Maharashtra State Board of Technical Education, Mumbai

K-2

LABORATORY PLAN (LP)

Academic Year: 2026-27

Date: 08/08/2026

Institute Name & Code: K. K. Wagh Polytechnic, Nashik-3 (0078) Class: TYCH

Program and Code: Chemical Engineering (CH) Course Index: CO306

Course Name: **Food Technology** Course Code &. Abbr.: 315310(FT)

Total Hrs: 30 Semester: 5th Scheme: K Name of Faculty: Mrs. Y. S. Kumawat

- **INDUSTRY EXPECTED OUTCOME**

Develop expertise in food processing, preservation techniques, oil-seed technology, additive use, and compliance with food laws and regulations in food processing industries.

- **COURSE LEVEL LEARNING OUTCOMES (COS)**

CO506.1 - Identify the causes of food spoilage and food poisoning and suggest preventive measures for the same.

CO506.2 - Select the appropriate equipment for Fruit and Vegetable Processing as per requirements.

CO506.3 - Apply the technologies and methods used in the lab scale production and processing of oils from seeds.

CO506.4 - Select the relevant food additive so as to maintain the nutritional values and enhance the shelf life food products.

CO506.5 - Follow the food laws and standards. FSSAI, FSSA 2006, AGMARK , BIS, and Codex.

- **Teaching and Examination Scheme:**

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs/Week			SLH	NLH			Theory				Based on LL & TSL Practical				Based on SL		
											FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
				CL	TL	LL					Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
315310	FOOD TECHNOLOGY	FT	DSE	4	-	**2**	-	**6**	**2**	03	30	70	100	40	2026	10	2026#	10	--	--	**150**

Abbreviations: CL- Class Room Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @$ Internal Online Examination

- **Laboratory Learning Outcome (LLO)**

LLO No.	Title of LLO
LLO 1.1	Estimate the moisture content in food materials.
LLO 1.2	Determine moisture content of different food materials using different techniques such as tray drying, oven drying etc..
LLO 2.1	Determine the pH values of different beverage samples such as fruit juices, carbonated drinks etc.
LLO 2.2	Analyse and interpret the Ph values obtained from the experiment to assess the quality and stability of fruit beverages.
LLO 3.1	Follow the procedure to prepare tomato ketchup by adding specific food preservatives to enhance the shelf life of the ketchup.
LLO 3.2	Practice proper food hygiene throughout the preparation process to ensure the product is safe for

	consumption.
LLO 4.1	Follow the procedure to dry the vegetables by using a suitable dryer.
LLO 4.2	Assess the quality of dried vegetables in terms of texture and colour properties.
LLO 5.1	Measure the specific gravity of fruit juice using appropriate instruments such as a hydrometer or density meter.
LLO 5.2	Measure the viscosity of fruit juice using a viscometer or similar equipment.
LLO 6.1	Determine the iodine value of vegetable oil by titration.
LLO 6.2	Interpret the iodine value to determine the level of unsaturation in the vegetable oil sample.
LLO 7.1	Determine the saponification value of vegetable oil by titration.
LLO 7.2	Interpret the saponification value to detect adulteration or contamination in vegetable oils.
LLO 8.1	Determination of acid value of vegetable oil using a titration method.
LLO 8.2	Interpret the results to evaluate the quality and freshness of the vegetable oil.
LLO 9.1	Determine the quantity of Benzoic acid in soft drinks by using titration.
LLO 9.2	Interpret test results to confirm the presence or absence of benzoic acid in the soft drink samples.
LLO 10.1	Select the food product as per the FSSAI standards.
LLO 10.2	Analyse the labels for mandatory information such as nutritional facts, ingredients list, net weight, manufacturer details, FSSAI license number, and expiry date.

- **COs, Practical Laboratory Learning Outcome (LLOs) and Mapping:**

PR. No	Relevant COs	Practical - Laboratory Learning Outcome (LLO)	Practical Titles	Planned Dates		Actual Date of conduction	Remark/ Assess-ment Date with Staff sign
				From	To		
1	CO1, CO2	LLO 1.1 LLO 1.2	*Estimation of moisture content indifferent food material samples such as orange pulp, apple pomace etc.	A-22/08/2026	A-29/08/2026		
2	CO1, CO2	LLO2.1 LLO2.2	**Determination of pH value for different beverage samples such as fruit juice, carbonated drink, packaged drinking water, etc. by using a pH meter.	A-29/08/2026	A-05/09/2026		
3	CO2	LLO 3.1 LLO 3.2	*Preparation of Tomato ketchup.	A-05/09/2026	A-05/09/2026		
4	CO2	LLO 4.1 LLO 4.2	Processing of vegetables such as potatoes, onions, etc., by drying using dryers	A-05/09/2026	A-12/09/2026		
5	CO2	LLO 5.1 LLO 5.2	*Measurement of Specific gravity and viscosity of fruit juice sample.	A-12/09/2026	A-19/09/2026		
6	CO3	LLO 7.1 LLO 7.2	*Determination of saponification value of vegetable oil.	A-19/09/2026	A-26/09/2026		
7	CO3	LLO 8.1 LLO 8.2	Determination of acid value of vegetable oil.	A-26/09/2026	A-03/10/2026		

