Department of Studies in Zoology
Davangere University
Discipline Core Paper Structure (DSC)

Sem	Course Category	Course Code	Course Title	Credits Assigned	Instructional Hours per week		Duration of the exam	Exam/ Evaluation pattern (Marks)		
					Theory	Practical		IA	Exam	Total
I	DSC	DSCC5Z00T1	Cytology, Genetics and Infectious Diseases	4	4		2	40	60	100
		DSCC5Z00P1	Cytology, Genetics and Infectious Diseases	2		4	3	25	25	50
II	DSC	DSCC5Z00T2	Biochemistry and Physiology	4	4		2	40	60	100
		DSCC5Z00P2	Biochemistry and Physiology	2		4	3	25	25	50
III	DSC	DSCC5Z00T3	Molecular Biology, Bioinstrumentation & Techniques in Biology	4	4		2	40	60	100
		DSCC5Z00P3	Molecular Biology, Bioinstrumentation & Techniques in Biology	2		4	3	25	25	50
IV	DSC	DSCC5Z00T4	Gene Technology, Immunology and Computational Biology	4	4		2	40	60	100
		DSCC5Z00P4	Gene Technology, Immunology and Computational Biology	2		4	3	25	25	50

Registrar
Davangere University
Shivagangotri, Davangere

Open Elective Course Structure (OEC)

Semester	Subject	Course Code	Paper No.	Credits	Theory	Internal	Total
I	Economic Zoology	OEC5ZOOT1	O-1	3	60	40	100
2	Parasitology	OEC5ZOOT2	O-2	3	60	40	100
3	Endocrinology	OEC5ZOOT3	O-3	3	60	40	100
4	Animal Behaviour	OEC5ZOOT4	O-4	3	60	40	100

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Shivagangotri, Davangere

PROGRAMME SPECIFIC OUTCOME OF B.Sc. Zoology PROGRAMME

PSO1 – The Program offers both classical as well as modern aspects of Zoology in Higher education

PSO2 - It enables the students to study animal diversity in both local and gle environments.

PSO3-Tomakethestudy of animals more interesting and relevant to human studies m emphasis is given to branches like behavioural biology, evolutionary biology and econom zoology.

PSO4-More of upcoming areas in cell biology, genetics, molecular biology, biochemist genetic engineering and bioinformatics have been also included.

PSO5-Equal importance is given to practical learning and presentation skills of students. POS6-The lab courses provide the students necessary skills required for their employability

PSO6-The courses provides the student necessary skills required for their employability

PSO7-Skill enhancement courses in classical and applied branches of Zoology enhance enterprising skills of students.

PSO8-The global practices in terms of academic standards and evaluation strategies.

PSO9- Provides opportunity for the mobility of the student both within and across the world.

PSO10-The uniform grading system will benefit the students to move across institutions within India to begin with and across countries. POs11-It will also enable potential employers in assessing the performance of the

PSO11-It will also enable potential employers in assessing the performance of the candidates across the world.

Board of Studies in Zoology
DAVANGERE UNIVERSITY

Sl. No	Name & Professional details	Designation
1	**Prof. Vijaykumar K** Professor of Zoology Postgraduate Department of Studies in Zoology Gulbarga University KALBURGI Contact No. 8472263300	Chairman
2	**Smt. Lolakshi K.V.** Associate Professor Department of Studies in Zoology Government First Grade College MCC B Block DAVANGERE Contact No. 9448824624	Member
3	**Dr. Muhammed Zafar Iqbal. A. Navalgund** Associate Professor Department of Studies in Zoology Government Science College CHITRADURGA Contact No. 9481927388	Member
4	**Dr. Renuka. C. Khaple** Assistant Professor Postgraduate Department of Studies in Zoology Davangere University DAVANGERE Contact No. 9342047484	Member
5	**Dr. Sathishagouda. S.** Assistant Professor Department of Studies in Zoology Government Science College CHITRADURGA Contact No. 9448833029	Member

