Dept. Biochemistry, Satavahana University
Proposed scheme for B.Sc Biochemistry program under choice based credit system (CBCS)
With effect from 2018-19
Syllabus for B.Sc Biochemistry Code: BS 504, DSC-1E
B.Sc III year: Vth Semester
Title: Physiology and Clinical Biochemistry (Core Theory) 3 HPW-credits-3

Credit-I: Physiology

1. Digestion and absorption of carbohydrates, lipids and proteins
2. Composition of blood and coagulation of blood
3. Hemoglobin and transport of gases in blood (oxygen and CO2)
4. Heart- structure of the heart, Cardiac cycle, and cardiac factors controlling blood pressure
5. Physiology of Vision
6. Muscle- kinds of muscles, structure of myofibril, organization of contractile proteins and mechanism of muscle contraction.
7. Structure of Neuron and propagation of nerve impulse

Credit-II: Endocrinology

1. Endocrinology- organization of endocrine system. Classification of hormones.
2. Mechanism of hormonal action- Steroid and peptide hormones such as adrenaline, glucocorticoids and insulin.
3. Chemistry, physiological role and disorders of hormones of Pituitary, Hypothalamus and Thyroid
4. Chemistry, physiological role and disorders of hormones of Pancreas
5. Chemistry, physiological role and disorders of hormones of Parathyroid
6. Chemistry, physiological role and disorders of hormones of Gonads, Placenta and Adrenals
7. Gastrointestinal hormones and their physiological role

Credit-III: Organs and Organ Function tests

1. Structure and functions of the liver.
2. Liver function tests- conjugated and total bilurubin in serum, albumin: globulin ratio, hippuric acid and bromsulphthalein tests. Serum enzymes in liver diseases- SGPT, GGT and alkaline phosphatase.
3. Kidneys-structure of nephron and Mechanism of urine formation
4. Normal and abnormal constituents of urine.
5. Biological buffers. Role of kidneys in maintaining acid-base and electrolyte balance in the body.
6. Renal function tests- creatinine and urea clearance tests, phenol red test.
7. Biochemical tests for the diagnosis of heart diseases- HDL/LDL cholesterol, SGOT, LDH, CK, C-reactive protein, cardiac troponins.

References

1. Textbook of Biochemistry and Human Biology – Talwar, G.P. and Srivastava. L.M., Printice Hall of India
2. Review of Medical Physiology-Ganong. McGraw-Hill.
3. Human Physiology – Chatterjee.C.C, Medical Allied Agency
4. Textbook of Medical Physiology – Guyton.A.G and Hall.J.E., Saunders
5. William's Textbook of Endocrinology – Larsen, R. P. Korenberg, H. N. Melmed, S. and Polensky, K. S. Saunders
6. Mammalian Biochemistry- White, A. Handler, P. and Smith, E. L. McGraw-Hill.
7. Textbook of Human Nutrition- Bamji, Pralhad Rao and Reddy V. Oxford & IBH Publishers.
8. Foods: Facts & Principle- Shakuntala and Shadaksharaswamy. Wiley Ester Press.
9. Essentials of Food and Nutrition – Swaminathan.M. Bangalore Press.
10. Human Nutrition and Dietetics. Davidson, S. and Passmore, J. R. ELBS.
11. A Textbook of Biochemistry: Molecular and Clinical Aspects. Nagini, S. Scitech Publishers.
12. Tietz Fundamentals of Clinical Chemistry- Burtis, A. A. and Ashwood, E. R. Saundersimprint Elsevier Pub.
13. Textbook of Biochemistry with Clinical Correlations – Devlin.T.M.,Wiley – Liss
14. Textbook of Medical Biochemistry – Chatterjea.M.N. and Shinde.R, Jaypee Brothers Medical Publishers.
15. Textbook of Medical Biochemistry- Ramakrishnan, S., Prasannan, K. G. and Rajan, R. Orient Longman

III Year B.Sc V SEMESTER BIOCHEMISTRY -2018-19
Title: (Practicals): Physiology and Clinical Biochemistry
2HPW- credits-1

1. Estimation of hemoglobin in blood.
2. Total count - RBC and WBC. Differential count.
3. Urine analysis for albumin, sugars and ketone bodies.
4. Estimation of urinary creatinine.
5. Estimation of blood urea.
6. Estimation of serum total cholesterol.
7. Determination of serum alkaline phosphatase activity.
8. Determination of SGOT and SGPT activity

References

1. Experimental Biochemistry-A student companion-Beedu Sashidhar Rao and VijayDeshpande.
2. Laboratory Manual in Biochemistry- Jayaraman, J. Wiley Eastern
3. Biochemical Methods- Sadasivam,S and Manickyam,A. New Age International Publishers

General Elective - 1

Semester – V: Paper – BS 501: Physiology and Biochemistry

(2 Credits; 2 Hr/week)

Credit – I: Physiology

1. Physiology of digestion
2. Physiology of vision
3. Physiology of muscle and nerve
4. Composition of blood and blood coagulation
5. Hormones secreted by Pituitary
6. Hormones of Thyroid and Clinical Relevance
7. Hormones of Pancreas and Clinical Relevance

Credit – II: Biomolecules and Metabolism

1. Water properties, pH and Buffers

2. Amino acids – Classification, properties and importance. Structure of proteins. Carbohydrates – Classification (mono, di, oligo and poly), properties and importance. Lipids – Classification, properties and importance. Nucleic acids – Purines, Pyrimidines, Nucleosides, Nucleotides. Structure and types of DNA and RNA and denaturation

