BIOCHEMISTRY AND BIOSTATISTICS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
			Hrs/ week	Total Hours/ Semester	Hrs/ week	Total Hours/ Semester		
V	21CZO5D	Elective I	5	60	5	60	Nil	3

COURSE OBJECTIVES:

- To develop the knowledge on the fundamental chemical principles that govern biological systems
- To enable the students to design, analyze, present and interpret research data.
- To expose the students about the role of statistics in biological sciences

COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Students will understand the acid base balance in biological system	K2, K3
CO2	Students will determine experiments and techniques in relation to biomolecules.	K2, K3, K4
CO3	Students will gain knowledge about how living organisms acquire and transform energy in order to perform biological work	K3, K4,
CO4	Students will able to design experiments, sampling variables, analyze the biological data, interpret and present the results in meaningful way.	K3, K4
CO5	Students will evaluate and interpret practically, the data acquired in biological experiments, by the means of statistical methods	K3,K4

Knowledge Level: K1- Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	S	S	M	M
CO3	M	S	S	S	S
CO4	S	S	S	S	S
CO5	S	M	S	S	S

S- Strong; M – Medium; L- Low

Distribution of Marks: Theory 100% and Problems Nil%

UNIT-I

FOUNDATIONS OF BIOCHEMISTRY (12 Hours)

Properties of water- Physical properties of water- water as a universal solvent. pH- Henderson Hasselbalch equation. Maintenance of blood pH- Chemical buffer, Respiratory mechanism and Renal mechanism, - and metabolic acidosis andalkalosis, Buffers and electrolytes and their functions. Acidity, Alkalinity and pH determination.

UNIT-II

BIOMOLECULES AND METABOLISM (12 Hours)

Classification, structure and functions of Carbohydrates, Lipids and Protein. Glycogenesis, Emden Meyerhof Pathway and TCA cycle, Respiratory chain and formation of ATP. Glycogenolysis, Gluconeogenesis and HMP shunt. Deamination and Transamination, Beta oxidation of fats.

UNIT-III

BIOENERGETICS AND BIOCHEMICAL TECHNIQUES (12 Hours)

Laws of Thermodynamics- First and second law- Concepts of Free Energy- ATP Bioenergetics. Biochemical Techniques: Separation techniques by Chromatography (GC and HPLC), Electrophoresis (SDS-PAGE), Spectrophotometry (UV-Vis Spectroscopy).

UNIT-IV

SAMPLING OF MEASURES OF CENTRAL TENDENCY (12 Hours)

Definition and Scope- Census and Sampling Methods - Frequency Distribution without class interval, Frequency Distribution with class interval and cumulative frequency distribution, Characteristics of a Frequency Distribution, Graphical Presentation of Data: Line Graphs, Bar Charts, Pie diagrams Histograms, Ogives. Measures of central tendency: (Discrete and Continuous series) Arithmetic Mean, Median and Mode, Measures of dispersion- Range, Mean Deviation and Standard Deviation.

UNIT-V

PROBABILITY AND CORRELATION, REGRESSION (12 Hours)

Probability: Definition, Rules for Calculating Probabilities-Venn Diagram, Binomial, Normal and Poisson Distributions. Correlation and Regression: Karl Pearson correlation, Scatter Plots Regression analysis- Test of significance: student's t-test and chi- square test.

TEXT BOOKS

S. No.	Authors	Title of the Book	Publishers	Year of Publication
1	Veerakumari.L,	Biochemistry	MJP Publications	2004

2	Ambika Shanmugam	Fundamentals of Biochemistry for Medical Students	Wolters Kluwer (India) Pvt. Ltd., New Delhi	2012
3	Ramakrishnan	Biostatistics	Saras Publications	2004

REFERENCE BOOK:

S. No.	Authors	Title of the Book	Publishers	Year of Publication
1	Lehninger,	Biochemistry	Worth Publications Inc., CBS Publ, New Delhi	1992
2	Albert L Lehninger	Biochemistry, Second Edition	Kalyani Publishers, New Delhi 2nd Edition	1978
3	H.S.Srivastave,	Elements of Biochemistry	Rostogi Publications	1986
4	S.P Gupta	Statistical Methods	D.Chand and Co. New Delhi.	2012
5	Jerold H. Zar	Bio Statistical Analysis (2nd edition)	Printice Hall of International edition, (Relevant portions).	1984
6	Victor W. Rodwell, David et al	Harpers Illustrated Biochemistry. 30th Edition	McGraw-Hill companies, Inc. USA	2015

WEB SOURCES:

www.sciencedirect.co.
www.pebmed.com
www.khansacademy.com
www.epatsala.com
www.swayam.com

TEACHING METHODOLOGY

- Class room teaching
- Charts/ Models
- Power point Presentations
- Discussions
- Assignments
- Home test

SYLLABUS DESIGNERS

- Dr. D. Sasikala, Assistant Professor and HOD
- Dr. V. Kiruthiga, Assistant Professor
- Dr. V. Rekha, Assistant Professor
- Dr. A. Vinodhini, Assistant Professor
- Dr. G. Vidhya, Assistant Professor