BIOPHYSICSAND BIOSTATISTICS

Semester	Subject code	Category	Lecture		Theory		P	C
V	21CBT5C	Core theory -VII	5hrs per week	75	5 hrs per week	75	0	4

COURSE OBJECTIVE: To develop an understanding of the biophysics, analytical instrumentation and biostatistics to interpret the results with statistical analysis

COURSE OUTCOMES: Upon successful completion of the course, students will able to

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL (K1-K4)
CO1	To remember and understand the essential level or the principle of thermodynamic and also the structure of biomolecules	K1 & K2
CO2	Understand the various instrument usage in the field of biotechnology	K2
CO3	Compare the different types of spectroscopy for various purpose	K3
CO4	Measure the data obtained through various experiment	K1
CO5	Understand the various types of statistical analysis based on the sample obtained	K2

Knowledge Level: K1- Remember, K2- Understand, K3- Apply, K4-analyze

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	M	S	S
CO2	S	S	S	M	M	M
CO3	M	S	S	S	M	M
CO4	S	S	M	S	S	S
CO5	M	M	S	M	S	S

S-Strong, M-Medium, L-Low

UNIT –I

PHYSICO-CEMICAL FOUNDATION **15 Hours**

Physicochemical properties of water, Acids- base theory, mole concept, molarity, normality, molality, concept of pH, measurement of pH, Henderson –Hasselbach equation, buffers, titration curve, pK values.

UNIT- II

PHYSICAL FOUNDATIONS **15 Hours**

Thermodynamics: Introduction, Fundamental thermodynamic relation, Isothermal process, Isobaric Process Laws of thermodynamics: (zeroth law. First, second and third law). Understanding structures of Nucleic acids and proteins (primary, secondary, tertiary and quaternary structures)

UNIT -III

MICROSCOPY **15 Hours**

Microscope: Introduction, Principle and application of Microscopes, Types of Microscopes: Phase contrast Microscope-Principle, Procedure and applications. Fluorescence Microscope-Principle, Procedure and applications. Electron microscope- Principle, Procedure and applications, Types of Electron Microscopes (Scanning Electron Microscope & Transmission Electron Microscope).

UNIT IV

BIO-STATISTICAL METHODS **15 Hours**

Bio-statistical methods-Introduction of Biostatics. Methods of data collection (primary data collection and secondary data collection), Frequency distribution curve, Diagrammatic and graphical representation of data.

Measures of central tendency (Arithmetic mean, median and mode), measures of dispersion (Standard deviation and variance).

UNIT V

TESTING OF SAMPLES **15 Hours**

Testing of samples: Introduction, Hypothesis testing (null and alternate), student's t-test, Z- test, Chi-square test: significance in small and large populations. Problems on Probability, conditional probability, Theoretical distributions (Binomial, Poisson, Normal).Protein expression 3D structure prediction (homology modelling).

Distribution of Marks: Theory 80% and Problems 20%

TEACHING METHODOLOGY:

- Class room teaching
- Assignments
- Discussions
- Homework

- PPT presentations
- Seminars
- Models and charts

TEXT BOOKS:

S.no.	Authors	Title	Publishers	Year of publication
1.	Jain JL, Jain N, Jain S	Fundamentals of Biochemistry(7^{th} ed)	S Chand Group, New Delhi, India.	2004
2.	Gupta SC, KapoorVK	Fundamentals of Applied Statistics	S Chand and Sons, New Delhi, India.	2003
3.	Rodney Cotterill	Biophysics: An introduction	Wiley	2014
4.	James F.Zolman	Biostatistics: Experimental design and statistical inference	Oxford University Press	1993
5.	Pattabhi V and Gautham	Biophysics	Springer Science & Business Media	2002

REFERENCE BOOKS:

S.no.	Authors	Title	Publishers	Year of publication
1.	Kothari CR	Research Methodology-Methods and Techniques	New Age International Publishers, New Delhi, India.	2004
2.	William Bialek	Biophysics: Searching of principles	Princeton University Press	2012
3	Anders Kallen	Understanding Biostatistics	John Wiley &Sons	2011
4	Rodney Cotterill	Biophysics an introduction	John Wiley &Sons	2003
5	Walter T. Ambrosius	Topics in Biostatistics	Springer Science and Business Media	2007

WEB SOURCES:

1. https://www.easybiologyclass.com/biostatistics-introduction-significance-applications-and-limitations-of-statistics
2. https://books.google.co.in/books/about/Topics_in_Biostatistics.html
3. https://books.google.com/books/about/Biostatistics.html?id=VDR7s05uFaQC
4. https://edurev.in/studytube/Thapar-University-PBT201-Biophysics
5. https://sites.google.com/site/prakashprabhubiophysics/biostatistics

Syllabus Designer:

- Dr. Amrita Anantharaman
  Assistant Professor