



CIRCULAR NO.SU/B.Sc./Biochem./41/2023

It is hereby inform to all concerned that, the syllabus prepared by the Ad-hoc Board and recommended by the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor has accepted **the syllabus of B.Sc. Biochemistry IIIrd and IVth semester under the scheme of Choice Based Credit & Grading System** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith.

This is effective from the Academic Year 2023-24 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.

REF.NO.SU/2023/15798-806

Date:- 23.10.2023.

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**Deputy Registrar,
Academic Section**

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- 1] **The Principal of all concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

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- 1] **The Director, Board of Examinations & Evaluation,**
Dr.BAMU,A'bad.
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**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
AURANGABAD.**



SYLLABUS

**B.Sc. Biochemistry
(Semester III to IV)**

Choice Based Credit system

Effective from June 2023

U. Divale
**Professor & Head
Department of Biochemistry
Dr. Babasaheb Ambedkar
Marathwada University,
Aurangabad.**

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**Choice Based Credit System (CBCS) Curriculum****For****Faculty of Science and Technology****Course Structure and Scheme of Examination****B.Sc. Three Year Undergraduate Degree Program for Biochemistry with effect from June 2022****Semester I**

	Course Code	Course Title	Teaching time/week	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1A) Core Courses	BCH -111	Core Course (Theory Paper-I)	2 hours	2	50	10	40	20
	BCH -112	Core Course (Theory Paper-II)	2 hours	2	50	10	40	20
	BCH -121	Lab course 1 (based on BCH -111 and BCH -112)	3 hours	1.5	50	10	40	20

Total Credits for Semester I: 5.5 (Theory:04;Laboratory:1.5)**Semester II**

	Course Code	Course Title	Teaching time/week	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1B) Core Courses	BCH -211	Core Course (Theory Paper-III)	2 hours	2	50	10	40	20
	BCH -212	Core Course (Theory Paper-IV)	2 hours	2	50	10	40	20
	BCH -221	Lab course 2 (based on BCH -211 and BCH -212)	3 hours	1.5	50	10	40	20

Total Credits for Semester II: 5.5 (Theory:04;Laboratory:1.5)

Semester III								
	Course Code	Course Title	Teaching time/week	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1C) Core Courses	BCH -311	Core Course (Theory Paper-V)	2 hours	2	50	10	40	20
	BCH -312	Core Course (Theory Paper-VI)	2 hours	2	50	10	40	20
	BCH -321	Lab course 3 (based on BCH -311)	3 hours	1.5	50	10	40	20
	BCH -322	Lab course 4 (based on BCH -312)	3 hours	1.5	50	10	40	20
Total Credits for Semester III: 07 (Theory:04;Laboratory: 03)								

Semester IV								
	Course Code	Course Title	Teaching time/week	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1D) Core Courses	BCH -411	Core Course (Theory Paper-VII)	2 hours	2	50	10	40	20
	BCH -412	Core Course (Theory Paper-VIII)	2 hours	2	50	10	40	20
	BCH -421	Lab course 4 (based on BCH -411)	3 hours	1.5	50	10	40	20
	BCH -422	Lab course 5 (based on BCH -412)	3 hours	1.5	50	10	40	20
Total Credits for Semester IV: 07 (Theory: 04; Laboratory:03)								

Semester V								
	Course Code	Course Title	Teaching time/week	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSE-1 A) Discipline	BCH -511	DSE-1A (1) (Theory Paper-IX) (Select any one paper from A1/B1/C1/D1)	2 hours	2	50	10	40	20
	BCH -512	DSE-1A (2) (Theory Paper-X) (Select any one paper from	2 hours	2	50	10	40	20

Specific Elective		A2/B2/C2/D2)						
	BCH -521	Lab course 6 (based on BCH -511)	3 hours	1.5	50	10	40	20
	BCH -522	Lab course 7 (based on BCH -512)	3 hours	1.5	50	10	40	20
Total Credits for Semester V: 07 (Theory:04;Laboratory: 03)								
Semester VI								
Optional I (DSE-1 B) Discipline Specific Elective	Course Code	Course Title	Teaching time/week	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
	BCH -611	DSE-1B (1) (Theory Paper-XI) (Select any one paper from A1/B1/C1/D1)	2 hours	2	50	10	40	20
	BCH -612	DSE-1B (2) (Theory Paper-XII) (Select any one paper from A2/B2/C2/D2)	2 hours	2	50	10	40	20
	BCH -621	Lab course 8 (based onBCH -611)	3 hours	1.5	50	10	40	20
	BCH -622	Lab course 9 (based on BCH -612)	3 hours	1.5	50	10	40	20
Total Credits for Semester VI: 07 (Theory:04;Laboratory:03)								
Total Credits for three years: Sem. I (05.5) + Sem. II (05.5) + Sem. III (07) + Sem. IV (07) + Sem. V (07) + Sem. VI (07) = 39 Credits								

