।। सा विद्या या विमुक्तये ।।

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

"ज्ञानतीर्थ" परिसर, विष्णुपूरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

"Dnyanteerth", Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)

Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

ACADEMIC (1-BOARD OF STUDIES) SECTION

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संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील तृतीय वर्षाचे CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२१–२२ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, मा. विद्याशाखेने **दिनांक ३१ मे २०२१ रोजीच्या बैठकीतील केलेल्या शिफारशीप्रमाणे व दिनांक १२ जून २०२१ रोजी संपन्न झालेल्या ५१ व्या मा. विद्या परिषद बैठकीतील विषय क्र. २६/५१–२०२१**च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या **संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील तृतीय वर्षाचे** खालील विषयांचे **C.B.C.S. (Choice Based Credit System) Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२१–२२ पासून लागू करण्यात येत आहेत.

1. B.Sc.-III Year-Biophysics
2. B.Sc.-III Year-Bioinformatics
3. B.Sc.-III Year-Biotechnology
4. B.Sc.-III Year-Biotechnology (Vocational)
5. B.Sc.-III Year-Botany
6. B.Sc.-III Year-Horticulture
7. B.Sc.-III Year-Agro Chemical Fertilizers
8. B.Sc.-III Year-Analytical Chemistry
9. B.Sc.-III Year-Biochemistry
10. B.Sc.-III Year-Chemistry
11. B.Sc.-III Year-Dyes & Drugs Chemistry
12. B.Sc.-III Year-Industrial Chemistry
13. B.C.A. (Bachelor of Computer Application)-III Year
14. B.I.T. (Bachelor of Information Technology)-III Year
15. B.Sc.-III Year-Computer Science
16. B.Sc.-III Year-Network Technology
17. B.Sc.-III Year-Computer Application (Optional)
18. B.Sc.-III Year-Computer Science (Optional)
19. B.Sc.-III Year-Information Technology (Optional)
20. B.Sc.-III Year-Software Engineering
21. B.Sc.-III Year-Dairy Science
22. B.Sc.-III Year-Electronics
23. B.Sc.-III Year-Environmental Science
24. B.Sc.-III Year-Fishery Science
25. B.Sc.-III Year-Geology
26. B. A./B.Sc.-III Year-Mathematics
27. B.Sc.-III Year-Microbiology
28. B.Sc.-III year Agricultural Microbiology
29. B.Sc.-III Year-Physics
30. B. A./B.Sc.-III Year Statistics
31. B.Sc.-III Year-Zoology

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.: शैक्षणिक–१/परिपत्रक/पदवी–सीबीसीएस अभ्यासक्रम/२०२१–२२/७५

दिनांक : १२.०७.२०२१.

स्वाक्षरित
सहा.कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :
१) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.
७) अधीक्षक, परिक्षा विभाग विज्ञान व तंत्रज्ञान विद्याशाखा प्रस्तुत विद्यापीठ.

SWAMI RAMAMAND TEERTH MARATHWADA UNIVERSITY, NANDED-431606, MS. INDIA

Under Faculty of Science

B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honors)

B.Sc Biochemistry Third Year (Semester-V)

Course No	Course Title	Periods/ week	Total Period	Internal Evaluation	External Evaluation	Credits
	Environmental studies	03	45	10	40	02
BC-V-501	Immunology	03	45	10	40	02
BC-V-502	Nutritional biochemistry	03	45	10	40	02
BC-V-503	Epidemic Management	03	45	10	40	02
BC-V-504	Food Biochemistry OR Elective paper Food Processing technique	03	45	10	40	02
BC-V-505	Proteomic OR Elective paper Genomic	03	45	10	40	02
BC-V-506	**#Competitive Skills**	03	-	25	-	-
SEC-III	Biochemical Technique	03	45	25	25	02
LCBC-V-1	Nutritional Biochemistry	03	45	10	40	02
LCBC-V-2	Epidemic Management& Immunology	03	45	10	40	02
						18

