Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BMIA1	**BASIC AND CLINICAL BIOCHEMISTRY**	Elective Generic / Discipline Specific Elective-I	**Y**	**-**	**-**	**-**	**3**	**3**	**25**	**75**	**100**

Course Objectives			
CO1	Attain thorough knowledge on carbohydrates and lipids, their characteristic properties and organization in carrying out all the living functions which constitute the life.		
CO2	Explain the biological activity of amino acids and proteins.		
CO3	Identify the metabolic errors in enzymes of carbohydrates and lipids.		
CO4	Describe the disorders in amino acid metabolism.		
CO5	Interpret the consequences, biochemical, clinical features, diagnosis and treatment of metabolic diseases of day today life.		
	Details	**No.of Hours**	**Course Objectives**
UNIT I	Biomolecules -Carbohydrate – General properties, function, structure, classification– monosaccharides (Glucose, Fructose, Galactose), Oligoaccharides (Sucrose, Maltose, Lactose) and polysaccharides (Starch, Glycogen,) and biological significance. Lipids – General properties, functions, structure, classification (Simple, Derived and Complex), Cholesterol, LDL, HDL – biological significance.	12	CO1
UNIT II	Biomolecules - Amino acids – General properties, functions, structure, classification and biological significance. Proteins– General structure, Properties, functions, classification and biological significance.	12	CO2
UNIT III	Disorders of Metabolism: Disorders of carbohydrate	12	CO3

	metabolism: diabetes mellitus,ketoacidosis, hypoglycemia, glycogen storage diseases, galactosemia and lactose intolerance. Disorders of lipid metabolism: hyperlipidemia, hyperlipoproteinemia, hypercholesterolemia, hypertriglyceridemia,sphingolipidosis.		
UNIT IV	Disorders of Metabolism: Disorders of amino acid metabolism:alkaptonuria, phenylketonuria, phenylalaninemia, homocystineuria, tyrosinemia, aminoacidurias.	12	CO4
UNIT V	Evaluation of organ function tests: Assessment and clinical manifestations of renal, hepatic, pancreatic, gastric and intestinal functions. Diagnostic enzymes: Principles of diagnostic enzymology. Clinical significance of aspartate aminotransferase, alanine aminotransferase, creatine kinase, aldolase and lactate dehydrogenase.	12	CO5
	Total	60	

Course Outcomes

Course Outcomes	On completion of this course, students will;	
CO1	Explain the structure, classification , biochemical functions and significance of carbohydrates and lipids	PO1
CO2	Differentiate essential and non-essential amino acids, biologically important modified amino acids and their functions, Illustrate the role, classification of Proteins and recognize the structural level organization of proteins, its functions and denaturation.	PO1
CO3	Assess defective enzymes and Inborn errors. Recognize diseases related to carbohydrate and lipid metabolism.	PO4, PO5, PO6
CO4	Discuss and evaluate the pathology of aminoacid metabolic disorders.	PO4, PO5, PO6
CO5	Appraise the imbalances of enzymes in organ function and relate the role of Clinical Biochemistry in screening and diagnosis.	PO5, PO6, PO9

Text Books	
1	Satyanarayana, U. and Chakrapani, U(2014).Biochemistry,4th Edition, Made Simple Publisher.
2	Jain J L, Sunjay Jain and Nitin Jain (2016).Fundamentals of Biochemistry, 7th Edition, S Chand Company.
3	AmbikaShanmugam's (2016). Fundamentals of Biochemistry for Medical Students, 8th Edition. Wolters Kluwer India Pvt Ltd.
4	Vasudevan. D.M.Sreekumari.S, Kannan Vaidyanathan (2019). Textbook Of Biochemistry For Medical Students. Kindle edition, Jaypee Brothers Medical Publishers
5	Jeremy M. Berg,LubertStryer, John L. Tymoczko, Gregory J. Gatto (2015). Biochemistry, 8th edition. WH Freeman publisher.
References Books	
1	AmitKessel&Nir Ben-Tal (2018). Introduction to Proteins: structure, function and motion. 2ndEdition, Chapman and Hall.
2	David L. Nelson and Michael M. Cox (2017).Lehninger Principles of Biochemistry, 7thEdition W.H. Freeman and Co., NY.
3	LupertStyrer, Jeremy M. Berg, John L. Tymaczko, Gatto Jr., Gregory J (2019). Biochemistry. 9thEdition ,W.H.Freeman& Co. New York.
4.	Donald Voet, Judith Voet, Charlotte Pratt (2016). Fundamentals of Biochemistry: Life at the Molecular Level, 5th Edition, Wiley.
5.	Joy PP, Surya S. and AswathyC (2015). Laboratory Manual of Biochemistry, Edition 1.,Publisher:Kerala agricultural university.
Web Resources	
1	https://www.abebooks.com › plp
2	https://kau.in/document/laboratory-manual-biochemistry
3	https://metacyc.org
4	https://www.medicalnewstoday.com
5	https://journals.indexcopernicus.com

