Ashok K Edition, Waste vrence K. Wang oyright Year 200 Edition, Food T Didier Montet, J oyright Year 202 I Edition Smart ssi, Copyright Yea	umar Treat , Yun 04 Tracea Rame 18 Bioso	Agrawal, tment in t g-Tse Hur ability and sh C. Ray ensor Tecl	Megh R. he Food I ng, Howan I Authent	Goyal. Process rd H. Lo ricity, A	2017. sing Industry o, Constantin analytical Teo	7, Ed ie Ya chnio	ited By pijakis, ques, Edited	

Modul	e/Course Ti	tle Non-Rum	inant and Mi	iscellane	ous A	nimal Prod	uction Strategy		
Module/Course Code		Student	Credits Semes		er	Frequency	<b>Duration</b> 1 semester		
		workload	2 SCU	1 <sup>st</sup>		Each			
PEP 91	1002	234,67		semeste	er	Semester			
		hours							
1.	Types of c		Conta			pendent	Class size		
	Elective U	nit	hours		stud		10-15 students		
			32 hou	ırs		67 hours			
					-	ctural			
						nment			
						7 hours			
					and s				
					hour	ing 112			
2.	Proroquisi	tes for partici	antion		noui	5)			
2.	-		Jacion						
3.	Intended	Learning Out	comes						
5.		le to intervene		nrohlems	at the	macro level			
		le to expand a		-					
		-	-			•	ent of the vision and		
		ssion of PSDIT		00110110000	0 00 01				
				ic theorie	s/con	ceptions/ide	eas, and contributing		
							logy in the field of		
		imal husbandı	-			•			
		stematic, and o	•				,,		
	-	velop a resear		•	ter, m	ulti, or trans	disciplinary		
		-	-				esearch as well as its		
		ationship to b	-		,				
		arning outco							
				mulate hy	pothe	eses, and res	earch methods for		
	non-ru	minant livest	ock productio	n and var	ious li	vestock.			
	• 2. Able	to conduct a	written study	of the pol	licy of	the non-run	ninant livestock		
	produc	ction system a	nd various liv	estock in	nation	nal developn	nent which aims to		
	fulfill t	he adequacy c	of food origina	ating from	livest	ock.			
	• 3. Stud	ents are able	to collect, pro	cess data	and in	terpret the	results logically and		
	system	atically writte	en in scientifio	c language	e.				
4.	Subject ain	ns/content							
							c and miscellaneou		
		Productions					government polic		
		-	•	-			minant livestock and		
							ion of biotechnolog		
							and the emergence of		
			-	-	_		c theories are needed outlined in scientifie		
			g strategies fo	or increas	ing pr	oduction as			
		nd presented.							
5.	Teaching n								
	Speech		_						
	-	t Base Learnin	g						
		ase Learning							
	•	Discussion							
6.	Assessmer								
		lual work							
	• Group	work							

7.	This module/course is used in the following study programme/s as well
	N/A
8.	Responsibility for module/course
	Prof.Dr.Ir. Veronica Margareta Ani Nurgiartiningsih , M.Sc.
9.	Other information (References)
	• Statistik Peternakan dan Kesehatan Hewan 20202. Jakarta: Direktorat Jendral
	Peternakan dan Kesehatan Hewan.
	• Commercial Chicken Meat and Egg Production. 2020.( Bell, D.D., W.D. Weaver)
	Academic Publisher. USA
	Poultry Genetics, Breeding and Biotechnology
	• Dewey M. Caron and Lawrence John Connor, 2013. Honey Bee Biology and
	Beekeeping. Wicwas Press LLC
	• Russell Goodman and Peter Kaczynski, 2014. Australian Beekeeping Guide. Fifth
	Edition. Rusal Industries Research and Development Corporation.
	• Warhurst P. and Goebel R., 2013. The bee book-beekeeping in Australia.