#Competitive Skills: Internal evaluation

SWAMI RAMAMAND TEERTH MARATHWADA UNIVERSITY, NANDED-431606, MS. INDIA

Under Faculty of Science

B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester-VI)

Course No	Course Title	Periods/ week	Total Period	Internal Evaluation	External Evaluation	Credits
BC-VI-601	Forensic Science **OR Elective Paper Cancer Biology**	03	45	10	40	02
BC-VI-602	Pharmaceutical biochemistry**OR Elective Paper Virology & Mycology**	03	45	10	40	02
BC-VI-603	Enterprenrship development	03	45	10	40	02
SEC-IV	Biochemical Technique	03	45	10	40	02
LCBC-VI-2	Project& Seminar	03	45	50	200	10
						18

Note:

1. Laboratory Course includes Skill enhanced Practical as mentioned therein.
2. The Practical Examination Will be conducted at the end of year.
3. Practical in the Laboratory course papers will be conducted throughout year i.e. during first and second semester.
4. Internal evaluation includes conduction of One internal test (Theory/ Objective or Both in one paper)
5. Internal evaluation for laboratory course should be for skill enhancement based practical.

SWAMI RAMAMAND TEERTH MARATHWADA UNIVERSITY, NANDED-431606, MS. INDIA

Distribution of credits for B.Sc Biochemistry

Under Faculty of Science

B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Immunology

Subject Code- BC-501

Period: 45 Marks-50

Objective(s):

To familiarize the students with the concept of antigen antibodies, immune response and immunological cell.

Course Outcome(s):

The student will be able to

1. Differentiate between innate and adaptive immunity.

2. Understand the cell types and organ involved in the process of immune response

3.Employ the antigen-antibodies interaction to conduct different immunological test.

4. Interpret the important immunological disorder and principle of autoimmunity

5. Know the adverse effect of immune system including allergy and hypersensitivity

Chapter	Contents& Name of the topic	Hours
I	**History of Immunology**, Definition – antigencity immunogenicity, Immunity – Innate and Acquired immunity, Mechanisms of innate immunity, Measurement of Immunity, Local immunity, Heard immunity.	**15**
II	**Antigens** – Definition of Antigen, Determinants of antigenicity-Size, Chemical nature, Susceptibility to tissue enzymes, Foreignness, Antigenic specificity, Biological classes of antigens. Haptens – Definition and Types. Epitopes &paratopes. Adjuvant. **Antibodies** – Structure, Immunoglobulin classes and subclasses, Abnormal immunoglobulins, Immunoglobulin specificities-Isotypic, allotypic&idiotpic variation. .	**10**
III	**Antigen–Antibody Reaction** – General features of antigen-antibody reactions. Precipitation – Mechanism and applications, agglutination – Mechanism and applications,complement fixation - Mechanism and applications, Immunofluorescence, RIA,	**05**

	Chromatographic immunoassay, ELISA. **Complement**- General properties, Complement activation, Classical pathway, Alternative C pathway.	
IV	**Structure and function of Immune System** - Central lymphoid organs, Peripheral lymphoid organs, Cells of Lymphoreticular system, T Cell, B Cell, MHC, **Immune Response** – Humoral immune response - Primary and Secondary responses, Production of antibodies, Cellular immune response – Induction of CMI.	**05**
V	**Hypersensitivity –** Definition, Classification, Type – I, II, III, IV (One example of each) **Autoimmunity** -Definition, Mechanisms of autoimmunization, Autoimmune diseases -Rheumatoid arthritis, Myasthenia gravis. **Immunology of Transplantation** -Classification of transplant, Allograft reaction, Histocompatibility antigens, Graft-versus host reaction.	**10**

REFERENCES:-

- Immunology 3rded by Janis kuby.
- Essentials of immunology (5thed) Roit, Blackwell Scientific Pubishing, London.
- Immunology by Nagoba.
- Cellular and Molecular immunology, 3rded, Abbas.
- Cells by David Prescott
- Cell Structure and Function by Loewy and Gallant
- Molecular Biology of the Cell by Albert Bruce et al, Garland Publication New York 1997
- Lehninger's Principles of Biochemistry by D. L. Nelson and M. M. Cox, CBS Publications, 2000
- Biochemistry by LubertStryer, 4th Edition
- Biochemistry by David Rawn

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Under Faculty of Science

B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Nutritional Biochemistry

Subject Code- BC-502

Period: 45 Marks-50

Objectives: To acquire basic knowledge about energy, protein, lipid and mineral metabolism.