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	M										
CO2	M										
CO3				S	S	S					
CO4				S	S	S					
CO5					S	S			S		

Semester –I					
Course Code 23BMIAP1	**Title of the Course**	**Lab-I: Lab in General Microbiology**	**P**	**Credits 2**	**Hours 2**
Objective1	➢ Gain knowledge on Media preparation ➢ Prepare media for bacterial growth. Discuss about plating and growth measurement techniques ➢ Identify the microbes by different staining methods ➢ Discuss the plate count and heamocytometric count method ➢ To Identify the organism based on biochemical test,Acquire knowledge on assessment of milk quality and water quality by various methods				

1. **Preparation of media**: nutrient broth, nutrient agar plate, soft agar.
2. **Pure culture techniques**: streak plate, spread plate and pour plate.
3. **Motility determination** – Hanging drop method and soft agar method
4. **Isolation of bacteria**- From different environmental samples (Soil, water, food).
5. **Enumeration of bacteria** - viable count (plate count) and total count (Haemocytometer count). **Direct microscopic observation**: fungal spores and mycelium (KOH Mount)
6. **Staining method**: simple, negative, Gram's staining and spore staining.
7. **Biochemical methods** - IMViC test, H_2S, TSI, Oxidase, catalase, urease test
8. **Water quality Assessment:**Analysis of drinking water(MPN).

Outcome1	• Demonstrate the various types of media preparation. • Isolate and Identifying the pure colonies by applying different plating methods • Determine the motility of bacteria, Apply the differential staining procedure to differentiate bacteria based on gram staining. • Distinguish the viable and total count of cells by plate count and heamocytometric count method • Elaborate on the bacterial identification - physiological, and biochemical methods.Analysis the portability of water

Reference and Textbooks:-

Aneja, K.R. (2003). Experiments in Microbiology: Plant Pathology and Tissue Culture, New Delhi: WishwaPrakashan.

Aneja, K.N. (2018). Lab Manual of Microbiology and Biotechnology, Medtec Publisher

Cappuccino, J.H. and Sherman, N. (2014). Microbiology – A Lab Manual (10th ed). Singapore: The Benjamin Publishing Company.

David, T. Plummer, (1992). An introduction to practical Biochemistry (3rd ed). New Delhi: Tata McGraw Hill publishing Com. Ltd.

Gunasekaran, P. (1995). Laboratory Manual in Microbiology. New Delhi: New Age International (P) Ltd. Publishers.

Gold man, E and Green, H.(2008) . Practical handbook of microbiology. CRC press Jayaraman, J. (1981). Laboratory Manual in Biochemistry. New Delhi: New Age International (Pvt.) Ltd. Publishers.

Palanivel, P. (2009). Laboratory Manual for Analytical Biochemistry & Separation Techniques. (4th ed). School of Biotechnology, Madurai Kamaraj University, Madurai.

Reddy, C. A., Beveridge, T. J., Breznak, J. A., Marzluf, G. A., Schmidt, T. M., & Snyder L. R. (2007). Methods for General and Molecular Microbiology (3rd ed). Washington: American Society for Microbiology.

Trivedi, R. (2016). Practical Mannual in Microbial Physiology and Industrial Microbiology. New Delhi: SSDN Publishers

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BMIA2	**BIO INSTRUMENTATION**	Elective Generic /Discipline Specific Elective II	**Y**	**-**	**-**	**-**	**3**	**3**	**25**	**75**	**100**