Government of Karnataka

Course Content under I Semester B.Sc. Zoology

(2021-2022 onwards & revised from 2023-2024)

Core Course Content

Course Title: **Cytology, Genetics and Infectious Diseases**	Course Credit: 4
Course Code: **DSCC5Zoo T1**	L-T-P per week:4-0-0
Total Contact Hours: 56	Duration of ESA: 2 Hours
Formative Assessment Marks: 40	Summative Assessment: 60
Syllabus Authors: BOS, Davangere University	

Core Course Prerequisite: To study Zoology in undergraduate, students must have studied Biology or equivalent subject in class 12

Course Outcomes (Cos)

At the end of the Course the student should be able to understand

1. Structure and function of the cell organelles
2. The chromatin structure and its location
3. The basic principles of life, including the mechanism and significance of cell division
4. Cell – Cell communication mechanisms
5. The principles of inheritance, Mendel's law and the deviations
6. The interaction between environment and genetic factors
7. The impact of chromosomal aberrations in humans and analysis of the family pedigrees
8. Host parasite interaction and about common parasitic infections to humans

Course Articulation Matrix: Mapping of Course Outcome with Program outcome

Course outcome (COs)/Program Outcome (Pos)	CCT1	CC2	CC3	CC4	CC5	CC6	CC7	CC8	CC9	CC10
I Core Competency	×									
II.Critical Thinking	×									
III.Analytical reasoning	×									

IV.Research Skills	×									
V.Team Work	×									

Content		Hrs
Unit 1		15
Chapter 1	**Structure and Function of Cell organelles in Animal cell - I** 1. Plasma membrane Chemical Structure: Lipids and Proteins (Fluid mosaic model) 2. Golgi complex, Endoplasmic reticulum (Structure and functions) 3. Endomembrane systems: Protein targeting, sorting, transport, endocytosis and exocytosis	
Chapter 2	**Structure and Function of Cell Organelles in Animal Cell - II** 1. Cytoskeleton: Microtubules, microfilaments & Intermediate filaments 2. Lysomomes, Peroxisomes (Structure and functions)	
	Unit 2	15
Chapter 3	**Nucleus and Chromatin Structure** 1. Structure and function of nucleus in eukaryotes 2. Chemical structure and base composition of DNA and RNA 3. Replication of DNA in prokaryotes and Eukaryotes 4. Forms of DNA and types of RNA 5. Chromatin Organization: DNA supercoiling, chromatin organization	
Chapter 4	**Cell cycle, Cell Division and Cell Signalling** 1. Introduction to Cell cycle and its regulation 2. Cell division: mitosis and meiosis 3. Apoptosis- Concept & mechanisms 4. Signal transduction: Intracellular signalling and cell surface receptors, via G-protein linked receptors 5. Cell-cell interaction: cell adhesion molecules, cellular junctions	
	Unit 3	15
Chapter 5	**Mendelism and Sex Determination** 1. Basic principles of heredity: Mendel's laws- monohybrid cross and dihybrid cross, Complete and Incomplete Dominance, Penetrance and expressivity 2. Genetic Sex-Determining Systems, Environmental Sex Determination, mechanism of Sex Determination in *Drosophila melanogaster* 3. Sex-linked characteristics in humans and dosage compensation	
Chapter 6	**Extensions of Mendelism, Genes and Environment** 1. Multiple Alleles (ABO blood grouping in humas, coat colour in rabbit) 2. Gene Interaction (Supplementary, Complementary, dominant epistasis, recessive epistasis, Lethal genes)	

