



**SRI VIDYA MANDIR ARTS & SCIENCE COLLEGE**

**(Autonomous)**

**[An Autonomous College Affiliated to Periyar University, Salem, Tamil Nadu]**

**[Accredited by NAAC with 'A' Grade with CGPA of 3.27]**

**[Recognized 2(f) & 12(B) Status under UGC Act of 1956]**

**Katteri – 636 902, Uthangarai (Tk), Krishnagiri (Dt)**

**Tamil Nadu, India**

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**DEGREE OF MASTER OF SCIENCE IN ZOOLOGY**  
**CHOICE BASED CREDIT SYSTEM (CBCS)**

**REGULATIONS AND SYLLABUS FOR**

**M.Sc. ZOOLOGY PROGRAMME**

**(SEMESTER PATTERN)**

**(For Students Admitted in the College from the Academic Year 2023-2024 Onwards)**



**REGULATIONS AND SYLLABUS FOR M.Sc. ZOOLOGY PROGRAM  
(For Students Admitted in the College from the Academic Year 2023-2024  
Onwards)**

**1. VISION OF THE DEPARTMENT**

Empowering the Students to face the challenges in a holistic way

**2. MISSION OF THE DEPARTMENT**

To produce well disciplined, socially committed morally and educationally intellectuals through quality education and Research

**3. DEFINITIONS**

- (i) **Programme:** Programme means a course of study leading to the award of the degree in a discipline.
- (ii) **Course:** Course refers to the subject offered under the Degree Programme.

**Programme Outcomes (POs)**

<b>PO1</b>	<b>Problem Solving Skill</b> Apply knowledge of Management theories and Human Resource practices to solve business problems through research in Global context.
<b>PO2</b>	<b>Decision Making Skill</b> Foster analytical and critical thinking abilities for data-based decision-making.
<b>PO3</b>	<b>Ethical Value</b> Ability to incorporate quality, ethical and legal value-based perspectives to all organizational activities.
<b>PO4</b>	<b>Communication Skill</b> Ability to develop communication, managerial and interpersonal skills.
<b>PO5</b>	<b>Individual and Team Leadership Skill</b> Capability to lead themselves and the team to achieve organizational goals.
<b>PO6</b>	<b>Employability Skill</b> Inculcate contemporary business practices to enhance employability skills in the competitive environment.



<b>PO7</b>	<b>Entrepreneurial Skill</b> Equip with skills and competencies to become an entrepreneur
<b>PO8</b>	<b>Contribution to Society</b> Succeed in career endeavors and contribute significantly to society.
<b>PO9</b>	<b>Multicultural competence</b> Possess knowledge of the values and beliefs of multiple cultures and a global perspective.
<b>PO10</b>	<b>Moral and ethical awareness/reasoning</b> Ability to embrace moral/ethical values in conducting one's life.

### Programme Specific Outcomes (PSOs)

<b>PSO1</b>	<b>Placement</b> To prepare the students who will demonstrate respectful engagement with others' ideas, behaviors, beliefs and apply diverse frames of reference to decisions and actions.
<b>PSO2</b>	<b>Entrepreneur</b> To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations.
<b>PSO3</b>	<b>Research and Development</b> Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards growth and development.
<b>PSO4</b>	<b>Contribution to Business World</b> To produce employable, ethical and innovative professionals to sustain in the dynamic business world.
<b>PSO5</b>	<b>Contribution to the Society</b> To contribute to the development of the society by collaborating with stakeholders for mutual benefit.



#### 4. ELIGIBILITY FOR ADMISSION

A Candidate who has passed B.Sc. Zoology or any other relevant Degree of Periyar University or any other University accepted by the Syndicate of the Periyar University as equivalent thereto, subject to such conditions as may be prescribed therefore are eligible for admission to Master of Science (M.Sc.) Degree Programme in Zoology and shall be permitted to appear and qualify for the (M.Sc.) Degree Examination in Zoology of this Autonomous College affiliated to Periyar University after a course of study of two academic years.

#### 5. DURATION OF THE PROGRAMME

The Programme for the Degree of Master of Science (M.Sc.) in Zoology shall consist of two academic years divided into four semesters. Each Semester consists of 90 working days (450 hours).