Course Outcome(s): The student will be able to

1. Gathering basic knowledge of energy sources.
2. Understand the different factor affect BMR.
3. Know the Malnutrition.
4. Explaining Mineral metabolism
5. Distinguish between protein and lipid metabolism

Chapter	Contents& Name of the topic	Hours
I	**Energy Metabolism** Energy value of food (Protein, carbohydrate, fats, & protein). BMR and factor affecting BMR Disease caused by mal nutrition's (Protein, mineral & vitamins)	10
II	Nutritional aspect of carbohydrate lipid and protein and fiber. Disease related to digestion & absorption of food. Minerals major and miner minerals physiological and biochemical function assay.	10
III	**Protein Nutrition** Protein food Nutritional significances of protein from milk, legumes, egg, meat & fish. Protein efficiency ratio, biological value and digestibility coefficient.	10
IV	**Lipid Nutrition**	10

	Source of fat & oil function and utilization, required daily allowances, excess & deficiency. Role of cholesterol & arteriosclerosis. Obesity – definition, complications prevention & treatment.	
V	**Water & Mineral Metabolism** Significance of water in metabolism. Dehydration & oedema. Source & significance of calcium & phosphate metabolism. Iodine metabolism. Significance, preservation of physiological PH & anion and cation balance. Acid – base balance in body fluids.	**05**

References:

1. Nutrition and dietetics - Shubhangi Joshi
2. Principles of nutrition - E.D.Wilson
3. Hardbook of food nutrition - M.Swaminathan
4. Applied nutritions - R.Rajlaxmi
5. Lehninger's Principles of Biochemistry by D. L. Nelson and M. M. Cox, CBS Publications, 2000
6. Biochemistry by LubertStryer, 4th Edition
7. Biochemistry by David Rawn

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B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Epidemic Management

Subject Code- BC-503

Period: 45 Marks-50

Objectives: The aim of this paper is to expose the students with the knowledge Infectious diseasesroute of disease transmission and methodology, of epidemiology

Course Outcome(s): The student will be able to

1. Gathering basic knowledge of epidemiology.
2. Understand the data collection tool
3. Know the route of disease transmission
4. Explaining Infectious diseases epidemiology
5. Learn thesurvey methodology, planningof epidemiology.

Chapter	Contents& Name of the topic	Hours
I	**Basic concepts, definition, uses of epidemiology** Definition and History of epidemic and pandemic, Type of Epidemiological studies • Observational – Descriptive, Analytical • Experimental Measurements in Epidemiology	**5**
II	**Infectious diseases epidemiology**: dynamics of disease transmission. Infectious diseases of public health importance & their comparative epidemiological characteristics Epidemicdue to Parasite, Bacteria, Virus and Fungus and their control. Notification and early reporting of infectious diseases. House to house survey, epidemiological case sheet, line listing ,	**10**

	examination of close contacts , contact tracing methods, Role of paramedical personnel in integrated disease surveillance.	
III	**Routes of transmission** Control of transmission of • Waterborne and food borne diseases: • Vector borne diseases. • Airborne diseases: Measures at individual, family and community level. Measures to be taken by travellers..	**12**
IV	**Control Mechanism** Importance of personal hygienic measures (e.g.hand washing) Environmental hygienic measures (e.g. avoidance of spitting , avoidance of open air defecation, avoidance of water collections in residential areas) in control of transmission of disease. Control measures for the susceptible host . Universal precautions, Personal protective equipment's and control of hospital acquired infections. Decontamination, disinfection and disinfectants: disinfection of common items used in patient care. Immunization in children . Immunization in outbreak situations and adult immunization	**15**
V	Post Epidemic Care and documentation – Post epidemic effect and care , Post epidemic documentation for further reference and case studies.	**03**