	3. The Interaction Between Sex and Heredity: Sex-Influenced and Sex-Limited Characteristics, Cytoplasmic Inheritance, Genetic Maternal Effects. 4. Interaction between Genes and Environment: Environmental Effects on Gene Expression, Inheritance of Continuous Characteristics.	
	Unit 4	15
Chapter 7	**Human Chromosomes and Patterns of Inheritance** 1. Patterns of inheritance with at least one example: Autosomal dominance, autosomal recessive, X-linked recessive, X-linked dominant 2. Human karyotyping and Pedigree analysis 3. Chromosomal anomalies: Numerical and structural anomalies with examples (Down Syndrome, Turner syndrome, Klinefelter syndrome, & Cri du chat syndrome)	
Chapter 8	**Infectious Diseases** 1. Introduction to pathogenic organisms: viruses, bacteria, fungi, protozoa and worms. 2. Structure, life cycle, pathogenicity, including diseases, causes, symptoms and control of common parasites: Trypanosoma, Giardia and Wuchereria.	

Suggested Readings:

1. Lodish et al: Molecular Cell Biology: Freeman & Co, USA (2004).
1. Alberts et al: Molecular Biology of the Cell: Garland (2002).
2. Cooper: Cell: A Molecular Approach: ASM Press (2000).
3. Karp: Cell and Molecular Biology: Wiley (2002). Pierce B. Genetics. Freeman (2004). A
4. S. Thomas J. Kindt, Richard A. Goldsby, Barbara A. Osborne, Janis Kuby- Kuby Immunology. W H Freeman (2007)
5. Principles of Genetics. E.J. Gardner, MJ Simmons, DP Snustard, Wiley Publications
6. Genes X By Benjamin Lewin & MH Stone, 9th Edition Jones & Bartlet Publication

Pedagogy: Lectures, Practical, Field and laboratory visits, Participatory Learning, Seminars, Assignments, etc

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
I Test	10
II Test	10
Assessments/Seminar/presentation/project/Term paper	10
Class performance/presentation	05
Attendance	05
Total	40

Course Title	**Cytology, Genetics and Infectious Diseases** (Practicals)	Practical Credits	**2**
Course Code	**DSCC5Z00P1**	Contact Hours	**4 Hours**
Formative Assessment	**25 Marks**	Summative Assessment	**25 Marks**

Course Articulation Matrix: Mapping of Course Outcome with Program outcome

Course outcome (COs)/Program Outcome (Pos)	CCP1	CC2	CC3	CC4	CC5	CC6	CC7	CC8	CC9	CC10
I Core Competency	×									
II.Critical Thinking	×									
III.Analytical reasoning	×									
IV.Research Skills	×									
V.Team Work	×									

List of labs to be conducted	
1. Understanding the principle and working of simple and compound microscopes. 2. To study different cell types such as buccal epithelial cells, neurons, striated muscle cells using Methylene blue/any suitable stain (virtual/ slaughtered tissue). 3. To study the different stages of Mitosis in root tip of *Allium cepa*. 4. To study the different stages of Meiosis in grasshopper testis (virtual). 5. To check the permeability of cells using salt solution of different concentrations. 6. Study of parasites in humans (e.g. Protozoans, Helminthes in compliance with Examples being studied in theory) (permanent microslides) 7. To learn the procedures of preparation of temporary and permanent stained slides, With available mounting material 8. Study of normal & mutant phenotypes of Drosophila sp. (from Cultures or Photographs). 9. Preparation of polytene chromosomes (*Chironomus* larva or *Drosophila* larva). 10. Preparation of	

a) Human karyotype preparation (Normal male & female) b) Study the chromosomal numerical aberrations (Down's Syndrome, Klinefelter syndrome, Turner's Syndrome from the pictures provided. (Virtual/optional). c) Study of stuructral chromosomal anomalies (Cri du chat Syndrome) 11. To prepare family pedigrees. 12. https://www.vlab.co.in 13. https://zoologysan.blogspot.com S 14. www.vlab.iitb.ac.in/vlab 15. www.onlinelabs.in	

Pedagogy: Lectures, Practical, Field and laboratory visits, Participatory Learning, Seminars, Assignments, etc

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
Internal Test	10
Lab record	05
Class performance/presentation/Seminar	05
Attendance	05
Total	25