Course Objectives			
CO1	Understand the analytical instruments and study the basic principles in the field of sciences.		
CO2	To gain knowledge about principles of spectroscopy		
CO3	Understand the analytical techniques of Chromatography and electrophoresis		
CO4	To understand the principle of different types of scans used in medical diagnosis		
CO5	To gain information about the principles of radioactivity and its measurements		
Unit	**Details**	**No.of Hours**	**Course Objectives**
Unit I	Basicinstruments:pH meter, Buffer of biological importance, Centrifuge- Preparative, Analytical and Ultra, Laminar Air Flow, Autoclave**,** Hot Air Oven and Incubator. Biochemical calculations-preparations of Molar solutions - Buffers-Phosphate, Acetate, TE, TAE- calculation of Normality ,PPM-Ammonium sulphate precipitation.	12	CO1
Unit II	Spectroscopic Techniques:Spectroscopic Techniques: Colorimeter, Ultraviolet and visible, Infra red and Mass Spectroscopy.	12	CO2
Unit III	Chromatographic and Electrophoresis Techniques:Chromatographic Techniques: Paper, Thin Layer, Column, HPLC and GC. Electrophoresis Techniques: Starch Gel, AGE, PAGE.	12	CO3
Unit IV	Imaging techniques:Principle, Instrumentation and application of ECG, EEG, EMG, MRI, CT and PET scan radioisotopes.	12	CO4
Unit V	Fluorescence and radiation based techniques:Spectrofluorimeter, Flame photometer, Scintillation counter, Geiger Muller counter, Autoradiography.	12	CO5
	Total	60	

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Gain knowledge about the basics of instrumentation.	PO1,PO4,PO11
CO2	Exemplify the structure of atoms and molecules by using the principles of spectroscopy.	PO4,PO10,PO11
CO3	Evaluate by separating and purifying the components.	PO4,PO7,PO11
CO4	Understand the need and applications of imaging techniques.	PO7,PO8,PO11
CO5	Categorize the working principle and applications of	PO10,PO11

	fluorescence and radiation.	
Text Books		
1.	Jayaraman J (2011). Laboratory Manual in Biochemistry, 2nd Edition. Wiley Eastern Ltd., New Delhi .	
2.	Ponmurugan. P and Gangathara PB (2012). Biotechniques.1stEdition. MJP publishers.	
3	Veerakumari, L (2009).Bioinstrumentation- 5 thEdition -.MJP publishers.	
4	Upadhyay, Upadhyay and Nath (2002). Biophysical chemistry – Principles and techniques 3rd Edition. Himalaya publishing home.	
5	Chatwal G and Anand (1989). Instrumental Methods of Chemical Analysis. S.Himalaya Publishing House, Mumbai.	
References Books		
1	Rodney.F.Boyer (2000). Modern Experimental Biochemistry, 3rd Edition. Pearson Publication.	
2	SkoogA.,WestM (2014). Principles of Instrumental Analysis – 14th Edition W.B.SaundersCo.,Philadephia.	
3	N.Gurumani. (2006). Research Methodology for biological sciences- 1st Edition – MJP Publishers .	
4	Wilson K, and Walker J (2010). Principles and Techniques of Biochemistry and Molecular Biology.7thEdition. Cambridge University Press .	
5	Webster, J.G. (2004). Bioinstrumentation- 4th Edition - John Wiley & Sons (Asia) Pvt.Ltd,Singapore.	
Web Resources		
1	http://www.biologydiscussion.com/biochemistry/centrifugation/centrifugeintroduction-types- uses-and-other-details-with-diagram/12489	
2	https://www.watelectrical.com/biosensors-types-its-working-andapplications/	
3	http://www.wikiscales.com/articles/electronic-analytical-balance/ Page 24 of 75	
4	https://study.com/academy/lesson/what-is-chromatography-definition-typesuses.html	
5	http://www.rsc.org/learn-chemistry/collections/spectroscopy/introduction	

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	L			M							S
CO2				L						M	S
CO3				L			M				S
CO4							S	S			S
CO5										M	S

Course Code 23BMIAP2	Title of the Course	Lab-I: BIOINSTRUMENTATION PRACTICAL	P	Credits 2	Hours 2

1) Principlesandmethodsofsterilization.
2) Principlesandmethodsof using pH meter.
3) Principlesandmethodsof using Colorimeter.
4) Principlesandmethodsof using UV-Vis Spectrophotometer.
5) Principlesandmethodsof using Microscopes.
6) Principlesandmethodsof using Centrifuge in separating Microbial cultures.
7) Principlesandmethodsof using Centrifuge in separating Microbial based proteins/enzymes.
8) Principlesandmethodsof using Laminar air flow.
9) Principlesandmethodsof using Hot air oven.

