



VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY

JNANASAGARA CAMPUS, BALLARI-583105

Department of Studies in

ZOOLOGY

II Semester Syllabus

Bachelor of Science

With effect from 2021-22 and onwards

DSC 2: BIOCHEMISTRY AND PHYSIOLOGY

Course Title: Biochemistry and Physiology	Course code: : 21BSC2C2BPL
Total Contact Hours: 56	Course Credits: 04
Internal Assessment Marks: 40 marks	Duration of SEE: 03 hours
Semester End Examination Marks: 60 marks	

Course Outcomes (CO's):

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

1. Basic structure of biomolecules through model making.
2. Develop the skills to identify different types of blood cells.
3. Enhance basic laboratory skill like keen observation, analysis and discussion.
4. Learn the functional attributes of biomolecules in animal body.
5. Know uniqueness of enzymes in animal body and their importance through enzyme kinetics.

DSC 2: BIOCHEMISTRY AND PHYSIOLOGY

Unit	Description	Hours
1	<p>Chapter 1. Structure and Function of Biomolecules:</p> <ul style="list-style-type: none"> • Structure and Biological importance of carbohydrates (Monosaccharides, Disaccharides, Polysaccharides and Glycoconjugates). • Lipids (saturated and unsaturated Fatty acids, Tri-acylglycerols, Phospho lipids, Glycolipids and Steroids) • Structure, Classification and General Properties of α-amino acids; Essential and non-essential amino acids, Levels of organization in proteins; Simple and conjugate proteins. <p>Chapter 2. Enzyme Action and Regulation</p> <ul style="list-style-type: none"> • Nomenclature and classification of enzymes; Cofactors; Specificity of enzyme action. • Isozymes; Mechanism of enzyme action • Enzyme kinetics; Factors affecting rate of enzyme-catalyzed reactions; Equation of Michaelis-Menton, Concept of K_m and V_{max}, Enzyme inhibition • Allosteric enzymes and their kinetics; Regulation of enzyme action. 	12

	<p>Chapter 3. Metabolism of Carbohydrates and Lipids</p> <ul style="list-style-type: none"> • Metabolism of Carbohydrates: glycolysis, citric acid cycle, gluconeogenesis, phosphate pentose pathway Glycogenolysis and Glycogenesis Lipids Biosynthesis of palmitic acid; Ketogenesis, • β-oxidation and omega -oxidation of saturated fatty acids with even and odd number of carbon atoms. <p>Chapter 4. Metabolism of Proteins and Nucleotides</p> <ul style="list-style-type: none"> • Catabolism of amino acids: Transamination, Deamination, Urea cycle, Nucleotides and vitamins • Peptide linkages 	11
3	<p>Chapter 5. Digestion and Respiration in humans</p> <ul style="list-style-type: none"> • Structural organization and functions of gastrointestinal tract and associated glands. • Mechanical and chemical digestion of food; Absorptions of carbohydrates, lipids, proteins, water, minerals and vitamins; Physiology of trachea and Lung. • Mechanism of respiration, Pulmonary ventilation; Respiratory volumes and capacities; Transport of oxygen and carbon dioxide in blood, Respiratory pigments, Dissociation curves and the factors influencing it; • Control of respiration. <p>Chapter 6. Circulation and Excretion in humans</p> <ul style="list-style-type: none"> • Components of blood and their functions; hemopoiesis • Blood clotting: Blood clotting system, Blood groups: Rh-factor, ABO and MN • Structure of mammalian heart • Cardiac cycle; Cardiac output and its regulation, Electrocardiogram, Blood pressure and its regulation • Structure of kidney and its functional unit; Mechanism of urine formation 	11
4	<p>Chapter 7. Nervous System and Endocrinology in humans</p> <ul style="list-style-type: none"> • Structure of neuron, resting membrane potential(RMP) • Origin of action potential and its propagation across the myelinated and unmyelinated nerve fibers. Types of synapse • Endocrine glands - pineal, pituitary, thyroid, parathyroid, pancreas and adrenal; hormones secreted by them. • Classification of hormones; Mechanism of Hormone action. <p>Chapter 8. Muscular System in humans</p> <ul style="list-style-type: none"> • Histology of different types of muscle; Ultra structure of skeletal muscle; Molecular and chemical basis of muscle contraction; Characteristics of muscle twitch; Motor unit, summation and tetanus. 	11

5	<p>Chapter 9. Sports Physiology</p> <ul style="list-style-type: none"> • Muscles in Exercise, Respiration in Exercise, Cardiovascular System in Exercise, Body Heat in Exercise, Body Fluids and Salt in Exercise, Drugs and Athletes, Body Fitness Prolongs Life. <p>Chapter 10. Reproduction</p> <ul style="list-style-type: none"> • Physiologic Anatomy of the Male and Female Sexual Organs, • Spermatogenesis and Oogenesis, • Testosterone and Other Male Sex Hormones, • Functions of the Ovarian Hormones-Estradiol and Progesterone, Abnormalities of Male Sexual Function, Pineal Gland—Its Function in Controlling Seasonal Fertility in Some Animals. • Placental hormones and functions 	11
<p>References:</p> <ol style="list-style-type: none"> 1. Nelson & Cox: Leininger'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 PTE Ltd. /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. Animal physiology. Vol. 2. Sunderland, MA: Sinauer Associates, (2004). 9. Chatterjee CC Human Physiology Volume 1 & 2, 11th edition, CBS Publishers (2016). 		