Open Elective Course Content

Course Title: **Economic Zoology**	Course Credit: 4
Course Code: **OEC5ZOOT1**	L-T-P per week:3-0-0
Total Contact Hours: 42	Duration of ESA: 2 Hours
Formative Assessment Marks: 40	Summative Assessment: 45
Syllabus Authors: BOS, Davangere University	

Course Outcome

At the end of the course, the student will be able to:

1. Gain knowledge about silkworm rearing and their products.
2. Gain knowledge on Bee keeping equipment and apiary management.
3. Acquire knowledge on dairy animal management, the breeds and diseases of cattle and learn the testing of egg and milk quality.
4. Acquire knowledge about the culture techniques of fish and poultry.
5. Understand the basic procedure and methodology of vemiculture.
6. Learn various concepts of lac cultivation.
7. Start their own business i.e. self-employments.
8. Get employment in different applied sectors

Course Articulation Matrix: Mapping of Course Outcome with Program outcome

Course outcome (COs)/Program Outcome (Pos)	OET1	CC2	CC3	CC4	CC5	CC6	CC7	CC8	CC9	CC10
I Core Competency	×									
II.Critical Thinking	×									
III.Analytical reasoning	×									
IV.Research Skills	×									
V.Team Work	×									

Content	
Unit 1	15
Chapter 1. Sericulture: History and present status of sericulture in India Mulberry and non-mulberry species in Karnataka and India Mulberry cultivation Morphology and life cycle of Bombyx mori Silkworm rearing techniques: Processing of cocoon, reeling Silkworm diseases and pest control Chapter 2. Apiculture: Introduction and present status of apiculture Species of honey bees in India, life cycle of Apis indica Colony organization, division of labour and communication Bee keeping as an agro based industry; methods and equipments: indigenous methods, extraction appliances, extraction of honey from the comb and processing Bee pasturage, honey and bees wax and their uses Pests and diseases of bees and their management	
Unit 2	15
Chapter 3. Live Stock Management: Dairy: Introduction to common dairy animals and techniques of dairy management Types, loose housing system and conventional barn system; advantages and limitations of dairy farming Establishment of dairy farm and choosing suitable dairy animals-cattle Cattle feeds, milk and milk products Cattle diseases Poultry: Types of breeds and their rearing methods	

Feed formulations for chicks Nutritive value of egg and meat Disease of poultry and control measures Chapter 4. Aquaculture: Aquaculture in India: An overview and present status and scope of aquaculture Types of aquaculture: Pond culture: Construction, maintenance and management; carp culture, shrimp culture, shellfish culture, composite fish culture and pearl culture	
Unit 3	15
Chapter 5. Fish culture: Common fishes used for culture. . Fishing crafts and gears. Ornamental fish culture: Fresh water ornamental fishes-biology, breeding techniques Construction and maintenance of aquarium: Construction of home aquarium, materials used, setting up of freshwater aquaria, aquarium plants, ornamental objects, cleaning the aquarium, maintenance of water quality. control of snail and algal growth. Modern techniques of fish seed production Chapter 6. Prawn culture: Culture of fresh and marine water prawns. Preparation of farm. Preservation and processing of prawn, export of prawn. Chapter 7. Vermiculture: Scope of vermiculture. Types of earthworms. Habit categories - epigeic, endogeic and anecic; indigenous and exotic species. Methodology of vermicomposting: containers for culturing, raw materials	

Habit categories - epigeic, endogeic and anecic; indigenous and exotic species. Methodology of vermicomposting: containers for culturing, raw materials required, preparation of bed, environmental pre-requisites, feeding, harvesting and storage of vermicompost. Advantages of vermicomposting. Diseases and pests of earthworms. Chapter 8. Lac Culture: History of lac and its organization, lac production in India. Life cycle, host plants and strains of lac insect. Lac cultivation: Local practice, improved practice, propagation of lac insect, inoculation period, harvesting of lac. Lac composition, processing, products, uses and their pests.	