BCH 311

Theory paper (V)

APPLIED ENZYMES AND BASIC IMMUNOLOGY

Theory credits - Lectures- 45

Isolations and purification of enzymes:

Selection of sources, isolation, enzyme stabilization, methods of solubilization, extraction, precipitation, filtration, centrifugation and purification. Isolation of amylase, papain, trypsin, and mechanism of chymotrypsin, carboxypeptidase, ribonuclease and Lysozyme.

Enzymes in industry:

Food industry (baking, dairy, brewing, meat), Beverage industry, wine industry, pharmaceutical industry, detergent industry.

Microbial enzymes for augmenting crop production (biofertilizers, bioprotectants, biostimulants). Role of soil enzymes in sustainable crop production.

Immobilization-Advantages-disadvantages, Immobilization Techniques, Properties of immobilized enzymes. Bioreactors.

BASIC IMMUNOLOGY

Introduction:

Historical perspective; early studies on humoral and cellular immunity. Innate immunity and adaptive immunity; humoral and cell-mediated immunity; primary and secondary immune response.

Hematopoiesis, organs and cells of the immune system:

Primary and secondary lymphoid organs; lymphatic system; systemic function of the immune system.

Immunoglobulins:

Basic and fine structure; classes, subclasses and functions.

Immune responses:

During bacterial (tuberculosis) parasitic (malaria) and viral (HIV) infection. Vaccines

References:

ENZYMOMOLOGY

- 1) Biochemistry 3rd (1994) By Lubert Stryer, WH Freeman and Co. San Francisco.
- 2) Enzymes (3rd Ed) Dixon M and Webb. E.C. Longmans London.
- 3) Enzyme's structure and function by S. Blackburn Marcel Dekker, Inc N.Y.

- 4) ENZYMES-Biochemistry, Biotechnology, Clinical Chemistry-By Trevor Palmer.
- 5) Biotechnology by J.E.Smith.
- 6) Fundamental of Biochemistry by J.L Jain.

IMMUNOLOGY

- 1) Kuby: Immunology; RA Goldsby, Thomas J. Kindt, Barbara A. Osborne.
- 2) Chakravarthy A.K. Immunology, Tata McGraw Hill, New Delhi.
- 3) Immunology by Roitt I. M., Brostoff J. and Male D. Gower medical publishing London.
- 4) Fundamentals of Immunology, Paul 1999, Lippencott Raven.
- 5) R. Tizard. Immunology: An Introduction. Saunders College publishing
- 6) Ivan, Immunology Method Manual, Vol. 4 1997, Academic Press, Sani Diego.
- 7) W Veird D.M., Immunology: Student's Notes, ELBS- Oxford.

BCH 312
Theory paper (VI)
BIOCHEMICAL TECHNIQUES II
Theory credits- Lectures- 45

Physico-Chemical Techniques to Study Biomolecules:

Hydration of Macromolecules, Role of Friction, Diffusion, Centrifugation: Basic Principle of Centrifugation, Instrumentation of Ultracentrifuge (Preparative, Analytical), Factors affecting Sedimentation velocity, Standard Sedimentation Coefficient, Centrifugation of associating systems, Rate-Zonal centrifugation, sedimentation equilibrium Centrifugation.

Radio isotopic Technique:

Types of radioisotopes used in Biochemistry, Units of radioactivity measurements, techniques used to measure radioactivity (gas ionization and liquid scintillation counting), isotopes commonly used in biochemical studies- (P32, S35, C14 and H3), Autoradiography, Biological hazards of radiation and safety measures in handling radioisotopes. Biological applications.

Immunological Techniques:

Immunodiffusion, Immunoelectrophoresis, Radioimmuno assay. ELISA, Immunofluorescence.

