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Academic:

| Course offered in UG | |
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| Theory | |
| UNIT I (GENERAL VETERINARY BIOCHEMISTRY) | |
| Lectures No. | Topics |
| 1 | Scope and importance of Biochemistry |
| 2 | Dissociation of acids, pH, buffer systems, Henderson-Hasselbalch equation |
| 3 | Structure of biological membranes and membrane transport. |
| 4 | Donnan's membrane equilibrium |
| 5 | Classification and biological significance carbohydrates |
| 6 | Properties of monosaccharides (Ribose, Glucose, Fructose, Galactose, Mannose and Amino Sugars) |
| 7 | Disaccharides (Maltose, Isomaltose, Lactose, Sucrose and Cellobiose) |
| 8 | Polysaccharides (starch, dextrins, dextrans, glycogen, cellulose, inulin, chitin) Muco-polysaccharides including bacterial cell wall polysaccharides |
| 9 | Classification, properties and biological significance of simple lipids |
| 10 | Compound and derived lipids and lipoproteins |
| 11 | Fat indices, Structure and functions of prostaglandins |
| 12 | Classification and structure of proteins viz. primary, secondary, tertiary and quaternary |
| 13 | Properties and biological significance of proteins |
| 14 | Amino acid structure and classification |
| 15 | Physical & chemical properties of amino acids : amphoteric nature, optical activity, and peptide bond formation |
| 16 | Chemistry of purine & pyrimidines, nucleoside and nucleotides. Biological significance of nucleosides and nucleotides |
| 17 | Structures and functions of deoxyribonucleic acid (DNA) & typical ribonucleic acid (RNA) |
| 18 | Structures and functions of typical ribonucleic acid (RNA) |
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| UNIT II (INTERMEDIARY METABOLISM) | |
| 1. | Enzymes: Definition and classification. |
| 2. | Conenzymes, cofactors & iso-enzymes. |
| 3. | Properties: Protein nature, enzyme units: International Units, katal, turnover number & specific activity. |
| 4. | Enzyme-substrate complex formation. |
| 5. | Modern concept of active centre of enzyme |
| 6. | Specificity of enzyme action: substrate specificity, group specificity, stereo, |



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| | optical specificity. |
| 7. | Factors influencing enzyme action: Effect of temperature, pH, concentration of substrate and enzyme. |
| 8. | Enzyme inhibition: Competitive, non-competitive and uncompetitive inhibition |
| 9. | Suicidal inhibition. Allosteric enzymes. |
| 10. | Biological oxidation: Enzymes and coenzymes involved in oxidation and reduction |
| 11. | Respiratory chain/electron transport chain |
| 12. | Oxidative phosphorylation. |
| 13. | Inhibitors, uncouplers and other factors influencing electron transport chain. |
| 14. | Glycolysis |
| 15. | Krebs cycle |
| 16. | HMP shunt |
| 17. | Gluconeogenesis, Cori cycle |
| 18. | Glycogenesis |
| 19. | Glycogenolysis |
| 20. | Bioenergetics of carbohydrates metabolism |
| 21. | Beta oxidation of fatty acids |
| 22. | Ketone body formation |
| 23. | Biosyntheses of long chain fatty acids. |
| 24. | Biosyntheses of short chain fatty acids. |
| 25. | Bioenergetics of lipid metabolism. |
| 26. | Biosynthesis of proteins. |
| 27. | Degradation of proteins: Deamination |
| 28. | Transamination of amino acid |
| 29. | Decarboxylation of amino acid |
| 30. | Ammonia transport and urea cycle |
| 31. | Metabolism of purine and pyrimidines. |
| 32. | DNA biosynthesis |
| 33. | Regulation and repair of DNA biosynthesis |
| 34. | RNA biosynthesis |
| 35. | Regulation and repair of RNA biosynthesis |
| 36. | Regulation and integration of metabolism |
| UNIT III (VETERINARY ANALYTICAL BIOCHEMISTRY) | |
| 1. | Hormonal control of carbohydrate metabolism and regulation of blood sugar |
| 2. | Disorders of carbohydrate metabolism: Diabetes mellitus, hyperinsulinism in dogs |
| 3. | Ketosis, bovine ketosis |
| 4. | Pregnancy toxemia, hypoglycemia in baby pigs. |
| 5. | Biochemical test for the detection of disturbance in carbohydrate metabolism |
| 6. | Plasma proteins and clinical significance, proteins and dysproteinemias |
| 7. | Acute phase proteins |
| 8. | Lipid profile in disease diagnosis |