Suggested Readings:

1. Eikichi, H. (1999). Silkworm Breeding (Translated from Japanese). Oxford & IBH Publishing Co.Pvt. Ltd., New Delhi.

2.Ganga, G. (2003). Comprehensive Sericulture Vol-II: Silkworm Rearing and Silk Reeling.

Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi. Mahadevappa, D., Halliyal, V.G., Shankar, D.G. and Bhandiwad, R., (2000). Mulberry Silk

5. Reeling Technology Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

Roger, M (1990). The ABC and Xyz of Bee Culture: An Encyclopedia of Beekeeping. KindleEdition.

Shukla and Upadhyaya (2002). Economic Zoology, Rastogi Publishers

8. Yadav Manju (2003). Economic Zoology, Discovery Publishing House. 9. Jabde Pradip V (2005). Textbook of applied Zoology, Discovery Publishing House, New

10. Cherian & Ramachandran Bee keeping in-South Indian Govt. Press, Madras.

11. Sathe, T.V. Vermiculture and Organic farming. 12. Bard. J (1986). Handbook of Tropical Aquaculture.

13. Santhanam, R. A. Manual of Aquaculture.

14. Zuka. R.1 and Hamiyn (1971). Aquarium fishes and plants

15. Jabde, P.V. (2005) Text Book of Applied Zoology: Vermiculture, Apiculture, Sericulture, Lacculture.

16. Animal Disease-Bairagi K. N. Anmol Publications Pvt.Ltd 2014

17. Economics Of Aquaculture - Singh(R.K.P) - Danika Publishing Company 2003

18. Applied and Economic Zoology (SWAYAM) web https://swayam.gov.in/nd2_cec20_ge23/preview

Pedagogy: Lectures, Practical, Field and laboratory visits, Participatory Learning, Seminars, Assignments, etc

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
I Test	10
II Test	10
Assessments/Seminar/presentation/project/Term paper	10
Class performance/presentation	05
Attendance	05
Total	40

Course Content under II Semester B.Sc. Zoology

(2021-2022 onwards & revised from 2023-2024)

Core Course Content

Course Title: **Biochemistry and Physiology**	Course Credit: 4
Course Code: DSCC5Z00T2	L-T-P per week:4-0-0
Total Contact Hours: 56	Duration of ESA: 3 Hours
Formative Assessment Marks: 40	Summative Assessment: 60
Syllabus Authors: BOS, Davangere University	

Core Course Prerequisite: To study Zoology in undergraduate, students must have studied Biology or equivalent subject in class 12

Course Outcomes (COs)

At the end of the Course the student should be able to understand

1. The student at the completion of the course will be able to:
2. Develop a deep understanding of structure of biomolecules like proteins, lipids and
3. carbohydrates.
4. Understand how simple molecules together form complex macromolecules.
5. Understand the thermodynamics of enzyme catalysed reactions.
6. Know mechanisms of e
7. at cellular and molecular levels.
8. Understand various functional components of an organism.
9. Explore the complex network of these functional components.
10. Comprehend the regulatory mechanisms for maintenance of function in the body.

Course Articulation Matrix: Mapping of Course Outcome with Program outcome

Course outcome (COs)/Program Outcome (Pos)	CCT2	CC2	CC3	CC4	CC5	CC6	CC7	CC8	CC9	CC10
I Core Competency	×									
II.Critical Thinking	×									
III.Analytical reasoning	×									
IV.Research Skills	×									
V.Team Work	×									