References

1. Microbiology: A Laboratory Manual (2002) by J.G. Cappuccino and N. Sherman, Addison-Wesley.
2. Laboratory Manual of Experimental Microbiology (1995) by R.M. Atlas, A.E.Brown and L.C.Parks, Mosby, St. Louis.
3. Microbiology Laboratory Manual (2003) by T. Sundararaj, No.5, I cross street, Thirumalai Nagar, Perungudi, Chennai 600 096 2nd Edition.
4. Casida L.E. Industrial Microbiology, Wiley Eastern Limited, New Delhi.
5. PrescottS.C. and Dunn C.C. Industrial Microbiology, Tata McGraw-Hill PublishingCompany limited, New Delhi.

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BMIA3	**CLINICAL LABORATORY TECHNOLOGY**	**ELECTIVE GENERIC/DISCIPLINE SPECIFIC ELECTIVE -III**	**Y**	**-**	**-**	**-**	**3**	**3**	**25**	**75**	**100**

Learning Objectives	
CO1	Demonstrate ethical and professional conduct with patients, laboratory personnel, health-care professionals, and the public.
CO2	Explain how accurate and reliable information might be obtained about proper procurement, storage, and *handling* of laboratory *specimens*.
CO3	Develop a sound scientific knowledge foundation that prepares them to interpret, analyze and evaluate scientific knowledge in clinical practice.
CO4	Perform a full range of laboratory tests with accuracy and precision.
CO5	Establish quality assurance principles and practices to ensure the accuracy and reliability of laboratory information.

Unit	Details	No.of Hours	Course Objectives
Unit I	**Introduction to Clinical Laboratory Science**: Basic laboratory principles - Code of conduct for medical laboratory personnel - Organization of clinical laboratory and role of medical laboratory technician - Safety measures. Assessment of a patient and brief history of collection. Maintenance of Hygiene & Infection Control Practices.	12	CO1
Unit II	**Specimen collection and processing** - Blood, urine, stool, sputum CSF, amniotic fluid and bile. Separation of serum and plasma, Handling of specimens for testing, preservation of specimens, transport of specimens and factors affecting the clinical results.	12	CO2
Unit III	**Introduction to histopathology**-Methods of examination of tissues and cells, Fixation of tissues: Classification and properties of fixatives. Tissue processing - Collection of specimens, Labeling and fixation, Dehydration, Clearing, Impregnation, Embedding - Paraffin block making, Section Cutting, Microtomes – types and mounting of sections.	12	CO3
Unit IV	**Introduction to Haematology**- Laboratory methods used in the investigation of coagulation disorders - coagulation tests , Routine coagulation tests, (prothrombin time , plasma recalcification time,partial thromboplastin time , activated partial thromboplastin time, thrombin time), Laboratory diagnosis of bleeding disorders. Estimation of fibrinogen, Assay of coagulation factors.	12	CO4
Unit V	**Quality Standards in Health Laboratories** – Development and	12	CO5

	implementation of standards, Accreditation Boards –NABL, ISO, CAP, COLA, Performing quality assessment - pre-analytical, analytical, and post-analytical phases of testing.		
	Total	60	
Course Outcomes			
Course Outcomes	On completion of this course, students will;		
CO1	Describe characteristics of laboratory organizations and demonstrate professionalism by displaying professional conduct, model ethical behavior and operate as a vital member of the medical lab team. Practice safety or infection control procedures in the clinical laboratory, properly use safety equipment and maintain a clean, safe work environment.	PO3, PO11	
CO2	Accurately collect specimens for various purposes. Determine appropriate tests based on test request, Maintain standard and transmission-based precautions, Engage in the scientific process by understanding the principles and practices of clinical study design, implementation, and dissemination of results.	PO5, PO6, PO11	
CO3	Identify the basic structure of cells, tissues and organs and describe their contribution to normal function. Interpret light and electron microscopic histological images and identify the tissue source and structures. Relate and recognize the histological appearance of affected tissues to the underlying pathology.	PO6, PO8, PO9, PO11	
CO4	Recognize the pathologies behind benign and malignant disorders of erythrocytes, leucocytes, thrombocytes and familiar with the diagnosis, evaluation, and management of hematologic malignancies.	PO5, PO6, PO9, PO11	
CO5	Interpret, implement, and complying with laws, regulations and accrediting standards and guidelines of relevant governmental and non-governmental agencies.	PO1,PO10	
Text Books			
1.	Mukharji,K.L. (2000).Medical Laboratory Techniques, Vol - I, II & III, 5th Edition. Tata McGrawHill, Delhi.		
2.	Ochei,A., Kolhatkar.A. (2000).Medical Laboratory Science: Theory and Practice, McGraw Hill Education.		
3	RamnikSood (2015).Concise Book of Medical Laboratory Technology:Methods and Interpretation, 2ndEdition, Jaypee Brothers Medical Publishers, NewDelhi.		
4.	S. Ramakrishnan, KN Sulochana(2012). Manual of Medical Laboratory Techniques,Jaypee Brothers Medical Publishers Pvt. Ltd		
5.	Talib V.H. (2019).Handbook Medical Laboratory Technology, 2ndEdition, Directorate of health services, Government of India.		
References Books			
1	Rutherford, B.H. Gradwohl , A.C. Sonnenwirth L. Jarett. Gradwohls. (2000). Clinical Laboratory Methods and Diagnosis, Vol-I, 8th edition, Mosby.		
2	Baker, F.J., Silverton, R.E., and Pallister,.J. (1998). An Introduction to Medical Laboratory Technology, 7thEdition, CBS Publishers and Distributors Pvt. Ltd.		
3	Godkar (2021).Textbook of Medical Laboratory Technology, 3rdEdition,Bhalani		