References:

1. Prescott, Harley, Klein's Microbiology (2008) 7th Ed., Willey, J.M., Sherwood, L.M., Woolverton, C.J. McGraw Hill International Edition (New York) ISBN: 978-007- 126727. 44

2. Mandell, Douglas and Bennett.S, Principles and practices of Infectious diseases, 7th edition, Volume, 2. Churchill Livingstone Elsevier.

3. Sherris Medical Microbiology: An Introduction to Infectious Diseases by Kenneth J. Ryan, C. George Ray, Publisher: McGraw-Hill

4. Medical Microbiology by Patrick R. Murray, Ken S. Rosenthal, Michael A. Pfaller, Elsevier Health Sciences

SWAMI RAMAMAND TEERTH MARATHWADA UNIVERSITY, NANDED-431606, MS. INDIA

Distribution of credits for B.Sc Biochemistry

Under Faculty of Science

B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Food Biochemistry (Section A)

Subject Code- BC-504

Period: 45 Marks-50

Objectives: The aim of this paper is to expose the students with the knowledge food content such as carbohydrate, protein, fat, fibre, food contamination, Adulteration, food additives and Quality management.

Course Outcome(s): The student will be able to

6. Gathering basic knowledge of food content carbohydrate, protein, lipid.
7. Understand the different source food contamination
8. Know the food additives
9. Explaining quality management of food
10. Learn the mechanism of adulteration.

Chapter	Contents& Name of the topic	Hours
I	**Food Biochemistry** Carbohydrate, Protein, Fat. Fiber, Vitamin , Effect of Food processing on food nutrition	**10**
II	**Food contamination and Adulteration** Microbial, Chemical and Physical food contamination, Common adulterants, simple tests for detection of adulteration	**10**
III	**Food additives** **Classification, functional role and Safety issues**	**10**
IV	**Advances in Food Safety Quality Management** Food Safety and standards act, 2006, Major aspect of the act. **Pre-requisite programme-Good Hygienic practices (GHP):** Objective, Scope and use, Key aspect of hygiene control Systems**.** **Pre-requisite programme- Good Manufacturing Practices (GMP):** What is GMP, GMP in Food industry? **Food Safety Management System-HACCP:** HACCP seven principles, HACCP application, HACCP based SOP's by USDA **Food Safety Management Systems-ISO22000:** Key element of ISO22000, What does ISO22000 bring to the	**10**

	HACCP method, Why to use ISO 22000.	
V	**Quality Management System-ISO 9001:** Introduction, Clauses of ISO9001:2000, Documentation structure of ISO 9001:2000 Quality Manual, Mandatory procedure, SOP's Format and record	**05**

References:

1. Food chemistry: Vol I Fennama O.R.
2. Food chemistry : Mayer L.H.
3. Guide to improving Food Hygiene - Ed Gaston & Tiffney
4. Handbook of Food Toxicology S.S. Deshpande
5. Food Additives Toxicology J.A. Maga and A.T. Tu
6. Safety of Foods (II Edition) H.D. Graham

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Distribution of credits for B.Sc Biochemistry

Under Faculty of Science

B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Food Processing Technique (Section B)

Subject Code- BC-504

Period: 45 Marks-50

Objectives: To acquire basic knowledge about food preservation, food processing and emerging issues in food processing technique.

Course Outcome(s): The student will be able to

6. Gathering basic knowledge of food preservation.
7. Understand the different technique in food processing.
8. Know the food packing and labelling.
9. Explaining different FSSAI act
10. Distinguish between organic food and GM food.