Content		Hours
	Unit 1	15
Chapter 1	**Structure and Function of Biomolecules** 1. Structure and Biological importance of carbohydrates (Monosaccharides, Polysaccharides and Glycoconjugates). 2. Lipids (saturated and unsaturated Fatty acids, Tri-acyl glycerols, Phospholipids, Glycolipids and Steroids) 3. Structure, Classification and General Properties of a-amino acids; Essential and non-essential amino acids, Levels of organization in proteins; Simple and conjugate proteins.	
Chapter 2	**Enzyme Action and Regulation** 1. Nomenclature and classification of enzymes 2. Chemical nature and properties of enzymes 3. Mechanism of enzyme action and Factors affecting rate of enzyme-catalysed reactions 4. Enzyme kinetics: Equation of Michaela's -Mendon, Concept of Km and V max 5. Enzyme inhibition (Reversible & irreversible) 6. Regulation of enzyme activity 7. Coenzymes 8. Applications of enzymes	
	Unit 2	15
Chapter 3	**Metabolism of Carbohydrates** 1. Metabolism of Carbohydrates: glycolysis, Kreb's Citric acid cycle, gluconeogenesis, Phosphate pentose pathway (HMP shunt), Glycogenolysis and Glycogenesis 2. Structure of Mitochondria, Oxidative Phosphorylation and Electron Transport System (Synthesis of ATP)	
Chapter 4	**Metabolism of Lipids and Proteins** 1. Biosynthesis of palmitic acid 2. β-Oxidation of lipids, Ketogenesis 3. Protein Metabolism: Deamination and transamination , Urea cycle	
	Unit 3	15
Chapter 5	**Digestion and Respiration in humans** 1. Structural organization and functions of gastrointestinal tract and associated glands. 2. Mechanical and chemical digestion of food; Absorptions of carbohydrates, lipids, proteins, water, minerals and vitamins; 3. Mechanism of Pulmonary ventilation; pulmonary volumes and capacities 4. Principle of Gas exchanges through respiratory membrane 5. Respiratory pigments 6. Transportation of oxygen and carbon dioxide (Dissociation curves and the factors influencing it)	

	7. Transport of oxygen and carbon dioxide in blood	
Chapter 6	**Circulation and Excretion in humans** 1. Components of blood and their functions; haemopoiesis 2. Blood clotting: Bloof cloting factors, Mechanism of blood cloting (Intrinsic & Extrinsic mechanisms) 3. Structure of mammalian heart, Cardiac cycle; Cardiac output and its regulation, Electrocardiogram, Blood pressure and its regulation 4. Structure of kidney and its functional unit; Mechanism of urine formation	
	Unit 4	15
Chapter 7	**Nervous System and Endocrinology in humans** 1. Structure and types of neuron, resting membrane potential (RMP) 2. Origin of action potential and its propagation across the myelinated and unmyelinated nerve fibers. Types of synapse 3. Endocrine glands -Basic structure and Hormones secreted by Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, Pancreas and Adrenal glands. 4. Classification of hormones 5. Mechanism of Hormone action	
Chapter 8	**Muscular System in humans** 1. Histology of different types of muscle 2. Ultra structure of skeletal muscle; Molecular and chemical basis of muscle contraction 3. Characteristics of muscle twitch; summation and tetanus	

Suggested Readings:

I. Nelson & Cox: Lehninger's Principles of Biochemistry: McMillan (2000)
2. Zubay et al: Principles of Biochemistry: WCB (1995)
3. Voet & Voet: Biochemistry Vols 1 & 2: Wiley (2004)
4. Murray et al: Harper's Illustrated Biochemistry: McGraw Hill (2003) Elliott and Elliott: Biochemistry and Molecular Biology: Oxford University Press
5. Guyton, A.C. & Hall, J.E. Textbook of Medical Physiology, XI Edition, Hercourt Asia PTELtd. W.B. Saunders Company. (2006).
6. Tortora, G.J. & Grabowski, S. Principles of Anatomy & Physiology. XI Edition John Wiley & sons (2006).
7. Christopher D. Moyes, Patricia M. Schulte. Principles of Animal Physiology. 3rd Edition, Pearson Education (2016).
8. Hill, Richard W., et al. Anima 1 physiology. Vol. 2. Sunderland, MA: Sinauer Associates, (2004).
9. Chatterjee CC Human Physiology Volume 1 & 2, 11th edition, CBS Publishers (20 I 6).