#### 6. FEATURES OF CHOICE BASED CREDIT SYSTEM

Under Choice Based Credit System (CBCS), a set of Courses consisting of Core Courses, Elective Courses and Extra Disciplinary Course are offered. Beside the Core Courses, which are totally related to the major subjects, the students have the advantage of studying supportive courses and non-major courses. This provides ample opportunity for the students to learn not only the major subjects but also inter disciplinary and application oriented subjects.

#### 7. SYLLABUS

The syllabus of the M.Sc. Zoology Degree Programme is divided into the following Courses:

- (i) **Core Courses:** The Core Courses are related to the Programme concerned including practical's and project offered under the Programme.
- (ii) **Elective Courses:** There are Two Elective Courses offered under the Programme related to the major or non-major but are to be selected by the students.
- (iii) **Extra Disciplinary Course (EDC):** Chosen by the students from other disciplines / departments of the college.
- (iv) **Extra Credit Courses:** In order to facilitate the students gaining extra credits, the Extra Credit Courses are offered. According to the guidelines of the UGC, the students are encouraged to avail this option of enriching the knowledge by enrolling themselves in the Massive Open Online Courses provided by various portals, such as SWAYAM, NPTEL, etc.



## **8.PROGRAMME OF STUDY**

The Programme of study for the Degree shall be in the (Choice Based Credit System) with internal assessment comprised of instructions in the following subjects according to the syllabi and books prescribed from time to time.

## **9.CREDIT**

Weightage given to each course of study is termed as Credit.

## **10.CREDIT SYSTEM**

The weightage of credits are spread over to four different semesters during the period of study and the cumulative credit point average shall be awarded based on the credits earned by the student. A total of 90 Credits are prescribed for the MSc. Degree Programme which is the minimum Credit requirement for the two years M.Sc. Zoology Degree Programme.



# PROGRAMME SYLLABUS



Program: M.Sc. Zoology				
Core – I		Course Code: 23PZO1C01		Course Title: Structure and Function of Invertebrates
Semester I	Hours/Week 6	Total Hours	Credits 4	Total Marks 100

### Course objectives

1. To understand the concept of classification and their characteristic features of major group of invertebrates.
2. To realize the range of diversification of invertebrate animals.
3. To enable to find out the ancestors or derivatives of any taxon.
4. To know the functional morphology of system biology of invertebrates.

#### UNIT-I

**Structure and function in invertebrates:** Principles of Animal taxonomy; Species concept; International code of zoological nomenclature; Taxonomic procedures; New trends in taxonomy

#### UNIT-II

**Organization of coelom:** Acoelomates; Pseudocoelomates; Coelomates: Protostomia and Deuterostomia; Locomotion: Flagella and ciliary movement in Protozoa; Hydrostatic movement in Coelenterata, Annelida and Echinodermata

#### UNIT-III

**Nutrition and Digestion:** Patterns of feeding and digestion in lower metazoan; Filter feeding in Polychaeta, Mollusca and Echinodermata. Respiration: Organs of respiration: Gills, lungs and trachea; Respiratory pigments; Mechanism of respiration

#### UNIT-IV

**Excretion:** Organs of excretion: coelom, coelomoducts, Nephridia and Malpighian tubules; Mechanisms of excretion; Excretion and osmoregulation.

**Nervous system:** Primitive nervous system: Coelenterata and Echinodermata; **Advanced nervous system:** Annelida, Arthropoda (Crustacea and Insecta) and Mollusca (Cephalopoda); Trends in neural evolution

#### UNIT-V

**Invertebrate larvae:** Larval forms of free living invertebrates - Larval forms of parasites; Strategies and Evolutionary significance of larval forms. Minor Phyla: Concept and significance; Organization and general characters.

**Reading list**

1. Barrington, E. J.W. 1979. Invertebrate Structure and Function. The English Language Book Society and Nelson, pp-765.

**Recommended texts**

1. Barnes, R. D. 1974. Invertebrate Zoology, (Second Edition), Holt-Saunders International Edition, pp-1024.
2. Barnes, R. S. K., P. Calow, P. J. W. Olive, D. W. Golding, J. J. Spicer. 2013. The Invertebrates: A Synthesis. Third Edition. John Wiles & Sons Inc., Hoboken. New Jersey, New Delhi.
3. Dechenik, J. A. 2015. Biology of Invertebrates (Seventh Edition). Published by McGraw Hill Education (India) Private Limited, pp-624.