Electrophysiological methods:

Single neuron recording, patch clamp recording, ECG, Brain activity recording, lesion and stimulation of brain, pharmacological testing, PET, MRI, fMRI, CAT.

References:

- 1) Outlines of Biochemistry by Eric E Corn. P.K. stumpff G. Bruening and Ray H Doi, John Wiley and Sons N.Y.
- 2) Biophysical chemistry Principles and Techniques by Upadhyay and Nath.
- 3) Principle and techniques of Practical Biochemistry William and Golding and /or William and Walker.

BCH 313 SEC-1 (A)

Protein Separation and Purification Techniques

Credits 2

Lectures (45)

Unit 1: Fundamentals of Protein Concentration Determination

Introduction to Protein Concentration Determination Methods, Practical Hands-on Session: UV Absorption, Lowry, Bicinchoninic Acid, Bradford, and Kjeldahl Methods

Unit 2: Cell disruption and preparation of initial crude extract

Extraction buffer, Composition of extraction buffer, role of antioxidants, enzyme inhibitors, enzyme substrate and cofactors, EDTA, PVP, Sodium azide etc. in the extraction buffer. Extraction of membrane proteins, cell disruption of mammalian cells, plant cells, bacteria, fungi and yeast. Cell disruption methods: Blenders, grinding with abrasives, Presses-French Press, X-Press and Hughes Press. Enzymatic methods, Sonication

Unit 3: Protein fractionation

Protein Solubility and Stability, Salting Out, Ammonium Sulfate Precipitation, Organic Solvent Precipitation, Cold Ethanol Precipitation, Factors Influencing Fractionation Technique Selection, Case Studies on Choosing the Right Fractionation Method.

Unit 4: Chromatographic Techniques

Chromatography Principles and Types, Ion Exchange Chromatography, Size Exclusion Chromatography, Affinity Chromatography, High-Performance Liquid Chromatography (HPLC), Practical Workshop: Chromatographic Separation Techniques.

Unit 5: Monitoring Protein Separation

SDS PAGE: Basics of SDS-PAGE (Sodium Dodecyl Sulfate Polyacrylamide Gel Electrophoresis), Interpretation of Gel Electrophoresis Patterns, Detection of Impurities and Multiple Proteins, Molecular Weight determination by Gel filtration and PAGE, detection of isozymes, Enzyme activity assays, applications of enzyme assays in protein purification. Hands-on Session: Gel Electrophoresis

References:

- 1) Principles and Techniques of Biochemistry and Molecular Biology Seventh edition
EDITED BY KEITH WILSON AND JOHN WALKER. CAMBRIDGE UNIVERSITY
PRESS. ISBN 978-0-521-51635-8
- 2) Physical Biochemistry: Principles and Applications (2010) 2nd ed., Sheehan, D., Wiley
Blackwell (West Sussex), ISBN:978-0-470-85602-4 / ISBN:978-0-470-85603-1. 2.
- 3) Physical Biochemistry: Applications to Biochemistry and Molecular Biology (1982) 2nd
ed., Freifelder, D., W.H. Freeman and Company (New York), ISBN:0-7167-1315-2 /
ISBN:0-7167-1444-2. 3.
- 4) An Introduction to Practical Biochemistry (1998) 3rd ed., Plummer D. T., Tata McGraw
Hill Education Pvt. Ltd. (New Delhi), ISBN:13: 978-0-07-099487-4 / ISBN:10: 0-07-
099487-0.

VUW

BCH 313 SEC-1 (B)
Laboratory Techniques in Clinical Diagnostics
Credits 2 Lectures (45)

Unit 1: Introduction to Clinical Laboratory Operations

Organization of Clinical Laboratories, Instrumentation and Automation in Clinical Biochemistry, Safety Regulations and First Aid, Specimen Collection Techniques: Types, Handling, and Storage. Emphasis on Precision, Accuracy, Quality Control. Precautions, and addressing limitations.

Unit 2: Investigation of Biochemical Changes in Diseases

Basic Hepatic, Renal, and Cardiovascular Physiology, Biochemical Symptoms Associated with Diseases, Diagnostic Biochemical Profile.

Unit 3: Assessment of Glucose Metabolism in Blood

Clinical Significance of Blood Glucose Variations, Diabetes Mellitus.