	Publishing House.
4	M.N.Chatterjee and RanaShinde.(2008). Textbook of Medical Biochemistry, 7thEdition, Jaypee Brothers Medical Publishers Pvt. Limited.
5	James G Cappucino. and Natalie Sherman. (2016). Microbiology – A laboratory manual.(5th Edition).The Benjamin publishing company. New York.
Web Resources	
1	https://www.jaypeedigital.com › book
2	https://www.pdfdrive.com › wintrobes-clinical-hematology
3	https://currentprotocols.onlinelibrary.wiley.com/doi/pdf/10.1002/cpet.5
4	https://vlab.amrita.edu/index.php?sub=3&brch=272
5	https://nptel.ac.in/courses/102105087

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1			M								S
CO2					M	S					S
CO3						S		S		S	S
CO4					M	S			S		S
CO5	M									M	

Course Code 23BMIAP3	Title of the Course	Lab-I: CLINICAL LABORATORY TECHNOLOGY PRACTICAL	P	Credits 2	Hours 2

1. Blood grouping and Rh typing.
2. Test for urine sugar (Benedict's method)
3. Estimation of blood glucose
4. Estimation of serum protein
5. Preparation of blood agar and demonstration of hemolysis.
6. Antibiotic sensitivity tests.
7. Assessment of minimum inhibitory concentration.

References

1. Dr. S. Rajan, Manual for Medical Laboratory Technology (2012), Anjanaa Book House, Chennai.
2. Gradwohls, (2000). Clinical Laboratory Methods and Diagnosis, M.D.B.I. Publications, New Delhi.
3. Richard R, (1989). Clinical Laboratory Medicine, Medical Publi, Chicago.

Williams and J. William, (1990). Haematology. Mc Graw Hill, New York.

4. Kanai L. Mukherjee, (1996). Medical Laboratory Technology, Volume-I. Tata Mc Graw Hill, New Delhi.

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BMIA4	**FOOD PROCESSING TECHNOLOGY**	**ELECTIVE GENERIC/ DISCIPLINE SPECIFIC ELECTIVE - IV**	**Y**	**-**	**-**	**-**	**3**	**3**	**25**	**75**	**100**

Learning Objectives	
CO1	To provide knowledge on objectives of food preservation.
CO2	To explain the freshness criteria and quality assessment of meat and fish.
CO3	To outline the methods of milk processing and fermented milk products.
CO4	To explain the importance of fat and oil processing.
CO5	To discuss the methods of microbiological examination of foods.