CO Number	CO Statement	Knowledge Level
CO1	Remember the general concepts and major groups in animal N classification, origin, structure, functions and distribution of life in all its forms.	K1 & K2
CO2	Understand the evolutionary process. All are linked in a sequence of life patterns.	K2 & K4
CO3	Apply this for pre-professional work in agriculture and conservation of life forms.	K3 & K5
CO5	Analyze what lies beyond our present knowledge of life process.	K4 & K6
CO5	Evaluate and to create the perfect phylogenetic relationship in classification.	K5 & K6

**K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

**Mapping of Cos with POs**

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

S – Strong

M–Medium

L –Low





Program: M.Sc. Zoology				
<b>Core – II</b>		<b>Course Code:</b> 23PZO1C02		<b>Course Title:</b> Comparative Anatomy of Vertebrates
<b>Semester</b> I	<b>Hours/Week</b> 6	<b>Total Hours</b> 75	<b>Credits</b> 4	<b>Total Marks</b> 100

### Course Objectives

1. Understanding the different systems in invertebrates & vertebrates.
2. Learning about various animal species, their phylogenetic affinities and their adaptive features
3. Imparting conceptual knowledge about the salient features and functional anatomy.
4. Developing the skill in mounting techniques of the biological samples.
5. Gaining fundamental knowledge on the skeletal system

#### **UNIT-I**

Origin of vertebrates: Concept of Protochordata; The nature of vertebrate morphology; Definition, scope and relation to other disciplines; Importance of the study of vertebrate morphology.

#### **UNIT-II**

Origin and classification of vertebrates; Vertebrate integument and its derivatives. Development, general structure and functions of skin and its derivatives; Glands, scales, horns, claws, nails, hoofs, feathers and hairs.

#### **UNIT-III**

General plan of circulation in various groups; Blood; Evolution of heart; Evolution of aortic arches and portal systems. Respiratory system: Characters of respiratory tissue; Internal and external respiration; Comparative account of respiratory organs

#### **UNIT-IV**

Skeletal system: Form, function, body size and skeletal elements of the body; Comparative account of jaw suspensorium, Vertebral column; Limbs and girdles; Evolution of Urinogenital system in vertebrate series.

#### **UNIT-V**

Sense organs: Simple receptors; Organs of Olfaction and taste; Lateral line system; Electoreception. Nervous system: Comparative anatomy of the brain in relation to its functions; Comparative anatomy of spinal cord; Nerves-Cranial, Peripheral and Autonomous nervous systems.

#### **Reading list**



1. SwayamPrabha
2. <https://www.swayamprabha.gov.in/index.php/program/archive/9Yong>,
3. J. Z. 1981. The life of Vertebrates, English language Book society, London, pp-645.
4. Romer, A.S. 1971. The Vertebrate body, W.B.S. Saunders, Philadelphia, pp-600.

### Recommended texts

1. A.J. Waterman (1971) Chordate Structure and Function, Collier Macmillan Ltd.
2. Ekambaranatha Ayyar and T. N. Ananthakrishnan. 2009. Manual of Zoology, Vol – II, S. Viswanathan Pvt. Ltd. Chennai.
3. Kotpal, 2019. R.L. Modern Text Book of Zoology Vertebrates, 4th Edition, Rastogi Publications, Meerut, pp-968.

