

Name of the Programme: M.Sc. Part-I (Biochemistry)

Course Code: CHB-522

Title of the Course: Practical Course in Biochemistry-II

Number of Credits: 4

Effective from AY: 2022-23

Pre-requisites for the Course:	Students should have graduate level knowledge either in chemical or life sciences or should have qualified change of discipline test.	
Course Objectives:	1. To provide basic knowledge of environmental pollution, effects of environmental pollutants and control measures. 2. To introduce various experimental techniques for analysis of environmental samples. 3. To impart skills in isolation and analysis of bioactive compounds in plants. 4. To acquaint the students with various food adulterants, food safety and methods of their analysis.	
Content:	1. Microbial Techniques (Any six) a. Laboratory safety protocols and Preparation of media and sterilization techniques. b. Isolation and enumeration of bacterial and fungal cultures from various environmental samples. c. Identification of microbial isolates: Morphological and biochemical identification technique d. Gram staining in bacteria. e. Determinations of total viable count. f. Determination of efficacy of cell disruption by sonication. g. Density gradient separation of cell biomolecules. h. Study of bacterial growth curve.	No of hours 30
	2. Analysis of bioactive compounds from plants (Any six) a. Extraction and estimation of betacarotene from fruits. b. Extraction and estimation of folic acids from vegetables. c. Extraction and estimation of lycopene from tomatoes. d. Extraction and estimation of astaxanthene from grapes. e. Separation of plant pigments using column chromatography. f. Steam distillation for extraction of essential oils. g. Determination of starch in plant tissues. h. Estimation of mineral contents in pulses by ashing method.	30
	3. Environmental analysis (Any six) a. Estimation of acidity, alkalinity of environmental water samples using titrimetry. b. Estimation of nitrate and total organic carbon using UV-Vis spectrophotometry. c. Estimation of total dissolved solids (TDS) by gravimetric determination.	30

	d. Estimation of nitrate using cadmium reduction column method. e. Estimation of total phosphorus using spectrophotometric method. f. To estimate total suspended solids (TSS) using the filter paper method. g. Isolation of xenobiotic degrading bacteria by selective enrichment. h. Calcium analysis by ethylenediaminetetraacetic acid (EDTA) titration.	
	4. Food safety analysis. (Any six) a. Study of sterilization techniques used in food safety. b. Screening and enumeration of spoilage bacteria from food samples. c. Study of spoilage fungi isolated from fruit samples. d. Assessing the quality of raw milk <i>via</i> MBRT test. e. Determination of total viable count in prepared (ready to eat) food sample. f. Determination of adulterants in food (turmeric- metanil yellow/ chilli powder- congo red) g. Testing the adulteration/ rancidity in oils. h. Assessment of surface sterilization using swab and rinse method	30
Pedagogy:	Mainly lectures and tutorials. Seminars / term papers / assignments / presentations / self-study or a combination of some of these can also be used. ICT mode should be preferred. Sessions should be interactive in nature to enable peer group learning.	
References/ Readings:	1. K. Wilson, J. Walker, Principles and Techniques of Practical Biochemistry; Cambridge University Press, 7th Edition, 2010. 2. S. K. Sawhney, R. Singh, Introductory Practical Biochemistry, Narosa Publishing House, 2005. 3. B. SMT and B. Poornima B, Food Science & Quality Control, Centrum Press First, 1st Edition, 2014. 4. A. Y. Sathe, A first course in Food Analysis. New Age International Pvt. Ltd., 1st Edition. 1999.	
Course Outcomes:	1. Students will be able to extract a bioactive compound from plants and perform a quantitative analysis. 2. Students will be in position to use different techniques for qualitative and quantitative analysis of environmental samples. 3. Students will be able to identify adulterants and pathogens in food. 4. Students will be able to explain the origin and harmful effects of toxic chemicals in the environment.	