Unit	Details	No.of Hours	Course Objectives
Unit I	Introduction to food preservation –objectives and techniques of food preservation. Preservation: principles of high temperature, low temperature, radiation, chemical preservatives and bio preservatives.	12	CO1
Unit II	Freshness criteria and quality assessment of meat and fish –spoilage and methods of preservation. Production of byproducts after processing waste and their utilization. Role of packaging material, types of packaging material.	12	CO2
Unit III	Composition of milk; assessment of milk, thermal processing of fluid milk-pasteurization (LTH, HTST&UHT techniques). Fermented milk products-cheese, Butter milk, Yogurt, Kumis, Kefir and Acidophilus milk. Hygiene and sanitation requirement in food processing and fermentation industries.	12	CO3
Unit IV	Importance of fats and oils in Food-Extraction of fats and Oils-Rendering, pressing, solvent extraction, pressing of oil- degumming, refining, bleaching, deodorization, fractionation, pyrolysis of fats, toxicity of frying oil.	12	CO4
Unit V	Methods for the microbiological examination of foods. Food borne illness and diseases. Microbial cultures for food fermentation. Indian Factories Act on safety, HACCP, Safety from adulteration of food.	12	CO5
	Total	60	

Course Outcomes

Course Outcomes	On completion of this course, students will;	
CO1	Assess the fundamental concepts of food preservation.	PO1, PO3, PO5,PO6, PO8
CO2	Investigate the quality assessment of meat and fish.	PO1, PO5, PO6, PO7, PO8

CO3	Design the processing of milk and milk quality assessment.	PO1, PO5, PO6, PO7, PO8
CO4	Explain about the importance of fats and oils.	PO1, PO4, PO6, PO7, PO8
CO5	Plan the food safety and adulteration detection.	PO3, PO4, PO6, PO7, PO8

Text Books

1.	Avantina Sharma. (2006). Text Book of Food Science and Technology, International Book Distributing Co, Lucknow, UP.
2.	Sivasankar. (2005). Food Processing and Preservation, 3rd Edition.,Prentice hall of India Pvt Ltd,NewDelhi.
3	Ramaswamy H & Marcotte M. (2006). Food Processing: Principles & Applications. Taylor & Francis.
4	NIIR Board of Food and Technologist. (2005). Modern Technology of Food Processing and Agrobased industries, National Institute of Industrial Research, Delhi.
5	Adams M.R. and Moss M. O (2007).Food Microbiology.New Age International.

Reference Books

1	Fellos PJ. (2005). Food Processing Technology: Principle &Practice 2nd Edition. CRC.
2	Peter Zeuthen and Leif Bogh-Sorenson. (2005). Food Preservation Techniques, WoodlandPublishing Ltd, Cambridge, England.
3	Gustavo V. Barbosa-Canovas, Maria S. Tapia, M. Pilar Cano. (2004). Novel Food Processing Technologies, CRC.
4	Suman Bhatti, Uma Varma. (1995). Fruit and vegetable processing organizations and institutions, 1st Edition., CBS Publishing, New Delhi.
5	MirdulaMirajkar, Sreelatha Menon. (2002). Food Science and Processing Technology Vol-2,Commercial processing and packaging, Kanishka publishers, New Delhi.

Web Resources

1	https://sites.google.com/a/uasd.in/ecourse/food-processing-technology
2	https://nptel.ac.in/courses/126105015
3	https://engineeringinterviewquestions.com/biology-notes-on-food-adulteration/
4	food processing | Definition, Purpose, Examples, & Facts | Britannica
5	Food Processing Technology | Food News & Views Updated Daily (foodprocessing-technology.com)

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	M		M		S	M		S	
CO2	M				S	M	S	S	
CO3	M				S	M	S	S	
CO4	M			S		S	S	S	
CO5			M	M		M	S	S	

Course Code 23BMIAP4	Title of the Course	Lab-I: FOOD PROCESSING TECHNOLOGY PRACTICAL	P	Credits 2	Hours 2

1. Viablecountofbacteriainmilk.
2. MethyleneBlueDyereductiontest.
3. Resazurindyereductiontest.
4. Phosphatasetest.
5. Litmusmilkreaction

References

1. Palanivel,P.(2000).LaboratoryManualforAnalyticalBiochemistry&SeparationTechniques. SchoolofBiotechnology,MaduraiKamarajUniversity,Madurai.
2. Aneja, K.R. (2003). Experiments in Microbiology: Plant Pathology and Tissue Culture. New Delhi: WishwaPrakashan.
3. Dr. S. Rajan, Manual for Medical Laboratory Technology (2012), Anjanaa Book House, Chennai.
4. Gradwohls, (2000). Clinical Laboratory Methods and Diagnosis, M.D.B.I. Publications, New Delhi.
5. Richard R, (1989). Clinical Laboratory Medicine, Medical Publi, Chicago.

Williams and J. William, (1990). Haematology. Mc Graw Hill, New York.