MIT MUZAFFARPUR

COURSE FILE OF

Tannery Waste Management (071823)

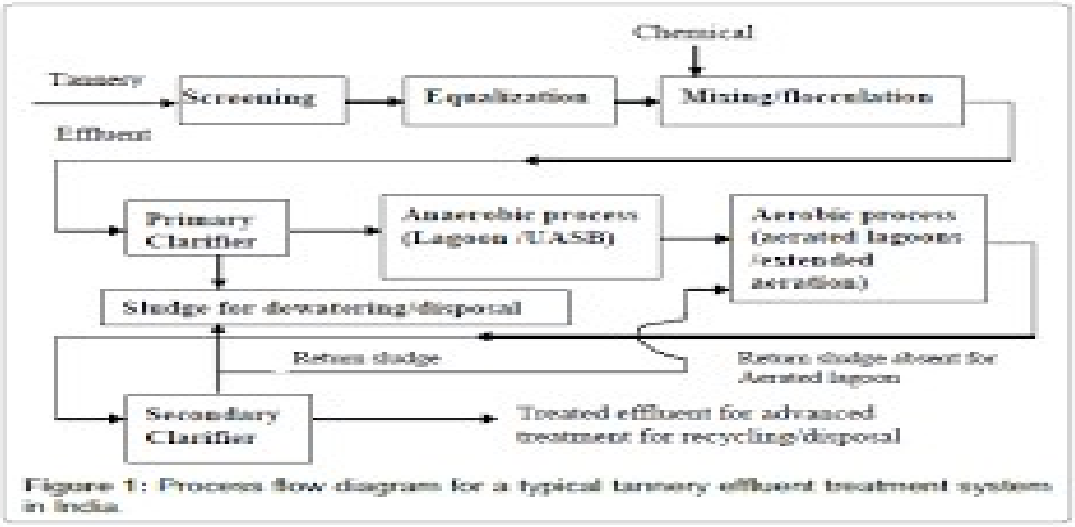

Figure 1: Process flow diagram for a typical tannery effluent treatment system in India.

Faculty Name:

ARATI KUMARI

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Content

S.No.	Topic	Page No.
1	Vision of department	
2	Mission of department	
3	PEO's	
4	PO's	
5	Course objectives and course outcomes(Co)	
6	Mapping of CO's with PO's	
7	Time table	
8	Student list	
9	Lecture plans	
10	Assignments	
11	Sessional question paper	
12	Result	
13	Result analysis	

VISION STATEMENT

- To emerge as a national leader in graduate level studies in all sub areas of leather field and to make significant contribution to the development of the society, industry, nation and the world.

MISSION STATEMENT

- Educate leather technology students to produce quality engineers who serve leading firms and different sectors of the industry and can work in multi-disciplinary environment to anticipate and address evolving challenges of the 21st century in tanning and footwear industry.
- Impart high performance knowledge in leather and footwear sector that are economic and environment friendly.
- To establish national leadership and provide technological support to the Indian leather industry.
- Improve fundamental knowledge of inter relationship between the built environment and natural systems.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

After successful completion of program, graduates will be able to

PEO1: Work in the Leather and chemical and footwear field.

PEO2: Pursue higher studies.

PEO3: Contribute in teaching, research and other innovative activities of Leather technology and its allied fields.

PEO4: Work in the multicultural and multidisciplinary groups for the sustainable development and growth of leather industry projects and profession.

PROGRAMME OUTCOMES (PO):

Students who complete the B.E. degree in leather technology will be able to:

1. An ability to apply knowledge of mathematics, science, and engineering,

2. The ability to conduct laboratory experiments and to critically analyze and interpret experimental data.
3. The ability to perform design in leather by means of design experiences integrated throughout the professional component of the curriculum.
4. An ability to function on teams, that must integrate contributions from different areas of leather technology towards the solution of multi-disciplinary projects.
5. An ability to identify, formulate, and solve Leather industries problems.
6. An understanding of professional practice issues in leather technology including professional and ethical responsibility.
7. An ability to write and speak effectively.
8. The broad education necessary to understand the impact of leather fields solutions in a global and societal context.
9. A recognition of the need for, and an ability to engage in life-long learning,
10. An ability to use the techniques, skills, and modern tools necessary for leather technology practices.
11. Possess a thorough understanding of techniques that are appropriate to environment and country.
12. Possess ability to estimate costs, estimate quantities and evaluate materials for leather manufacturing.