Chapter	Contents& Name of the topic	Hours
I	**Introduction of Food Processing** **Food Preservation Techniques:** Pickling, Drying, Smoking, Curing, Canning, Bottling, Jellying, Modified atmosphere, Pasteurization etc). **Food Processing technique:** Minimal processing technologies, Photochemical processes, Pulsed electric field, Hurdle technology. F&VP, Milk, Meat, Oil, Grain milling, Tea-Coffee, Spices & Condiments Processing**.**	**10**
II	**Emerging issues in food processing** **Organic food** Identifying organic food, advantage, the organic certification process, Organic food labelling. **GM Food** Why are GM food produced? Main issues of concern for Human health, How are GM food regulated, Internationally, Regulation in India. Role of WHO to Improve evaluation of GM Food. Benefit & Controversies**.** **Irradiated Food** How is food Irradiated, sources of radiations used, potential uses of food irradiation, labelling of irradiated food. **Freeze dried Food:**	**10**

	Definition, principle of freeze-drying process, benefit of freeze-drying **Functional food&Nutraceutical** Functional food plant and animal source,nutraceutical,dietary supplement, regulation **Nano-tech in Food Processing** What is Nanotechnology, Use in Food Product and Processing, Food fortification and modification	
III	**Food Packing and Labelling** Packing types, Understanding labelling rule and regulation, Nutritional labelling, Labelling requirement for pre-packaged food as per CODEX	**10**
IV	**Codex Alimentarious Commission** Introduction, Standards, Codex of praxtice, Guideline and recommendation. Applying codex standards **Codex India** Role of codex contact point, national codex contact point (NCCP), Core function of NCCP-India. National Codex Committee of India-TOR (Term of Reference), Function and Shadow Committees	**10**
V	**FSSAI Act and Other related act** Food Safety and Standards Act, 2006, Major aspect of the act. Other related act: B. I. S., C.R.P.C/I.P.C, EC (Essential Commodities Act), Consumer Protection Act	**05**

References:

1. Technology of Food preservation N.W. Dersoir and N.W. Dersoir

2. Introduction to Food Science and Technology. G.P. Stewart and M.A. Amerine

3. Technology of cereals: Kent

4. Post-harvest technology of cereals, pulses and oil seeds: A. Chakrawarthy

5. Modern cereal science and technology: Y. Pomeranz

6. Utilization of rice: Luh

7. Post-harvest biotechnology of cereals: D.K. Salunkhe

8 Handbook of cereal science and technology: O.R. Fennema, Markus, Karel

9.Preservation of Fruit and Vegetable Products - Giridharilal, Siddappa G.S. and Tondon G

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Distribution of credits for B.Sc Biochemistry

Under Faculty of Science

B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Proteomic (Section A)

Subject Code- BC-505

Period: 45 Marks-50

Objective(s):

The aim of this paper is to expose the student with knowledge in protein extraction, purification, quantification.

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Course Outcome(s): The student will be able to

1. Understand the basic concept of extraction, purification.
2. Able to understand the theory of MS.
3. Understand principle of isoelectrofocusing.
4. Able to understand LC based proteomic.
5. Know Interpret

Chapter	Contents& Name of the topic	Hours
I	Proteome, proteomics and protein fractionation, separation and purification I, Protein extraction and sample preparation, General Biochemical Properties of Protein	**15**
II	Protein quantification and Isoelectric focusing , Protein 2D gel electrophoresis, Protein digestion and peptide extraction	**05**
III	Mass Spectrometry-Fundamental parameters: Mass accuracy, Resolution, Sensitivity, Ion sources: Electrospray ionization, Matrix assisted laser desorption and ionization, Mass analyzers: Quadrupole, Ion-trap, Time-of-flight, Orbitrap, Fourier-transform ion cyclotron resonance, Hybrid analyzers, Detectors: Electron multipliers, Microchannel plate.	**10**
IV	Gel based proteomics, LC-based proteomics, Peptide mass finger	**15**

	printing, Tandem mass spectrometry, Collision induced dissociation, Electron transfer dissociation, Data-dependent MS/MS, Protein Identification and data evaluation, Identification of post-translational modifications: Phosphorylation, Glycosylation, Acetylation.	

