

Course: Leather Science and Technology

1. **Type** : Specialization's Elective
2. **Code** : PTH 6404
3. **Credit** : 2/0
4. **Semester** : Odd
5. **Description** :

This course of leather science and industry explains the skins from various types of animals, bio-chemistry, tissue structure, skin characteristics physically and chemically, principles of preservation and tanning, tanning waste treatment, skin tanning factory design and leather industry in Indonesia.

6. Course Outcomes (CO)

- CO 1 : The knowledge and comprehension (able to comprehend the biosynthetic process of skin, skin microstructure and leather chemical reaction).
- CO 2 : Intellectual ability (able to do fresh skin quality analysis and tanning).
- CO 3 : Practical ability (able to plan the eco-friendly tanning process)
- CO 4 : Able to deliver and manage (able to plan the leather processing industry).
- CO 5 : Personality and Attitude (Leadership, Cooperation and Maturity thinking).

7. The Alignment Between CO and ELO

CO*	ELO**																	
	A				B			C				D						
	1	2	3	4	1	2	3	1	2	3	4	1	2	3	4	5	6	
CO 1				✓														
CO 2					✓	✓	✓											
CO 3								✓	✓	✓	✓							
CO 4												✓	✓		✓			
CO 5																		

*CO refers to point 6.

**Expected Learning Outcomes (ELO) are written below,

A. Attitudes and Behaviors	
The graduates are able to behave well, correctly, and culturally as the result of internalization and actualization of values and norms, which is reflected in a spiritual and social life through learning process, experience, research, and/or community development in the animal husbandry.	
1	Piety to God and be able to show religious attitude and maintain the humanity values in carrying the task, which is based on religion, moral, and ethics.
2	Be proud and love the homeland show nationalism, and contribute to the improvement of the life quality in the community, nation and country, and the advancement of civilization according to Pancasila.
3	Showing the social sensitivity and attention to the community and environment by respecting the culture diversity, view, religious, beliefs, and other people's opinion, and also obey the rules.
4	Be accountable in carrying the professional practice that includes ability to accept accountability towards decision and professional action. It shall be according to the scope of the practice under their responsibility and laws.
B. Mastery in Sciences	
Master the theory of the current science in the animal husbandry and its application.	

1	Able to master the current animal science and its application theory.
2	Able to master the livestock production science, animal nutrition and feed science, animal products technology, and the livestock social economics in relation to food security and environment.
3	Able to master the design, management, and development of livestock research.
C. Special Skills	
The graduates are able to develop science, technology, and arts in the animal husbandry through interdisciplinary/multidisciplinary innovative and tested research.	
1	Able to make innovation in the animal husbandry based on the development of science and technology.
2	Able to design interdisciplinary and multidisciplinary research in the animal husbandry.
3	Able to formulate and solve problems in the national development especially in terms of animal husbandry.
4	Able to solve problems and anticipate issues in the development of animal science and industry.
D. General Skills	
The graduates are able to manage resources by utilizing science, technology, and arts to solve problems in the animal husbandry with current science and also conduct research with accountability and full responsibility.	
1	Able to develop logical, critical, systematic, and creative thought through scientific research, creation of design in the science and technology, which pays attention and applies humanity values according to their expertise. The graduates are able to arrange scientific concept and the study result based on the principles, procedures, and scientific ethics.
2	Able to identify the science that becomes their research object and position it to a research map by using information technology in the context of science development and expertise implementation developed through interdisciplinary or multidisciplinary approaches.
3	Able to make a decision in the context of solving problems in the development of science and technology, which pays attention and applies humanity values based on analysis study or experiment towards information and data.
4	Able to communicate the result of reasoning and scientific research in form of thesis and scientific writing responsibly based on academic ethics in the accredited national journal.
5	Able to maintain the academic integrity generally and avoid the plagiarism practice.
6	Able to communicate spoken and written English effectively by using the information technology for the development of animal science and its implementation.

8. Course Content

Week	CO	Topic/Subtopic	Learning Activity	Assessment Tools	Allocated Time	Lecturer
1	CO 1	Introduction	Classical lecture, discussion	Exam	2 x 50 minutes	Yuny E
2	CO 1	Animal hides from various livestock animal	Classical lecture, discussion	Exam	2 x 50 minutes	Yuny E
3	CO 1	Histology of animal hide	Classical lecture, discussion	Exam	2 x 50 minutes	Yuny E

4	CO 2	Chemical and biochemical aspects of leather	Classical lecture, discussion	Exam	2 x 50 minutes	Yuny E
5	CO 3	Animal hide preservation	Classical lecture, discussion	Exam	2 x 50 minutes	Ambar
6	CO 3	Tanning preparation	Classical lecture, discussion	Exam	2 x 50 minutes	Ambar
7	CO 3	Tanning process	Classical lecture, discussion	Exam	2 x 50 minutes	Ambar
Midterm Examination						
8	CO 3	Tanning quality test	Classical lecture, discussion	Exam	2 x 50 minutes	Nanung
9	CO 2	Techniques on animal hide processing for collagen	Classical lecture, discussion	Exam	2 x 50 minutes	Nanung
10	CO 2	Techniques on animal hide processing for gelatine	Classical lecture, discussion	Exam	2 x 50 minutes	Nanung
11	CO 4	Waste management	Classical lecture, discussion	Exam	2 x 50 minutes	Yuny E
12	CO 3	Waste management	Classical lecture, discussion	Exam	2 x 50 minutes	Nanung
13	CO 1; CO 2; CO 3; CO 4	Paper presentation	Classical lecture, discussion	Exam	2 x 50 minutes	Tim Dosen
14	CO 1; CO 2; CO 3; CO 4	Paper presentation	Classical lecture, discussion	Exam	2 x 50 minutes	Tim Dosen
Final Examination						

9. Assessment

Component	CO	Percentage (%) for final grade	Minimum Satisfactory Level
Midterm	CO 1; CO 2; CO 3; CO 4	30	70
Presentation and assignment	CO 4	30	70
Final exam	CO 1; CO 2; CO 3; CO 4	35	70
Total		100	

10. Lecturer

1. Yuny Erwanto, S.Pt., MP., Ph.D.
2. Ir. Ambar Perwitiningrum, S.Pt., M.Si., Ph.D., IPM.
3. Nanung Agus Fitriyanto, S.Pt., M.Sc., Ph.D.

11. Reference

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2. Frendrup, W. 2000. Hair-save Unhairing Methods in Leather Processing. Regional Programme for Pollution Control in the Tanning Industry in Sout East Asia. UNIDO.
3. Intenational Union of Leather Technologist and Chemist Societies (IULTCS). 2004. IUE Recommendation on Cleaner Technologies for Leather Production. Available at <http://www.google.co.id>
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5. Ockerman, H. W. and C. L. Hansen. 2000. Animal-By-prdouct Processing &Utilization. CRC Press. Washington
6. Sarkar, K. T. 1995. Theory and Practice of Leather Manufacture. Revised ed. The Author. Madras
7. Triatmojo, S. 2009. Impelementasi “Produksi Bersih” dalam Industri Penyamakan Kulit Guna Peningkatan Efisiensi dan Pencegahan Pencemaran Lingkungan. Pidato Pengukuhan Jabatan Guru Besar. Universitas Gadjah Mada. Yogyakarta
8. UNEP. 1999. Pollution, Prevention and Abatement Handbook: Toward Cleaner Production/Washington.
9. White, H.F., C.A. Money, J.M. Poole, and Karamoshos. ----. Cabron Dioxide Deliming of Full Thicness hide. CSIRO Leather research Center. Victoria.