3. Enzymes – Classification, Factors affecting enzyme activity, Clinically important enzymes (SGOT, SGPT, LDH and CPK)

4. Amino acid metabolism – General reactions, metabolism of aromatic amino acids

5. Carbohydrate metabolism – Glycolysis, TCA cycle and Gluconeogenesis

6. Lipid metabolism – oxidation of fatty acids, de novo synthesis of fatty acidsβ

7. Nucleic acid metabolism – Synthesis and degradation of purines and pyrimidines

References

1. Textbook of Biochemistry and Human Biology – Talwar, G.P. and Srivastava. L.M., Printice Hall of India

2. Human Physiology – Chatterjee.C.C, Medical Allied Agency

3. William's Textbook of Endocrinology – Larsen, R. P. Korenberg, H. N. Melmed, S. and Polensky, K. S. Saunders

4. Lehninger's Principles of Biochemistry – Nelson.D.L. and Cox.M.M., Freeman & Co.

5. Biochemistry – Berg.J.M., Tymoczko.J.L. and Stryer.L., Freeman & Co 6. Fundamentals of Biochemistry –Jain, J.L., Jain, S., Jain, N. S. Chand & Co

Dept. Biochemistry, Satavahana University

Proposed scheme for B.Sc Biochemistry program under choice based credit system (CBCS)

With effect from 2018-19

Syllabus for B.Sc Biochemistry Code: BS 604, DSC-1E

B.Sc III year: VIth Semester

Title: Immunology and r-DNA technology (Core Theory) 3 HPW-credits-3

Credit – II: Immunology

1. Organization of immune system.
2. Organs and cells of immune system.
3. Innate and acquired immunity.
4. Cell mediated and humoral immunity (T- and B- cells).
5. Classification of immunoglobulins, structure of IgG. Theories of antibody formation-clonal selection theory.
6. Epitopes / antigenic determinants. Concept of haptens. Adjuvants.
7. Monoclonal antibodies and their applications

Credit – II: r-DNA technology I

1. Outlines of cloning strategies.
2. DNA sequencing- Maxam Gilbert and Sanger's methods.
3. Tools of r-DNA technology: Enzymes- Restriction endonucleases and ligases
4. Restriction mapping.
5. Cloning vectors- Plasmids, Cosmids, and λ phages
6. Hosts- E.coli
7. Molecular markers–RFLP, AFLP and RAPD

Credit – III: r-DNA technology II

1. Construction of c-DNA libraries.
2. Polymerase chain reaction- principle and applications.
3. Outlines of blotting techniques-Southern, Northern and Western.
4. Applications of gene cloning- production of insulin
5. Production of human growth hormone
6. Production of Bt cotton
7. Edible vaccines.

References

1. Textbook of Microbiology – Ananthanarayan, R and Jayaram Paniker, C.K., Orient Longman.
2. Microbiology – Prescott.L.M.,Harley.J.P. & Klein.D.A, McGraw-Hill.
3. Microbiology – Pelczar Jr,.M.J., Chan.E.C.S. and Krieg.N.R., Tata McGraw-Hill.
4. Textbook of Microbiology- Dubey, R. C. and Maheshwari, D. K. S. Chand & Co.
5. Principles of Gene Manipulation: An introduction to GE – Old, R. and Primrose, S.B. Blackwell Sci. Pub
6. Molecular Biotechnology Glick, BR and Paternak, JJ. Publish ASM Press

III Year B.Sc VI SEMESTER BIOCHEMISTRY -2016-17
Title: (Practicals): Immunology and r-DNA Technology
2HPW- credits-1

1. Preparation of culture media and sterilization methods.
2. Isolation of pure cultures: (i) Streak plate method (ii) Serial dilution method.
3. Gram staining.
4. Motility of bacteria by hanging drop method.
5. Bacterial growth curve.
6. Antibiotic sensitivity by paper disc method.
7. Gene cloning (Demonstration only)
8. Preparation and transformation of competent cells

References

1. Molecular Cloning (Lab manual) by Maniatis T, Fritsch EF, Sambrook J, Volume –I, CSH
2. Microbiology – A Laboratory manual by Cappuccino and Sherman, Pearson Publications LPE.
3. Experiments in Microbiology, Plant Pathology and Biotechnology by Aneja A. R., New Age Publications

General Elective - 2

Semester – VI: Paper – BS 502: Nutrition in health and disease

(2 Credits; 2 Hr/week)

Credit – I: Nutrition

1. Balanced Diet
2. Calorific value of foods
3. SDA of foods
4. BMR and factors affecting it
5. BMI and its determination
6. Recommended dietary allowance (RDA) for children, adults and lactating women
7. Foods and their Nutrient content – cereals, pulses, nuts and fibre

Credit – II: Nutritional disorders

1. Malnutrition - Kwashiorkar,
2. Malnutrition – Marasmus
3. Vitamins – Classification, dietary sources, biochemical role, deficiency disorders
4. Trace elements (Ca, Mg, Fe, I and Zn)
5. Obesity and diabetes
6. Probiotics in human health
7. Functional foods

References

1. Essentials of Food and Nutrition –Swaminathan M. Bangalore Press
2. Manual of Nutritional Therapeutics, 2nd edition, Alpers (1991), Little Brown Publications, Washington.