		tle Ruminant							<b>D</b>	
Module/Course		Student		Credits		ter	Frequency		Duration	
		workload	2 SC	CU	1 <sup>st</sup> semester		Each		1 semester	
PEP 91	1003	234.67					Semester			
		hours						1		
1.	Types of c			Contact			pendent		ass size	
	Elective Ur	nit		32 hours	5	stud		10	)-15 students	
							67 hours			
						(stru	ctural			
							nment			
							7 hours and			
							earning			
						112 l	nours)			
2.	Prerequisi	tes for particip	ation							
3.	- Intended I	Learning Outc	omes	:						
		le to intervene			blems at	the ma	acro level.			
		le to expand an		-				ulti	and	
		nsdisciplinary								
		ssion of PSDIT								
	• Fin	ding or develo	ping s	cientific tl	neories/o	concep	tions/ideas.	and	contributing	
	to the development and practice of science and/or technology in the field of animal husbandry based on scientific methodologies, logical, critical,									
	systematic, and creative thinking.									
	<ul> <li>Develop a research roadmap with an inter, multi, or transdisciplinary</li> </ul>									
	approach, based on a study of the main objectives of the research as well as its									
	relationship to broader objectives.									
	Course Learning Outcomes:									
	• Able to formulate problems, formulate hypotheses, and research methods for									
	ruminant livestock production.									
	<ul> <li>Able to conduct a written study of the policy of the ruminant livestock</li> </ul>									
	production system in national development which aims to fulfill the adequacy									
	of food originating from livestock.									
	<ul> <li>Students are able to collect, process data and interpret the results logically</li> </ul>									
	and systematically written in scientific language.									
4.			y write	ten m sere	intine lan	guuge				
1.	Subject aims/content The Ruminant Livestock Production Improvement Strategy course discusses the logic									
	of science, government policy theories/concepts, strategies for increasing ruminant									
	livestock production through improved management, implementation of									
	biotechnology and breeding design to produce superior production. Discussion and									
		ence of ideas or								
	•				•		•	-		
	theories are needed as a basis in formulating strategies for increasing production a outlined in scientific writings and presented.									
5.										
2.	Speech									
	<ul> <li>Speech</li> <li>Project Base Learning</li> </ul>									
	<ul> <li>Project Base Learning</li> <li>Case Base Learning</li> </ul>									
		Discussion								
6.	Assessmen									
0.										
		lual work								
	• Group		1.				,			
7.		le/course is us	ed in t	the follow	ing study	' progr	amme/s as v	vell		
	N/A									

8.	Responsibility for module/course
	Prof.Dr.Ir. Puguh Suryowardoyo, MP.
9.	Other information (References)
	• Statistik Peternakan dan Kesehatan Hewan 20202. Jakarta: Direktorat Jendral
	Peternakan dan Kesehatan Hewan.
	• Kementerian Pertanian. 2012. Pedoman Pengembangan Kawasan Pertanian
	• Badan Standarisasi Nasional. 2020. Standar Nasional Indonesia – Bibit Ternak
	Journal Animal Production Science
	Journal Asian-Australasian of Animal Science

Modul	e/Course Ti	tle Genetic Qual	ity In	nproveme	nt Strate	gy		
Module/Course Code PER 92003		StudentCrownworkload2 S234.67234.67hours234.67		dits	Semest 1 <sup>st</sup> seme	er	<b>Frequency</b> Each semester	<b>Duration</b> 1 semester
1.	Reproduct Elective Ur	nt of Animal ion and Breedin nits	0	<b>Contact</b> 36 hours		study	<b>pendent</b> y 57 hours	<b>Class size</b> 10-15 students
2. 3.	Prerequisit - Learning o	tes for participa utcomes	tion					
	<ul> <li>Able to</li> <li>Able to</li> <li>quantit</li> <li>Able t</li> <li>system</li> </ul>	o formulate prob o formulate str tative genetic m o collect data natically.	ategi odels	es for im , genomic	proving 1 s, crossbr	the an reeding	imal genetion g programs a	c quality through and biotechnology lts logically and
4.	for improv genomics, o using basi	e discusses abou ving the anima crossbreeding p	al ge rogra cienti	netic qua ams and bi ific theori	lity thro iotechnol es are n	ough q ogy. Di eeded	uantitative iscussion and as the basi	enetics, strategies genetics models, d innovative ideas s for formulating oment goals
5.	• Case Ba							
6.	Assessmen	it methods lual work						
7.		le/course is use	d in t	the follow	ing study	progr	amme/s as v	vell
8.	Responsibi Prof.Dr.Ir.	ility for module, Veronica Marga	reta I	Ani Nurgia	artiningsi	h , M.S	с.	
9.	<ul> <li>Cip</li> <li>Pe</li> <li>Nui</li> <li>Pre</li> <li>Sch</li> <li>bre</li> <li>Pre</li> </ul>	eternakan-Veter rgiartiningsih, V ess. nultz, B. et al. 20 eeding to biotecl ess iagarajan, R. 202	arto, iner. 7. M. A 20. G hnolo	Aulani'an UB Press. A. 2017. Pe enetic imp ogical appr ext book o	Malang. engantar provemer coaches in f Animal	ISBN 9 Param nt of liv n Anim Breedi	978-602-432 leter Genetik vestock, from lal Agricultur	a pada Ternak. UB n conventional re. Academic