PR. No	Relevant COs	Practical - Laboratory Learning Outcome (LLO)	Practical Titles	Planned Dates		Actual Date of conduction	Remark/ Assess-ment Date with Staff sign
8	CO4	LLO 9.1 LLO 9.2	*Determination of the quantity of benzoic acid in soft drinks.	A-03/10/2026	A-10/10/2026		
9	CO5	LLO 10.1 LLO 10.2	Compliance with ingredients listed on food labels matches FSSAI standards.	A-10/10/2026	A-17/10/2026		
10			**Practical Beyond Syllabus**	A-17/10/2026	A-17/10/2026		

- **ASSESSMENT METHODOLOGIES/TOOLS**

A. Formative assessment (Assessment for Learning) (FA-TH)

- Continuous assessment based on process and product related performance indicators. Each practical will be assessed considering
  - 60% weightage is to process
  - 40% weightage to product

B. Summative Assessment (Assessment of Learning) (SA-TH)

- Continuous Assessment based on Process and Product related performance indicators. Each practical will be assessed considering
  - 60% weightage to Process
  - 40% weightage to Product

- **Laboratory Equipment / Instruments / Tools / Software required**

Sr. No.	Equipment Name with Broad Specifications	Relevant LLO Number
1	Weighing balance A weighing balance with a range of 0-5 kg is a suitable choice for laboratory settings.	1,3,4,5,6,7,8,9
2	Dryer Number of trays. 12 Trays ; Loading capacity. 30 kg ; External Dimension (cm). 137 X531 X 94.	1,4
3	Digital pH meter A digital pH meter has a measurement range of 0-14 pH, with an accuracy of ±0.01 pH.Resolution and sensitivity are also important factors, with a resolution of 0.001 pH and asensitivity of 1 mV/pH.	2
4	Crusher Hammer mill include a rotor diameter of 4-12 inches, a motor power of 1/4-1 HP, and agrinding capacity of 1-10 pounds per hour. The mill's speed can range from 1,000 to5,000 RPM, and the screen size can vary from 1/16 to 1 inch.	3
5	Heating Bath Capacity: 3.4 L · Temperature Range: RT+5°C to 100°C · Temperature Resolution:±0.5°C · Temperature Stability: ±1.0°C · Inner Dimension (WxDxH): 168x168x120 mm.	3
6	Specific gravity bottle and viscometer Specific gravity bottle:Capacity: 10 To 50 mL ; Size/Dimension. Standard ; Features.Standard ; Color. Transperent Viscometer :Main Body Size 360 × 350 × 590 mm (maximum) Weight approx. 9 kgSettable Rotational Speed 0.1 to 200 rpm (number of configurable stages 290) ViscosityMeasurement Accuracy ±1.0??F.S.?	5
7	Titration set up Burette 10-50mL , Pipette 10 mL, Conical flask 20260mL, Holding stand	6,7,8,9

- **References:**
- **Suggested Learning Materials / Books:**

Sr. No.	Author	Title of Book	Publication
1	P. J. Fellows	Food Processing Technology	Wood head Publishing Ltd., Cambridge ISBN:978-1-84569-216-2
2	G. Subbulakshmi	Food Processing &Preservation	New Age International Publisher ISBN: 978-8122424854
3	Valentas Rotstein Singh	Handbook of Food EngineeringPractical	CRC Press, New York ISBN: 978-1566763627
4	Maney Shakuntala	Food, Facts and Principles	New age international (P) Ltd., New DelhiISBN: 978-8122414824
5	Jim Smith, Lily Hong–Shum	Food Additives Data Book	John Wiley & Sons. Second Edition.2011 ISBN:978-1405133797
6	Sudhir Andrews	Food and BeverageManagement	The Mc Graw-Hill Companies ISBN: 978-0070655737
7	R. Singaravelaran	Food and Beverage Service	Oxford University Press, New Delhi ISBN: 978-019569962026

- **Learning Websites & Portal**

Sr. No	Link / Portal	Description
1	https://nptel.ac.in/courses/103107088/33	Food Production Methods
2	https:// nptel.ac.in/courses/103103029/35	Food Processing Equipment
3	https://public.wsu.edu/~rasco/.../Intro%20to%20Food%20Processing82905.pdf	Fundamentals of food processing engineering
4	https://www.slideshare.net/shilleary/introduction-to-food-pr	Introduction to food processing
5	https://www.slideshare.net/.../oilseed-processing-for-smallscale-producers-9582940	Oil seed processing
6	https://www.fda.gov/Food/.../Food Additives Ingredients/default.htm	Food Additives
7	http://www.intechopen.com/books/food-industry/quality-management-important- aspects-for-the-food-industry	Introduction to foodtechnology

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