DSC 2: BIOCHEMISTRY AND PHYSIOLOGY LAB

Course Title: Biochemistry and Physiology Lab	Course code: 21BSC2C2BPP
Total Contact Hours: 56	Course Credits: 02
Internal Assessment Marks: 25	Duration of SEE: 03 hours
Semester End Examination Marks: 25	

Course Outcomes (CO's):

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

1. Understand the Basic structure of biomolecules through model making.
2. Develop the skills to identify different types of blood cells.
3. Enhance basic laboratory skill like keen observation, analysis and discussion.
4. Learn the functional attributes of biomolecules in animal body.
5. Know uniqueness of enzymes in animal body and their importance through enzyme kinetics.

DSC 2: BIOCHEMISTRY AND PHYSIOLOGY LAB

List of Experiments

1. Qualitative analysis of Carbohydrates, Proteins and Lipids.
2. Qualitative analysis of Nitrogenous wastes – Ammonia, Urea and Uric acid.
3. Separation of amino acids or proteins by paper chromatography.
4. Action of salivary amylase under optimum conditions.
5. Estimation of Hemoglobin in human blood using Sahli's haemoglobinometer.
6. Counting of RBC in blood using Hemocytometer.
7. Counting of WBC in blood using Hemocytometer
8. Differential staining of human blood corpuscles using Leishman stain.
9. Recording of blood glucose level by using glucometer.
10. Study of pulse rate and blood pressure in normal and exercised conditions in human being.
11. Study of the T.S. of mammalian testis and accessory reproductive organs.
12. Study of mammalian ovary and accessory reproductive organs.
13. Preparation of models of nitrogenous bases- nucleosides and nucleotides.
14. Preparation of models of amino acids and dipeptides.
15. Preparation of models of DNA and RNA.

Virtual Labs (Suggestive sites)

1. <https://www.vlab.co.in>
2. <https://zoologysan.blogspot.com>
3. www.vlab.iitb.ac.in/vlab
4. www.onlinelabs.inwww.powershow.com
5. <https://vlab.amrita.edu>
6. <https://sites.dartmouth.edu>

References:

1. Nelson & Cox: Leininger'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, Hecourt Asia PTE Ltd. /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. Animal physiology. Vol. 2. Sunderland, MA: Sinauer Associates, (2004).
9. Chatterjee CC Human Physiology Volume 1 & 2, 11th edition, CBS Publishers (2016).

OEC 2: PARASITOLOGY

Course Title: Parasitology	Course code: 21BSC2O2ZO2
Total Contact Hours: 42	Course Credits: 03
Internal Assessment Marks: 40 marks	Duration of SEE: 03
Semester End Examination Marks: 60 marks	

Course Outcomes (COs):

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

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.

OEC 2: PARASITOLOGY

Unit	Description	Hours
1	Chapter 1. General Concepts <ul style="list-style-type: none"> • 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 	8
2	Chapter 2. Parasitic Platyhelminthes Study of morphology, life cycle, pathogenicity, prophylaxis and control measures of <ul style="list-style-type: none"> • <i>Fasciolopsis buski</i> • <i>Schistosoma haematobium</i> • <i>Taenia solium</i> • <i>Hymenolepis nana</i> 	7
3	Chapter 5. Parasitic Protists Study of morphology, life cycle, pathogenicity, prophylaxis and control measures of <ul style="list-style-type: none"> • <i>Entamoeba histolytica</i> 	10