COURSE OBJECTIVE AND COURSE OUTCOMES:

Institute / College Name :	MUZAFFARPUR INSTITUTE OF TECHNOLOGY		
Program Name	**B. Tech.Leather Technology**		
COURSE CODE	071823		
COURSE NAME	**Tannery waste Management**		
Lecture / Tutorial / Practical (per week):	3 – 0- 3	**Course Credits**	5
Course Coordinator Name	ARATI KUMARI		

Course objective:

The objective of this course is to have a clear concept of sources of tannery wastes (solid & liquid) and effluent load from different sections of a tannery, method for estimation of different

parameters of tannery waste water, tannery waste treatment, Indian and international standards for industrial effluent discharge and recovery & reuse of waste water and materials.

Course Outcomes (CO):

CO1: Became able to perform the estimation of all parameters of tannery waste water viz. TDS, SS, COD, BOD, Sulphides etc.

CO2: Became able to know the permissible limits of industrial(tannery) effluent discharge.

CO3: Became able to identify and rectify the processing receipes and analyze their economic feasibility when the effluent load is very high (such as recovery & reuse of waste water and materials and eco- friendly technologies).

CO4: Became able to model mathematically the effluent load from different tanneries and analyze & design a lay out for effluent treatment plant.

MAPPING OF COs AND POs

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓		✓			✓	✓	✓		✓	
CO2		✓			✓	✓			✓		✓	
CO3	✓	✓		✓	✓	✓	✓	✓	✓			✓
CO4	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓

Correlation level: 1- slight (Low) 2- moderate (Medium) 3-substantial (High)

COURSE SYLLABUS:

Topics	Number of Lectures	Weightage (%)
Water pollution in general perspectives Leather industry attributed for water pollution, Types of water pollution- physical, chemical and biological pollution Hazardous effects of water pollution on land, ground water, surface water, aquatic life and sea. Ecological system and water pollution	10	25

Tannery Effluent Types of tannery effluent, characteristics of effluent from beamhouse processes, tanyard processes and finishing processes, their nature and pretreatment before disposal. Most toxic ingredients, hazardous of tannery effluents, principles involved in removing their toxic effect from tannery effluent. Principles for estimation of TDS, SS, DO, COD, BOD, sulphides, chromium, non-biodegradable and aromatic substances in waste water	10	25
Primary Treatment Main object of primary treatment- Primary treatment units, waste water in tanneries Screening and equalization of waste water	5	12
Secondary Treatment Principles of secondary treatment- Different processes involved in secondary treatment systems, lagoon treatment, aeration treatment. Trickling filter, systematic design of these systems	5	12
Tertiary Treatment Unit operation in controlling pollutant at tertiary stage	3	6
Standards and Specifications Indian standard, International standards, specifications for industrial effluent discharged, types of effluent disposal	4	10

Recovery and of waste water and materials Different processes in recovery and reuse of waste water and material in tanning industry, economic feasibility of different processes	**4**	**10**

MUZAFFARPUR INSTITUTE OF TECHNOLOGY

B.Tech. 8th Semester (2014 Batch) PROVISIONAL TIME TABLE WITH EFFECT FROM 09.02.2018

8thSEMESTER Leather Technology					ROOM NO. LB-1			
	10:00 - 10:50	10:50 - 11:40	11:40 - 12:30	12:30 – 1: 20	1:20 – 1:50	1:50- 2:40	2:40 - 3:30	3:30 – 4:20
MON					R	TWM(AK)		
TUES					E			
WED					C	TWM(AK)		
THUR					E			
FRI		TWM LAB(AK)				TWM(AK)		
SAT					S S			

FACULTY NAME: AK: ARATI KUMARI
PAPER NAME: TWM: TANNERY WASTE MANAGEMENT

STUDENTS LIST:

Sl. No.	College Roll No.	NAME
1.	14LT06	AKANSHA KUMARI
2.	14LT07	SONU KUMAR
3.	14LT08	SHILPEE MISHRA
4.	14LT09	PRINCE KUMAR
5.	14LT10	GAUTAM KUMAR
6.	14LT11	KUNAL GAURAV
7.	13LT03	SANJEEV KUMAR RAM
8.	13LT07	RITESH LAL RAJAK
9.	12LT05	ADITYA KUMAR