References:

1. Sambrook J, Fritsch E. F. and Maniatis (1989) Molecular cloning, vol. I, II, III, II nd edition, Cold spring harbor laboratory press, New York.

2. DNA Cloning : A practical approach D.M. Glover and D.B. Hames, RL Press, Oxford, 1995

3. Molecular and cellular methods in Biology and Medicine, P.B. Kaufman, W. Wu , D. Kim and L.J. Cseke, CRC Press Florida 1995

4. Methods in Enzymology Guide to Molecular Cloning Techniques, Vol. 152 S.L. Berger and A. R. Kimmel, Academic Press Inc, San Diego, 1996

5. Methods in Enzymology Gene Expression Technology, Vol. 185D. V. Goedel, Academic Press Inc, San Diego, 1990

6. DNA Science: A First Course in Recombinant Technology, D. A. Mickloss and G. A Freyer, Cold Spring Harbor Laboratory Press, New York, 1990

7. Molecular Biotechnology, 2nd Ed. S. B. Primrose, Blackwell Scientific publishers, Oxford, 1994

8. Milestones in Biotechnology, Classic Papers on Genetic Engineering, J. A. Davis and W. S. Reznikoff, Butterworth-Heinemann Boston 1992

9. Route Maps in Gene Technology, M. R. Walker, and R. Rapley, Blakwell Science, Oxford, 1997

10. Genetic Engineering : An Introduction to Gene Analysis and Exploitation in Eukaryotes, S. M. Kingsman, Blackwell Scientific Publications, Oxford, 1998

11. An Introduction to Genetic Engineering, 3rd Edition. Desmond S. T. Nicholl, Cambridge University press, 2008.

12. Gene Cloning and Manipulation, 2nd Ed. Cristopher Howe, Cambridge University Press, 2007.

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Distribution of credits for B.Sc Biochemistry

Under Faculty of Science

B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Genomic (Section B)

Subject Code- BC-505

Period: 45 Marks-50

Objectives: To acquire basic knowledge about gene, genome, genome mapping and cross breeding.

Course Outcome(s): The student will be able to

1. Gathering basic knowledge of gene and genome.
2. Understand the different technique genome mapping.
3. Know the gene identification.
4. Explaining human genome project
5. Distinguish DNA Marker.

Chapter	Contents& Name of the topic	Hours
I	Organization of genomes: Introduction: Genome, Genomics, Omics and importance, General features, C-value paradox. Gene identification; gene prediction rules and software's; Genome databases; Annotation of genome. Genome diversity: taxonomy and significance of genomes – bacteria, yeast, Caenorhabditis, Homo sapiens, Arabidopsis, etc.	**10**
II	Mapping genomes: Genetic mapping – i) Cross breeding and pedigree analysis, ii)DNA markers - RFLPs, SSLPs, SNPs Physical mapping - Restriction mapping, Fluorescent in situ hybridization, Radiation hybrid mapping and Sequence tagged site mapping.	**10**
III	Genomics: Genome projects: The Human genome project, HapMap Project, The 1000 genome project, and The ENCODE Project. Structural genomics: Assembly of a contiguous DNA	**15**

	sequence- shotgun method, clone contig method, and whole – genome shotgun sequencing Understanding a genome sequence: locating the genes in a genome sequence, determining the functions of individual genes and by studying the activity of a protein coded of an unknown gene	
IV	Pattern of genome evolution: The origin of genomes- Origin of macromolecules, RNA world and DNA world Acquisition of new genes (By gene duplication) and Gene families – (Types, Pseudogenes, Origin of gene families (lateral gene transfer, allopolyploidy).Synthetic genomes and their applications	**10**

References:

1. Brown T. A. 2007, Genomes 3. Garland Science Publishing, New York.

2. Dunham, I., 2003. Genome Mapping and sequencing. Horizon Scientific

3. Graur, D and W H Li, 2000. Fundamentals of molecular evolution.Sinauer Associates.

4. Hartwell, L. H., L. Hood, M. L. Goldberg, A. E. Reynolds, L. M. Silver and R. G. Veres. 2004. Genetics from Genes to Genomes. McGraw Hill.