### Course Outcomes (COs)

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

CO Number	CO Statement	Knowledge Level
CO1	Remember the general concepts and major groups in animal classification, origin, structure, functions and distribution of life in all its forms.	K1 & K2
CO2	Understand the evolutionary process. All are linked in a sequence of life patterns.	K2 & K4
CO3	Apply this for pre-professional work in agriculture and conservation of life forms.	K3 & K5
CO4	Analyze what lies beyond our present knowledge of life process.	K4 & K6
CO5	Evaluate and to create the perfect phylogenetic relationship in classification.	K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

### Mapping of Cos with Pos



PO C O	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010
CO1	S	M	L	S	M	S	M	S	M	S
CO2	S	L	L	S	M	S	M	M	M	M
CO3	S	M	L	S	M	S	M	L	M	M
CO4	S	L	L	S	L	S	M	L	M	L
CO5	S	M	L	S	S	S	M	S	M	M

\*S – Strong

M–Medium

L –Low



Program: M.Sc. Zoology				
Core – III		Course Code: 23PZO1P01	Course Title: Lab Course in Invertebrates & Vertebrates	
Semester I	Hours/Week 6	Total Hours 75	Credits 4	Total Marks 100

### Course Objectives

The main objectives of this course are:

1. Understanding the different systems in invertebrates & vertebrates.
2. Learning about various animal species, their phylogenetic affinities and their adaptive features
3. Imparting conceptual knowledge about the salient features and functional anatomy.
4. Developing the skill in mounting techniques of the biological samples.
5. Gaining fundamental knowledge on the skeletal system

### INVERTEBRATES

#### Dissection

Earthworm	: Nervous system
<i>Pila</i>	: Digestive and nervous systems
<i>Sepia</i>	: Nervous system
Cockroach	: Nervous system
Grasshopper	: Digestive system and mouth parts
Prawn	: Appendages, nervous and digestive systems
Crab	: Nervous system

**Study of the following slides with special reference to their salient features and their modes of life**

1. *Amoeba*
2. *Entamoeba histolytica*
3. *Paramecium*
4. *Hydra* with bud
5. Sporocyst – Liver fluke
6. *Cercaria* larva
7. *Tape worm (Scolex)*
8. *Ascaris* T. S.
9. Mysis of prawn

#### Spotters

1. Scorpion



2. *Penaeus indicus*
3. *Emerita (Hippra)*
4. *Perna viridis*

### Mounting

- Earthworm : Body setae  
*Pila* : Radula  
 Cockroach : Mouth parts  
 Grasshopper : Mouth parts

## CHORDATES

### Study the nervous system of Indian dog shark \ Indian major crabs– Dissection

1. Nervous system of *Scoliodon laticaudatus* – 5<sup>th</sup> or Trigeminal nerve
2. Nervous system of *Scoliodon laticaudatus* – 7<sup>th</sup> or Facial nerve
3. Nervous system of *Scoliodon laticaudatus* – 9<sup>th</sup> and 10<sup>th</sup>  
or Glossopharyngeal & Vagus nerve

### Study of the following specimens with special reference to their salient features and their modes of life

1. *Amphioxus* sp. (Lancelet)
2. *Ascidia* sp. (sea squirt)
3. *Scoliodon laticaudatus* (Indian dog shark)
4. *Trygon* sp. (Sting ray)
5. *Torpedo* sp. (Electric ray)
6. *Arius maculatus* (Cat fish)
7. *Belone cancila* (Flute fish)
8. *Exocoetus poecilopterus* (Flying fish)
9. *Mugil cephalus* (Mullet)
10. *Tilapia mossambicus* (Tilapia)
11. *Rachycentron canadum* (Cobia)
12. *Tetrodon punctatus* (Puffer fish)
13. *Dendrophis* sp. (Tree snake)

### Study of the different types of scales in fishes

1. Cycloid scale
2. Ctenoid scale
3. Placoid scale

### Study of the frog skeleton system (Representative samples)

1. Entire skeleton
2. Skull
3. Hyoid apparatus
4. Pectoral girdle and sternum
5. Pelvic girdle
6. Fore limb



7. Hind limb

### Mounting

1. Weberian ossicles of fish

### Text Books:

1. Lal, S.S. 2009. Practical Zoology, Rastogi Publications, pp-484.
2. Iuliis G. D. and D. Pulerà, 2007. The Dissection of Vertebrates: A Laboratory Manual. Academic Press, Imprint of Elsevier Publication, pp-416.
3. Verma, P.S. 2000. Manual of Practical Zoology: Chordates, S. Chand Publishing Company, pp-528

### Reference Books:

1. Preeti, G., and C. Mridula, 2000. Modern Experimental Zoology, Indus International Publication.
2. Sinha, J., A. K. Chatterjee, P. Chattopadhyaya. 2011. Advanced Practical Zoology, Arunabha Sen Publishers, pp-1070.