Exercises:

- Collection of Blood and Storage
- Separation and Storage of Serum
- Estimation of Blood Glucose by Glucose Oxidase Peroxidase Method

Unit 4: Lipid Profile

Composition and Functions of Lipoproteins, Clinical Significance of Elevated Lipoproteins

Exercises: Estimation of Triglycerides

Unit 5: Liver Function Tests, Renal Function Tests and Urine Analysis

Estimation of Bilirubin (Direct and Indirect), Use of Urine Strip/Dipstick Method for Urine Analysis Quantitative Determination of Serum Creatinine and Urea

Unit 6: Tests for Cardiovascular Diseases

Involvement of Enzymes in Diagnostics of Heart Diseases, Aspartate Transaminase, Isoenzymes of Creatine Kinase, Lactate Dehydrogenase, and Troponin.

Exercises: Estimation of Creatine Kinase MB

References

- 1) Medical Laboratory Technology - a Procedure Manual for Routine Diagnostic Tests Vol. I (2010), Mukherjee, K.L., Tata Mc Graw–Hill Publishing Company Limited (New Delhi). ISBN:9780070076594 / ISBN:9780070076631
- 2) Medical Laboratory Technology - a Procedure Manual for Routine Diagnostic Tests Vol. II (2010), Mukherjee, K.L., Tata Mc Graw – Hill Publishing Company Ltd. (New Delhi), ISBN: 9780070076648.
- 3) Medical Biochemistry (2005) 2nd ed., Baynes, J.W. and Dominiczak, M.H., Elsevier Mosby Ltd. (Philadelphia), ISBN:0-7234-3341-0.
- 4) Experimental Biochemistry: A Student Companion (2005) Rao, B.S. and Deshpande, V., IK International Pvt. Ltd. (New Delhi), ISBN:81-88237-41-8.

104

Lab Course -321
(Based on BCH 311)

- 1) Detection of some common enzymes
- 2) Determination of the optimum pH of an enzyme
- 3) Determination of the optimum temperature of an enzyme
- 4) Effect of substrate concentration on enzyme activity and determination of its K_m value
- 5) Determination of thermostability of an enzyme
- 6) Effect of inhibitors on enzyme activity
- 7) Immobilization of enzyme
- 8) Estimation of serum alkaline phosphates/amylase

Lab Course -322
(Based on BCH 312)

- 1) To process blood samples and separation of blood components by centrifugation
- 2) Differential staining and counting of WBCs.
- 3) Blood group detection, hemagglutination,
- 4) To study latex agglutination technique.
- 5) To study a simple, and large-scale separation method of IgG from immunized hen egg.
- 6) Purification of IgG antibodies with ammonium sulphate

VISIT TO LABORATORY/RESEARCH INSTITUTE/FORENSIC LAB

BCH 411

Theory paper (VII)

METABOLISM-I

Course credit - lectures – 45

Introduction to Bioenergetics:

State functions, equilibrium constant, coupled reactions, energy charge, ATP cycle, phosphorylation potential, phosphoryl group transfers. Chemical basis of high standard energy of hydrolysis of ATP, other phosphorylated compounds and thioesters. Redox reactions, standard redox potentials and Nernst equation. Universal electron carriers.

Carbohydrate Metabolism:

Reactions and energetics of glycolysis Alcoholic fermentations. Entry of fructose, galactose, mannose, etc. Reactions and energetics of TCA cycle. Gluconeogenesis, glycogenesis and glycogenolysis. Reactions and physiological significance of pentose phosphate pathway, Regulation of glycolysis and TCA cycle.

Lipid Metabolism:

Introduction, hydrolysis of triacylglycerol, transport of fatty acids into mitochondria, oxidation of saturated fatty acids, ATP yield from fatty acid oxidation, Biosynthesis of saturated and unsaturated fatty acids. Metabolism of Ketone bodies, oxidation of unsaturated and odd chain fatty acids, Biosynthesis of triglycerides and Regulation of cholesterol metabolism.

Amino acid Metabolism and Nucleotide Metabolism

Transamination, deamination, decarboxylation, urea cycle. Biosynthesis and amino acids and their regulation. Sources of purine & pyrimidine Salvage pathway of purine synthesis of pyrimidine Degradation of purines & pyrimidines.