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| 9. | Clinical enzymology: Diagnostic importance of non-functional plasma enzymes and isoenzymes |
| 10. | Liver function tests: classification, biochemical tests for differential diagnosis of jaundice |
| 11. | Biochemical tests of renal function: urine analysis, role of BUN, uric acid and creatinine in diagnosis. |
| 12. | Disturbance in acid base balance and its diagnosis |
| 13. | Biochemistry of digestive disorders |
| 14. | Biochemistry of oxidative stress and shock |
| 15. | Biochemical basis of fluid therapy |
| 16. | Detoxification in body: metabolism of xenobiotics |
| 17. | General reactions for biotransformation of different groups of substances |
| 18. | Cytochrome p450 system of enzymes. |
| Practicals | |
| UNIT I (GENERAL VETERINARY BIOCHEMISTRY) | |
| Practicals No. | Practicals Names |
| 1 | Concentration of solutions- System international (SI) units; Preparation of buffers |
| 2 | Preparation / Standardization of acid and alkali |
| 3 | Titration curve of acids versus base |
| 4 | Qualitative test and identification of carbohydrates, Qualitative test for monosaccharide |
| 5 | Qualitative test for disaccharide and polysaccharide |
| 6 | Determination of acid numbers of oil |
| 7 | Precipitation reactions of proteins |
| 8 | Colour reactions of proteins |
| 9 | Estimation of amino acids (Sorenson's method) |
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| UNIT II (INTERMEDIARY METABOLISM) | |
| 1. | Effect of temperature and pH on enzyme activity |
| 2. | Estimation of blood/plasma Glucose by Folin Wu method |
| 3. | Estimation of blood/plasma Glucose by GOD/POD method |
| 4. | Estimation of serum total protein by Lowry method |
| 5. | Estimation of serum total protein by Biuret method |
| 6. | Estimation of serum Albumin, Globulin and A/G ratio |
| 7. | Estimation of serum Inorganic Phosphate |
| 8. | Estimation of serum Calcium |
| 9. | Estimation of serum Magnesium |
| 10. | Estimation of Ascorbic acid by Dichlorophenolindophenol (DCPIP) method |
| 11. | Estimation of milk lactose by Benedicts quantitative method |
| 12. | Estimation of sodium by flame photometer |
| 13. | Estimation of potassium by flame photometer |
| 14. | Paper Chromatography of amino acids |
| 15. | Thin Layer Chromatography of amino acids |
| 16. | Estimation of Vitamin A by colorimetry |



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| 17. | Isolation of DNA from whole blood |
| 18. | Electrophoresis |
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| UNIT III (VETERINARY ANALYTICAL BIOCHEMISTRY) | |
| 1. | Physical and microscopic detection of pathological constituents in urine |
| 2. | Biochemical test for detection of pathological constituents in urine |
| 3. | Estimation of serum creatinine |
| 4. | Estimation of blood urea nitrogen |
| 5. | Estimation of total serum cholesterol |
| 6. | Estimation of Alanine Transaminase |
| 7. | Estimation of Aspartate Transaminase |
| 8. | Estimation of serum bilirubin |
| 9. | Acute phase protein |

| List of PG Courses | | | | | |
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| Sr. No. | Course No. | Title | Credit | Semester | Core/Optional |
| 1 | BCT 601 | Biophysical Chemistry | 2 + 0 | I | Core |
| 2 | BCT 602 | Biochemistry of Biomolecules | 2 + 0 | I | Core |
| 3 | BCT 603 | Enzymology | 2 + 1 | I | Optional |
| 4 | BCT 604 | Analytical Techniques and Instrumentation in Biochemistry | 1 + 1 | I | Core |
| 5 | BCT 605 | Clinical Biochemistry of Animals | 2 + 1 | II | Optional |
| 6 | BCT 606 | Intermediary Metabolism and Regulation | 3 + 0 | I | Core |
| 7 | BCT 607 | Molecular Biochemistry | 2 + 1 | II | Core |
| 8 | BCT 608 | Nutritional and Industrial Biochemistry | 2 + 0 | II | Optional |
| 9 | BCT 609 | Endocrinology and Reproductive Biochemistry | 2 + 0 | I | Optional |
| 10 | BCT 610 | Biochemistry of Ruminants and Wild Animals | 1 + 1 | II | Optional |
| 11 | BCT 611 | Introduction to Bioinformatics and Computational Biology | 1 + 1 | I | Optional |
| 12 | BCT 612 | Masters Seminar | 1+0 | III | Core |
| 13 | BCT 613 | Masters Research | 0+10 | III | Core |
| 14 | BCT 613 | Masters Research | 0+20 | IV | Core |
| Ph. D. Courses (Regular Student) | | | | | |
| 1 | BCT 701 | Applied Molecular Biochemistry and Systems Biology | 2 + 1 | I | Optional |
| 2 | BCT 702 | Membrane Biochemistry | 2 + 0 | I | Core |
| 3 | BCT 703 | Recent Trends in Enzymology | 2 + 1 | I | Optional |
| 4 | BCT 704 | Diagnostic Techniques in Clinical Biochemistry | 0 + 2 | I | Optional |



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| 5 | BCT 705 | Recent Trends In Biochemical Techniques And Instrumentation | 2 + 1 | I | Core |
| 6 | BCT 706 | Developmental Biochemistry | 2 + 0 | II | Optional |
| 7 | BCT 707 | Bioinformatics Tools in Biochemistry | 1 + 1 | I | Optional |
| 8 | BCT 708 | Environmental and Toxicological Biochemistry | 2 + 0 | II | Optional |
| 9 | BCT 709 | Biochemistry of Diseases and Disorders | 2 + 0 | II | Core |
| 10 | BCT 710 | Immuno-biochemistry | 2 + 0 | II | Optional |
| 11 | BCT 711 | Special Problem | 0+2 | II | Optional |
| 12 | BCT 700 | Research & Publication Ethics | 1+1 | III | Core |
| 13 | BCT 712 | Doctoral Seminar-I | 1+0 | III | Core |
| 14 | BCT 713 | Doctoral Seminar-II | 1+0 | III | Core |
| 15 | BCT 714 | Doctoral Research | 0+15 | III | Core |
| 16 | BCT 714 | Doctoral Research | 0+20 | IV | Core |
| 17 | BCT 714 | Doctoral Research | 0+20 | V | Core |
| 18 | BCT 714 | Doctoral Research | 0+20 | VI | Core |