Text Books:

TB1:. Principles of Leather Making by S.S.Dutta
TB2: Environmental & Tannery – M.C.C. Carre et. Al. centre technique du cuir, Lyon, France

Reference journals:

Different journals of ILTA

COURSE PLAN:

Topic No.	Topic	No. of Lecture/ lecture no.	Text book
1.	**Water pollution in general perspectives**	**10**	**TB1**
	Leather industry attributed for water pollution, Types of water pollution- physical, chemical and biological pollution	1-5	
	Hazardous effects of water pollution on land, ground water, surface water, aquatic life and sea	6-8	
	Ecological system and water pollution	9-10	
2.	**Tannery Effluent**	**10**	**TB1 & TB2**
	Types of tannery effluent, characteristics of effluent from beamhouse processes, tanyard processes and finishing processes, their nature and pretreatment before disposal	11-15	
	Most toxic ingredients, hazardous of tannery effluents, principles involved in removing their toxic effect from tannery effluent	16-17	
	Principles for estimation of TDS, SS, DO, COD, BOD, sulphides, chromium, non-biodegradable and aromatic substances in waste water	18-20	

3.	**Primary Treatment**	**5**	**TB1 & TB2**
	Main objects of primary treatment – Primary treatment units, Waste water in tanneries, Screening and equalization of waste water	21-25	
4.	**Secondary Treatment**	**5**	**TB1 & TB2**
	Principles of secondary treatment- Different processes involved in secondary treatment systems, lagoon treatment, aeration treatment	26-28	
	Trickling filter, systematic design of these systems	29-30	
5.	**Tertiary Treatment**	**3**	**TB1 & TB2**
	Unit operation in controlling pollutant at tertiary stage	31-33	
6.	**Standards and Specifications**	**4**	**TB1 & TB2**
	Indian standard, International standards, specifications for industrial effluent discharged, types of effluent disposal	34-37	
7.	**Recovery of Waste Water and Materials**	**4**	**JILTA**
	Different processes in recovery and reuse of waste water and material in tanning industry, economic feasibility of different processes	38-41	
	Total no. of lectures	**41**	

DETAILS OF ASSIGNMENTS:

S.No.	Assignment	Topic No.
1	Assignment 1	1
2	Assignment 2	2
3	Assignment 3	3,4,5
4	Assignment 4	6,7

Tannery Waste Management (071823)

Assignment -1

Q.1 What do you mean by ecosystem balance and pollution?

Q.2 How water pollution due to leather industry affects our eco system?

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Assignment -2

Q.1 Define tannery effluent? Tabulate the sources of effluents from different segments of a tannery from pre-tanning to post tanning.

Q.2 Differentiate between DO, BOD and COD?

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Assignment -3

Q.1 Discuss briefly the working procedure of primary treatment units.

Q.2 Mention the principles of secondary treatment.

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Assignment -4

Q.1 Write down the permissible limits for industrial effluents discharged in surface water and on land.

Q.2 Mention the advantages of recover, recycle and reuse water in a tannery.

B.Tech. VIII sem. Leather Technology
Mid Semester Examination-2018

Subject: Tannery Waste Management Code: LT-071823

Max. marks:20 **Time** :2Hours

Note: Attempt any **four** questions. All questions have equal marks. Assume any missing data.

Q1. Mention the different types of pollution.

Q2. Discuss the characteristics of effluents from different segments of tannery.

Q3. Define dissolved oxygen. Write about its importance in ecosystem. How will you find out BOD & COD?

Q4. Mention the specification for industrial effluent discharge in river. Detail the method of primary treatment of tannery effluents.

Q5. Distinguish between aerobic biodegradation & anaerobic biodegradation of tannery effluents. With a neat and clean sketch discuss the working of trickling filter.

Q6. Write short notes on any three:-

(a) Effect of tannery effluents on land (b) Solid wastes

(c) Toxic metals (d) Oxidation pond

(e) Recovery and reuse of chromium

Result of the students

Roll No	Name	Marks of attendance	Class test	End semester exam	Total	Marks of attendance	Class performance	viva voice	Total