Pedagogy: Written Assignment/Presentation/Project/Term/Papers/Seminars.

Pedagogy: Lectures, Practical, Field and laboratory visits, Participatory Learning, Seminars, Assignments, etc

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks

I Test	10
II Test	10
Assessments/Seminar/presentation/project/Term paper	10
Class performance/presentation	05
Attendance	05
Total	40

Course Title	**Biochemistry & Physiology (Practicals)**	Practical Credits	**2**
Course Code	**ZOO CP**	Contact Hours	**4 Hours**
Formative Assessment	**25 Marks**	Summative Assessment	**25 Marks**

Course Articulation Matrix: Mapping of Course Outcome with Program outcome

Course outcome (COs)/Program Outcome (Pos)	CCP2	CC2	CC3	CC4	CC5	CC6	CC7	CC8	CC9	CC10
I Core Competency	×									
II.Critical Thinking	×									
III.Analytical reasoning	×									
IV.Research Skills	×									
V.Team Work	×									

List of labs to be conducted	Hours
1. Preparation of models of nitrogenous bases-nucleosides and nucleotides. 2. Preparation of models of amino acids and dipeptides. 3. Preparation of models of DNA and RNA. 4. Qualitative analysis of Carbohydrates, Proteins and Lipids. 5. Qualitative analysis of Nitrogenous wastes-Ammonia, Urea and Uric acid. 6. Separation of amino acids or proteins by paper chromatography.	**20**

7.Determination of the activity of enzyme (Urease)-Effect of [S] and determination of Km and Vmax. 8. Determination of the activity of enzyme (Urease) - Effect of temperature and time. 9. Action of salivary amylase under optimum conditions. 10. Quantitative estimation of oxygen consumption by Fresh Water Crab. 11. Quantitative estimation of salt gain and salt loss by fresh water crab.	**15**
12. Estimation of Haemoglobin in human blood using Sahli's haemoglobin meter. 13. Counting of RBC in Blood from Human blood sample 14. 13. Counting of WBC in Blood from Human blood sample 15. Differential Staining of Human blood corpuscles using Leishman stain 16. Demonstration of Blood glucose level by using glucometer	**15**
Virtual Labs (Suggestive sites) https://www.vlab.co.in https://zoologysan.blogspot.com www.vlab.iitb.ac.in/vlab www.onlinelabs.in www.powershow.com htttps://vlab.amrita.edu https://sites.dartmouth.edu	**06**

Pedagogy: Lectures, Practical, Field and laboratory visits, Participatory Learning, Seminars, Assignments, etc

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
Internal Test	10
Lab record	05
Class performance/presentation/Seminar	05
Attendance	05
Total	25

Open Elective Course Content

Course Title: **Parasitology**	Course Credit: 4
Course Code: **OEC5ZOOT2**	L-T-P per week:3-0-0
Total Contact Hours: 42	Duration of ESA: 2 Hours
Formative Assessment Marks: 40	Summative Assessment: 45
Syllabus Authors: BOS, Davangere University	

Course Outcomes

1. Know the stages of the life cycles of the parasites and infective stages.
2. Develop ecological model to know population dynamics of parasite, establishment of parasite population in host body, adaptive radiations and methods adopted by parasite to combat with the host immune system.
3. Develop skills and realize significance of diagnosis of parasitic infection and treatment.
4. Understand about diseases caused by Protozoa, Helminthes, Nematodes and Arthropods at molecular level.
5. Develop their future career in medical sciences and related administrative services.