### Mapping of Cos with Pos

PO C O	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010
CO1	S	S	S	M	S	S	M	S	M	S
CO2	S	M	L	S	M	S	M	M	M	M
CO3	M	M	L	S	L	S	M	L	M	M
CO4	S	S	L	S	L	S	M	L	M	L
CO5	S	S	M	L	M	S	M	S	M	M

\*S - Strong;

M - Medium;

L - Low



Program: M.Sc. Zoology				
Elective – I		Course Code: 23PZO1E01		Course Title: Molecules and their interaction relevant to Biology
Semester	Hours/Week	Total Hours	Credits	Total Marks
I	4	75	3	100

### Course Objectives

1. Students should know the fundamentals of biochemistry

#### **UNIT-I**

Basics of biophysical chemistry and biochemistry: Structure of atoms, molecules and chemical bonds - Principles of biophysical chemistry (pH, buffer, reaction kinetics, thermodynamics, colligative properties).

#### **UNIT-II**

Biomolecular interactions and their properties: Stabilizing interactions (Vander Waals, electrostatic, hydrogen bonding, hydrophobic interaction etc. - Composition, structure, metabolism and function of biomolecules (carbohydrates, lipids, proteins, nucleic acids and vitamins).

#### **UNIT-III**

Bioenergetics and enzymology: Bioenergetics, glycolysis, oxidative phosphorylation, coupled reaction, group transfer, biological energy transducers - Principles of catalysis, enzymes and enzyme kinetics, enzyme regulation, mechanism of enzyme catalysis, isoenzymes.

#### **UNIT-IV**

Structural conformation of proteins and nucleic acids: Conformation of proteins (Ramachandran plot, secondary, tertiary and quaternary structure; domains; motifs and folds) - Conformation of nucleic acids (A-, B-, Z-DNA), t-RNA, micro-RNA).

#### **UNIT-V**

Stabilizing interactions in biomolecules: Stability of protein and nucleic acid structures - hydrogen bonding, covalent bonding, hydrophobic interactions and disulfide linkage.

#### **Reading list**

1. Berg, J. M., J. L. Tymoczko and L. Stryer 2002. Biochemistry. 5th Ed., W.H. Freeman & Co., New York, pp-1050.



2. Kuchel P.W. and G. B. Ralston. 2008. Biochemistry. McGraw Hill (India) Private Limited, UP, pp-580.
3. McKee T. and J. R. McKee. 2012. Biochemistry: The Molecular Basis of Life. (7th Edition). Oxford University Press, US, pp-793.
4. Nelson D.L. and M.M. Cox. 2012. Lehninger's Principles of Biochemistry. (6th Edition). W. H. Freeman Publishers, New York, pp-1158.
5. Satyanarayana U. and U. Chakrapani, 2006. Biochemistry. (3rd Edition). Books and Allied (P) Ltd. Calcutta, pp-695.

### Recommended texts

1. Buchanan, B.B., W. Gruissem and R.L. Jones. 2015. Biochemistry and Molecular Biology of Plants. John Wiley and Sons Ltd., UK, pp-1280.
2. Murray, R.K., D.K. Granner, P.A. Mayes and V.W. Rodwell. 2003. Harper's Illustrated Biochemistry (26th Edition), The McGraw-Hill Companies, Inc., USA, pp-704.
3. Palmer, T. 2004. Enzymes. Affiliated East-West Press Pvt. Ltd., New Delhi, pp-416.
4. Voet D. and J.G. Voet. 2011. Biochemistry. (4th Edition). John Wiley & Sons (Asia) Pvt. Ltd., pp-1428.