cou	ePES	<b>Student</b> work-load 234,67 hours	Credits 2 SCU	Semester 1 <sup>st</sup> Sem.	<b>Frequency</b> Each Semester	<b>Duration</b> 1 semester
1	<b>Types of</b> Elective c	f <b>courses</b> ourse	Contact 32 hour		Independent study 202,67 hours Structural assignment 90,67 hours Independence study 112 hours	10-15 students
2	-	isites for partici	pation (if aj	pplicable)		
3	<ol> <li>able t livest devel comp</li> <li>able t types livest</li> <li>Able t mark</li> </ol>	ock agribusiness opment of livesto etitiveness and p o critically evalua of services, as we ock agribusiness. to understand the	and describe ock agribusin overty reduce ate contribute ell as the char e outlines an itutions, pro	e the main op less, which ir ction. cions in vario racteristics of d discussions perty rights,	as and debates in the opportunities and const aclude aspects of adde us sectors of activity, of actors in the proces s of current debates re intellectual property	raints related to the d value, types of policies, s of developing elated to the role of
4	Subject a The Live rural and developr various f policy in agribusin This coun developr strategie sector, fa	aims/Content stock Agribusines I urban areas in d nent of livestock a actors driving pro- terventions that o ness development rse reviews the in nent in developing l collities and infras	ss Developm eveloping co agribusiness ogress and c can be imple t to improve nportance of g countries. ivestock agr tructure, bu	ent course ai ountries, as w activities. th hange, how t mented to re added value the role of li In addition, i ibusiness. Th siness institu	ms to emphasize prog vell as their implicatio e discussion of lectury o define progress and alize the main goals o competitiveness and vestock agribusiness t also examines conce his includes the role of tions, research and co livestock agribusiness	ns for the pattern of e material includes change, as well as f livestock eliminate poverty. for economic pts, theories and the business funding punseling, climate
5	Teaching1.Speed2.Proje3.Case	g methods				
6	Assessm 1. Indiv 2. Group	e <b>nt methods</b> idual work o work	_		_	
7	This mo	dule/course is u	sed in the f	ollowing stu	dy programme/s as	well

9	Other information
	1.Agribusiness: Principles of Management. David D. Van Fleet, Ella W. Van Fleet, and George J. Seperich. © 2014 Delmar, Cengage Learning.
	2. Agribusiness Supply Chain Management. N. Chandrasekaran n G. Raghuram. © 2014 by Taylor & Francis Group, LLC CRC Press is an imprint of Taylor & Francis Group, an Informa business.
	3. Strategic Management and Business Policy: TOWARD GLOBAL SUSTAINABILITY. Thomas L. Wheelen and J. David Hunger. Copyright © 2012 by Pearson Education, Inc., publishing as Prentice Hall.
	4. Principles of Agricultural Economics. Andrew Barkley and Paul W. Barkley. © 2013 Andrew Barkley and Paul W. Barkley.
	5. The future of food and agriculture Trends and challenges. Food and Agriculture Organization of the United Nations Rome, 2017.
	6. Understanding Digital Marketing Marketing strategies for engaging the digital generation. Damian Ryan. Third edition 2014 by Kogan Page Limited.
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	8. Global Marketing. Foreign Entry, Local Marketing & Global Management. Johny K. Johansson. Published by McGraw-Hill/Irwin, a business unit of The McGraw-Hill Companies, Inc.,1221 Avenue of the Americas, New York, NY, 10020. Copyright © 2009.
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00	lule/	Student	Credits	Semester	Frequency		Duration	
course		work-load	2 SCU	1 <sup>st</sup> Sem.				
	e PES	234,67 hours			Each Semester		1 semester	
940	1		Contract		Index on death stands			
1	<b>Types of courses</b> Elective Course		Contact		Independent study	<b>Class size</b> 10-15 students		
	Elective Course		32 hour	S	202,67 hours Structural	10-	·15 students	
					assignment 90,67			
					hours			
					Independence study 112 hours			
2	Prerequ	isites for partici	pation (if a	pplicable)	·			
	-							
3	Learning outcomes							
					aches, methods, instru	ment	s for scenario	
	studies and livestock agribusiness policies.							
	<b>2.</b> Designing IoT (virtual coworking-space, application) for livestock agribusiness							
		opment and educ	ation.					
4	Subject aims/Content							
	The Digital-Based Livestock Agribusiness (IoT-Livestock Agribusiness = IoTLA) course aims to							
	improve scientific insight and skills regarding the relevance between agribusiness and livestock food-processors, society, digital communication technology (IoT) management, rura							
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