Content	
Unit 1	**15**
Chapter 1. General Concepts Introduction, Parasites, parasitoids, host, zoonosis Origin and evolution of parasites Basic concept of Parasitism, symbiosis, phoresis, commensalisms and mutualism Host-parasite interactions and adaptations Life cycle of human parasites Occurance, mode of infection and prophylaxis Chapter 2. Parasitic Platyhelminthes Study of morphology, life cycle, pathogenicity, prophylaxis and control measures of *Fasciolopsisbuski, Schistosoma haematobium, Taenia solium, Hymenolepis nana*	

Chapter 3. Parasitic Protists Study of morphology, life cycle, pathogenicity, prophylaxis and control measures of *Entamoeba histolytica, Giardia intestinalis,Trypanosoma gambiense, Plasmodium vivax*	
Unit 2	**15**
Chapter 4. Parasitic Nematodes Study of morphology, life cycle, pathogenicity, prophylaxis and control measures of *Ascaris lumbricoides, Ancylostoma duodenale, Wuchereria bancrofti Trichinella spiralis* Nematode plant interaction; Gall formation. Chapter 5. Parasitic Arthropods Biology, importance and control of Ticks (Soft tick Ornithodoros, Hard tick Ixodes), Mites(Sarcoptes) Lice (Pediculus), Flea (Xenopsylla), Bug (Cimex), Parasitoid (Beetles) Chapter 6. Parasitic Vertebrates Cooki cutter Shark, Hood Mocking bird, Vampire bat and their parasitic behavior and effect on host	
Unit 3	**15**
Chapter 7. Molecular diagnosis & clinical parasitology General concept of molecular diagnosis for parasitic infection Advantages and disadvantages of molecular diagnosis Fundamental techniques used in molecular diagnosis of endoparasites Immunoassay or serological techniques for laboratory diagnosis of endoparasites on the basis of marker molecules like G. intestinalis, B. coli, E. histolytica, L. donovani, and Malarial parasite using ELISA, RIA, Counter Current Immunoelectrophoresis (CCI) Complement Fixation Test (CFT) PCR, DNA, RNA probe Life cycle, host plants and strains of lac insect.	

Lac cultivation: Local practice, improved practice, propagation of lac insect, inoculation period, harvesting of lac. Lac composition, processing, products, uses and their pests.	

Suggested Readings:

Suggested Readings:

1. Arora, D. R and Arora, B. (2001) Medical Parasitology. II Edition. CBS Publications andDistributors. 2. E.R. Noble and G.A. Noble (1982) Parasitology: The biology of animal parasites. V

Edition, Lea & Febiger. 1. Ahmed, N, Dawson, M., Smith, C. and Wood, Ed. (2007) Biology of Disease. Taylor and Francis Group.

4 Parija, S. C. Textbook of medical parasitology, protozoology & helminthology (Text and colour Atlas), II Edition, All India Publishers & Distributers, Medical Books Publishers, Chennai, Delhi.

5. Meyer, Olsen & Schmidt's Essentials of Parasitology, Murray, D. Dailey, W.C. Brown Publishers. 6. K. D. Chatterjee (2009). Parasitology: Protozoology and Helminthology. XIII Edition, CBSPublishers & Distributors (P) Ltd.

7. Guna, A. and Pitt, S.J. (2012). Parasitology: an Integrated Approach. Wiley Blackwell. Noble, E. R. and G.A.Noble (1982) Parasitology: The biology of animal parasites. V Edition, Lea & Febiger.

9. Paniker, C.K.J., Ghosh, S. (Ed) (2013). Paniker's Text Book of Medical Parasitology. Jaypee, New Delhi.

10. Parija, S.C. Textbook of medical parasitology, protozoology & helminthology (Text and color Atlas), IIEdition, All India Publishers & Distributers, Medical Books Publishers, Chennai, Delhi.

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Course Articulation Matrix: Mapping of Course Outcome with Program outcome

Course outcome (COs)/Program Outcome (Pos)	OET1	CC2	CC3	CC4	CC5	CC6	CC7	CC8	CC9	CC10
I Core Competency	×									
II.Critical Thinking	×									
III.Analytical reasoning	×									
IV.Research Skills	×									
V.Team Work	×									