	<ul style="list-style-type: none"> • <i>Giardia intestinalis</i> • <i>Trypanosoma gambiense</i> • <i>Hymenolepis nana</i> <p>Chapter 4. Parasitic Nematodes Study of morphology, life cycle, pathogenicity, prophylaxis and control measures of</p> <ul style="list-style-type: none"> • <i>Ascarislumbricoides</i> • <i>Ancylostoma duodenale</i> • <i>Wuchereria bancrofti</i> • <i>Trichinella spiralis</i> • Nematode plant interaction ; Gall formation 	
4	<p>Chapter 3. Parasitic Arthropods Biology, importance and control of</p> <ul style="list-style-type: none"> • Ticks (Soft tick <i>Ornithodoros</i>, Hard tick <i>Ixodes</i>) • Mites(Sarcoptes) • Lice (<i>Pediculus</i>) • Flea (<i>Xenopsylla</i>) • Bug (<i>Cimex</i>) • Parasitoid (Beetles) <p>Chapter 4. Parasitic Vertebrates</p> <ul style="list-style-type: none"> • Cookicutter Shark • Hood Mocking bird and Vampire bat and their parasitic behavior and effect on host 	8
5	<p>Chapter 6.Molecular diagnosis & clinical parasitology</p> <ul style="list-style-type: none"> • 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 <i>G.intestinalis</i>, <i>B. coli</i>, <i>E. histolytica</i>, <i>L. donovani</i>, Malarial parasite using <ul style="list-style-type: none"> ✓ ELISA, RIA ✓ Counter Current Immunoelectrophoresis (CCI) ✓ Complement Fixation Test (CFT) PCR, DNA, RNA probe 	9
<p>References</p> <ol style="list-style-type: none"> 1. Arora, D. R and Arora, B. (2001) Medical Parasitology. II Edition. CBS Publications and Distributors. 2. E.R. Noble and G.A. Noble (1982) Parasitology: The biology of animal parasites. V Edition, Lea &Febiger. 3. 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, CBS Publishers & Distributors (P) Ltd.
7. Gunn, A. and Pitt, S.J. (2012). Parasitology: an Integrated Approach. Wiley Blackwell.
8. Noble, E. R. and G.A.Noble (1982) Parasitology: The biology of animal parasites. V th 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.Textbookofmedicalparasitology,protozoology&helminthology(Textand color Atlas),II Edition, All India Publishers & Distributers, Medical Books Publishers, Chennai, Delhi.
11. Roberts, L.S and Janovy, J. (2009). Smith & Robert's Foundation of Parasitology. 8th. Edn. McGraw Hill.
12. Bogitsh, B. J. and Cheng, T. C. (2000). Human Parasitology. 2nd Ed. Academic Press, New York.
13. Chandler, A. C. and Read. C. P. (1961). Introduction to Parasitology, 10th ed. John Wiley andSons Inc.
14. Cheng, T. C. (1986). General Parasitology. 2nd ed. Academic Press, Inc. Orlando.U.S.A.
15. Schmidt, G. D. and Roberts, L. S. (2001). Foundation of Parasitology. 3rd ed. McGraw Hill Publishers.
16. Schmidt, G. D. (1989). Essentials of Parasitology. Wm. C. Brown Publishers (Indian print1990, Universal Book Stall).
17. John Hyde (1996) Molecular Parasitology Open University Press.
18. J Joseph Marr and Miklos Muller (1995) Biochemistry and Molecular Biology of Parasites 2nd Edn Academic Press.

Question Paper Pattern for UG Semester End Examination
with effect from the AY 2021-22

Languages /Discipline Core Courses (DSC) & Open Elective
Courses (OEC)

Paper Code:

Paper Title:

Time: 3 Hours

Max. Marks: 60

Instruction: Answer all Sections

SECTION-A

1. Answer the following sub-questions, each sub-question carries **ONE** mark. (10X1=10)

- a).
- b).
- c).
- d).
- e).
- f).
- g).
- h).
- i).
- j).

Note for Section-A: Two sub-questions from each unit.

SECTION-B

Answer any **FOUR** of the following questions, each question carries **FIVE** marks. (4X5=20)

- 2.
- 3.
- 4.

5.

6.

7.

Note for Section-B: Minimum One question from each unit (Q No 2 to 6) and remaining one question from unit II to V (Q.No. 7)

SECTION-C

Answer any **THREE** of the following questions, each question carries **TEN** marks. (3X10=30)

8.

9.

10.

11.

12.

Note for Section- C: One question from each unit. Sub-questions such as ‘a’ and ‘b’ may be given for a question in section-C only.

B.Sc. II Semester Practical Examination, 2021-22
Course Title: Biochemistry and Physiology

Time: 3 hours

Max. Marks: 25

- | | |
|---|---------|
| 1. Experiment from Biochemistry | 5 marks |
| 2. Experiment from Physiology | 5 marks |
| 3. Experiment from Physiology | 5 marks |
| 4. Experiment from Sports Physiology/Reproduction | 5 marks |
| 5. Record Book | 5 marks |

Scheme of evaluation

- | | |
|-------------|---------|
| Procedure | 2 marks |
| Performance | 2 marks |
| Result | 1 mark |

SEC & AECC Subjects

Paper Code:

Paper Title:

Time: 1 Hours

Max. Marks: 30

There shall be Theory examinations of **Multiple Choice Based Questions [MCQs]** with **Question Paper of A, B, C and D Series** at the end of each semester for **AECCs (Environmental Studies and (ii) Constitution of India)** and **SECs (SEC-1: Digital Fluency, SEC-2: Artificial Intelligence, SEC-3: Cyber Security and SEC-4: Societal Communication)** for the duration of **One hour (First Fifteen Minutes for the Readiness of OMR and remaining Forty-Five Minutes for Answering thirty Questions)**. The Answer Paper is of **OMR (Optical Mark Reader) Sheet**.

Note:

Add the Scheme of Evaluation of UG -----practicals.