Electron Transfer Chain and Oxidative Phosphorylation:

Structure of mitochondria, sequence of electron carriers, sites of ATP production, inhibitors of electron transport chain. Hypothesis of mitochondrial oxidative phosphorylation (basis concepts) Inhibitors and uncouplers of oxidative phosphorylation. Transport of reducing potentials into mitochondria.

References:

- 1) Suggested Readings:
- 2) Biochemistry by Stryer
- 3) Biochemistry by Lehninger
- 4) Biochemistry by Voet and Voet.

- 5) Greenberg David M - Metabolic Pathways. Vols 2 and 3, 3rd editions. Academic Press, New
- 6) Biochemistry & Molecular Biology of Plants - Natural Products
- 7) Henry Richard et al - Clinical Chemistry, Principles and Techniques, 2nd edition, Harper and
- 8) Row, New York
- 9) Kamal SH - Clinical Biochemistry for Medical Technologies, Churchill Livingston, London
- 10) Todd et al - Clinical Diagnosis and Management, 17th edition, WB Saunders, Philadelphia
- 11) Stokes Joan et al - Clinical Microbiology, Edward Arnold, London
- 12) O. Gill CV - Short cases in clinical biochemistry, Churchill Livingston, Edinburgh, 1984
- 13) Bayens Dominiczak - Medical biochemistry, Mosby Publishers, Harcourt, 1999

BCH 412
Theory paper (VIII)
Microbial Biochemistry
Course credit- Lectures- 45

Introduction

History & Development of Microbiology, Controversy over spontaneous generation, Fermentation & Germ theory of diseases, Concept of immunization. Classification of Microorganisms: Prokaryotes and Eukaryotes, Haeckel system, Whittaker system, Bergey's Manual.

Prokaryotic cell structure

Colony morphology and colony character of bacteria: texture, margin, elevation and shape. Prokaryotic Genetic material, Ribosome. Organic and Inorganic Inclusion bodies. Cell Wall/Peptidoglycan structure, Peptidoglycan in Gram-positive and negative, Synthesis of peptidoglycan. Difference in Gram-positive and Gram-negative bacteria. Structures surrounding bacterial cell: Capsule, Slim, S layer, Pili and flagella; Staining techniques: Negative staining, Simple stain, Differential stain: Grams and Acid-fast staining. Structural or special stains: Capsule staining, flagella staining, and spore staining. Nuclear stain: Acridine orange.

Microbial Physiology

Measurement of microbial growth; bacterial growth curve and its distinct phases- Lag phase, Log phase, Stationary phase, and Death phase; calculation of growth rate and generation time of bacterial pure cultures; influence of environmental factors for microbial growth-salt concentration, pH, temperature, oxygen concentration, radiation; nutritional groups of bacteria based on energy source, electron donor, carbon source.

Special features of bacterial metabolism

Food spoilage, fermentation, food-borne infections. Role of microorganisms in domestic and industrial sewage. Microbiological standards.

References:

- 1) General Microbiology, Vol. I & II - Powar, Dagainawala - Himalaya Publishing House.
- 2) General Microbiology - Stanier, Adelberg, Ingraham - The Macmillan Press-London
- 3) Fundamental Principles of Bacteriology - Salle - TMH Pub. Co. Ltd.- New Delhi
- 4) Microbiology - Davis, Dulbacco, Eisen, Ginsberg - Harper International Edition
- 5) Microbiology - Pelczar, Chan, Kreig - McGraw Hill Int. Edition.
- 6) Microbiology-An Introduction - Tortora, Funke, Case, Benjamin - Cummings Publ. Co.
- 7) Fundamental Virology (1995) - B. N. Fields, D. M. Knipe, P. M. Howley, R. M. Chanock, J. L. Meenick, T P. Monath, Strans, Lippin Cott Raven.

BCH 413 SEC- 1(B)

BIOSTATISTICS

Credits 2

Lectures (45)

Unit 1: Data analysis

Nature and scope of statistical methods and their limitations. Collection, classification, tabulation of statistical data. Organization of data - Individual series, discrete series, continuous series/class interval. Diagrammatic and graphical representation of statistical data (bar diagram, line diagram, pictogram, histogram & horizontal and vertical bar diagram).