### Course Out comes (COs)

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the structure, properties, metabolism and bioenergetics of biomolecules	K1 & K3
CO2	Acquire knowledge on various classes and major types of enzymes, classification, their mechanism of action and regulation	K1 & K2
CO3	Understand the fundamentals of biophysical chemistry and biochemistry, importance and applications of methods in conforming the structure of biopolymers	K2 & K3
CO4	Comprehend the structural organization of and proteins, carbohydrates, nucleic acids and lipids	K2 & K4
CO5	Familiarize the use of methods for the identification, characterization and conformation of biopolymer structures	K5 & K6

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create



**Mapping of COs with POS**

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

\*S – Strong

M–Medium

L –Low

Program: M.Sc. Zoology				
Elective – II		Course Code: 23PZO1E02		Course Title: Biostatistics
Semester	Hours/Week	Total Hours	Credits	Total Marks
I	4	60	3	100

**Course Objectives**

1. Students should know basic concepts in Biostatistics.

**UNT-I**

Definition, scope and application of statistics; Primary and secondary data: Source and implications; Classification and tabulation of biological data: Types and applications. Variables: Definition and types. Frequency distribution: Construction of frequency, distribution table for grouped data; Graphic methods: Frequency polygon and ogive curve; Diagrammatic representation: Histogram, bar diagram, pictogram and pie chart.

**UNT-II**

Measures of central tendency: Mean, median and mode for continuous and discontinuous variables. Measures of dispersion: Range, variation, standard deviation, standard error and coefficient of variation.

**UNT-III**

Probability: Theories and rules; Probability - Addition and multiplication theorem; Probability distribution: Properties and application of Normal, Binomial and Poisson distributions.

**UNT-IV**

Hypothesis testing: Student 't' test - paired sample and mean difference 't' tests. Correlation: Types - Karl Pearsons Co-efficient, Rank correlation, Significance test for correlation coefficients. Regression analysis: Computation of biological data, calculation of regression co-efficient, graphical representation and prediction.

**UNT-V**

Analysis of variance: one way and two way classification. Data analysis with comprehensive statistical software using Statistical Package for the Social Sciences (SPSS).

**Reading list**

1. Arora, P. N. and P. K. Malhan. 1996. Biostatistics, Himalaya Publishing House, Mumbai, pp-447.
2. Gurumani, N. 2005. Introduction to Biostatistics, M.J.P. Publishers, Delhi, pp-407.
3. Das, D. and A. Das. 2004. Academic Statistics in Biology and Psychology, Academic Publisher, Kolkata, pp-363.
4. Palanichamy, S. and Manoharan, M. 1990. Statistical Methods for Biologists, Palani Paramount Publications, Tamil Nadu, pp-264.

**Recommended texts**

1. Bailey, N. T. J. 1959. Statistical in Biology, English Universities Press, London, pp-48.
2. Sokal, R. R. and F. J. Rohlf, 1973. Introduction to Biostatistics, W.H. Freeman, London, pp-467.
3. Sokal, R.R. and F.J. Rohlf. 1981. Biometry: The principles and practice of statistics in biological research, San Francisco: W.H. Freeman, London, pp-859.
4. Zar, J.H. 1998. Biostatistical Analysis, Pearson Education (Singapore) Pvt. Ltd., Delhi, India, pp-660.
5. Bailey, N. T. J. 1994. Statistical Methods in Biology (Third Edition), Cambridge University Press, Cambridge, pp-255.
6. Wayne W. Daniel. Biostatistics: A Foundation for Analysis in the Health Sciences, John Wiley & Sons Inc, USA, pp-443.
7. Snedecor, G. W. and W. G. Cochran. 1967. Statistical Methods (Sixth Edition), Oxford & IBH Publishing Co., New Delhi, pp-593.

Pagano, M. and K. Gauvreau. 2008. Principles of Biostatistics (Second Edition), Cengage Learning, New Delhi, pp-525.

**Course Outcomes (COs)**

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

CO Number	CO Statement	Knowledge Level
CO1	Clear understanding of design and application of biostatistics relevant to experimental and population studies.	K2 & K3
CO2	Acquired skills to perform various statistical analyses using modern statistical techniques and software.	K3 & K4
CO3	Knowledge on the merits and limitation of practical problems in biological/ health management study as well as to propose and implement appropriate statistical design/ methods of analysis.	K5 & K6

**K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create**

**Mapping of COs with Pos**

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

**\*S – Strong**

**M–Medium**

**L –Low**