Unit 2: Measure of central tendency and dispersion

Mean, Median, Mode. Measure of Dispersion- Introduction. Range - Introduction & definition. Standard deviation, Variance, Coefficient of Variation.

Unit 3: Probability and distributions

Probability - Introduction & Definition. Testing of Hypothesis - null hypothesis, alternative hypothesis, standard error. Introduction to Theoretical Distribution, Binomial distribution, Poisson distribution and Normal distribution. Skewness and Kurtosis Chi-Square test introduction & application, t-test- introduction & application.

Unit 4: Correlation and regression

Correlation Analysis - introduction, definition, use. Types of correlation - Positive and negative, linear and nonlinear, simple and multiple, partial and total correlation. Regression Analysis - introduction, definition, application, types of regression.

Unit 5: Analysis of Variance (ANOVA)

Analysis of Variance (ANOVA) - introduction, one-way and two-way classification.

References:

- 1) Introduction to Biostatistics and Research Methods by P. S. S. Sundar Rao, J. Richard 5th edition PHI Learning Pvt Ltd. 2012.
- 2) Biostatistics: A Foundation for Analysis in the Health Sciences, 10th Edition Wayne W. Daniel, Chad L. Cross Wiley Global Education, 2012.
- 3) Statistical methods - S. P. Gupta. Sultan Chand & sons. 2012.
- 4) Biostatistical analysis - Jerrold H. Zar 5th edition Prentice Hall of India 2010.
- 5) Statistical Methods, S. P. Gupta 28th edition Sultan Chand & Sons 2009.
- 6) Statistical methods - G. W. Snedecor and W. Cochran- 8th edition. Oxford and IBH, New Delhi. 1989.

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BCH 413 SEC- 1(A)

Food Adulteration

Credits 2

Lectures (45)

Unit 1

Common Foods and Adulteration: Common Foods subjected to Adulteration - Adulteration – Definition – Types; Poisonous substances, foreign matter, Cheap substitutes, Spoiled parts. Adulteration through Food Additives – Intentional and incidental. General Impact on Human Health.

Unit 2

Adulteration of Common Foods and Methods of Detection: Means of Adulteration, Methods of Detection Adulterants in the following Foods: Milk, Oil, Grain, Sugar, Spices and condiments, Processed food, Fruits and vegetables. Additives and Sweetening agents.

Exercise

- Detection of starch, cellulose, urea, cane sugar, and glucose in Milk
- Alkaline Phosphatase Test for Checking Efficiency of Pasteurization Liquid Milk
- Detection of preservatives in Milk.
- Detection of oil rancidity
- Detection of adulteration in oil.

Unit 3

Highlights of Food Safety and Standards Act 2006 (FSSA) –Food Safety and Standards Authority of India–Rules and Procedures of Local Authorities. Role of voluntary agencies such as Agmark, I.S.I.

Reference Books and Websites:

- 1) A first course in Food Analysis – A.Y. Sathe, New Age International (P) Ltd., 1999.
- 2) Food Safety, case studies – Ramesh. V. Bhat, NIN, 1992.
- 3) https://old.fssai.gov.in/Portals/0/Pdf/Draft_Manuals/Beverages and confectionary.pdf

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Lab Course -421
(Based on BCH 411)

- 1) Estimation of free and total acidity of gastric juice
- 2) Estimation of glucose by DNSA method
- 3) Estimation of nitrogen by Nessler's reagent
- 4) Estimation of vitamin C by Diphenylamine
- 5) Estimation of Protein by Biuret Methods.
- 6) Estimation of Protein by Lowry methods.
- 7) Estimation of Amino Acids by Ninhydrin method.
- 8) Estimation of Carbohydrates by Sumner method.

Lab Course -422
(Based on BCH 412)

- 1) Laboratory safety instructions, Demonstration, and use of microbiological equipment.
- 2) preparation and sterilization of microbiological media
- 3) Aseptic handling, inoculation of fungal culture, preparation of wet mounts
- 4) Micro-organism Stains and Wet Mounts: Gram's staining, Negative staining and acid-fast staining.
- 5) Bacterial Motility using hanging drop method.
- 6) Culture Techniques: Spread plate, streak plate, pour plate and slant.
- 7) Biochemical Characteristics: starch hydrolysis, TSI, catalase test
- 8) Antibiotic sensitivity of Grams Negative and Grams Positive bacteria.