5. Lewin B. 2003. Genes VIII. Oxford University Press. Oxford.

6. The Human Genome 2001, Nature Vol. 409.

7. The Drosophila Genome. 2000, Science Vol. 267.

8. The Caenorhabditiselegans genome 1998. Science Vol. 282.

9. The Arabidopsis Genome 2000 Nature vol. 408.

10. Primrose, S. B., and R. M. Twyman . 2006. Principles of gene manipulation and Genomics, Blackwell Publishing MA. USA.

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Distribution of credits for B.Sc Biochemistry

Under Faculty of Science

B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: **Competitive Skills**

Subject Code- BC-V-506

Period: 22 Marks-25

Objective(s):
This course aims to give information about varies competitive examination.

Course Outcome(s): The student will be able to

1. Collect information regarding Higher Education in Foreign Universities
2. Gathering information regarding different Scholarship offered For Higher Studies.
3. Understand the pattern of examination.

Chapter	Contents& Name of the topic	Hours
I	**Module 1: Gate Exam Preparation:** Gate Exam Preparation: Orientation of GATE Curriculum for students, Providing information regarding literature of GATE Examination. Solving some sample question papers of GATE Examination.	**4**
II	**Module 2: Preparation of General Aptitude** Preparation General Aptitude (GA) with Language and Analytical Skills for GATE examination.	**04**
III	**Module 3: Information (4 Hrs)** Information regarding Technical MPSC Examination and Recruitment procedure of Graduate students with detail curriculum, Literature and Guidance	**04**
IV	**Module 4: Information** Technical Post, Curriculum and authentic literature of RRB, BSRB ,CSIR, NET, SET examination .Preparation for PG entrance examination – Curriculum and information of entrance examination to IIM and national institues.	**04**
V	**Module 5**: **Higher Studies** Information Regarding Higher Education in Foreign Universities, Preparation of Pre requirements like SAT, PTE, LSAT, ACT, CAE, CPE GMAT, GRE, IELTS and the TOEFL. Preparation for	**06**

	PG entrance examination, Curriculum and information of entrance examination to IIM and other MBA collages. Information regarding different Scholarship offered For Higher Studies abroad to the Indian students.	

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B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Biochemical Technique

Subject Code- SEC-III (Section-A)

Objective(s):

This course aims to give clear understanding of the basic concept of chromatography technique, blotting, extraction andisolation.

Course Outcome(s): The student will be able to

1. Understand the basic concept chromatography.
2. To train the students for extraction and isolation.
3. Understand the blotting techniques.
4. Be able to student for protein purification.

1. Plasmid isolation
2. Blotting
3. MIC and MFC by CLSI M-27 method of unknown molecule.
4. Study of biofilm formation on synthetic medium
5. Protein extraction and purification
6. Extraction of various fractions from plant materials
7. Demonstration of HPTLC
8. Demonstration of GC-MS
9. Demonstration of X-ray crystallography
10. Demonstration of MRI

Reference Book:

1. Physical biochemistry – Frifielder. D, W.H.Freeman and Co. New York, 1983

2.Analytical biochemistry – Holmes and H.Peck, academic press, New York.

3. Biophysical technique – Wilson and Goulding, ELBS edition, latest edition.

4. Biophysical chemistry (principle and technique) – Upadhyaya and Upadhayaya and Nath Himalaya Pub. Nagpur, latest edition

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B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Biochemical Technique

Subject Code- SEC-III (Section-B)

Objective(s):

This course aims to give clear understanding of the biochemical changes in disease, quality control, precautions and limitation..

Course Outcome(s): The student will be able to

1. Understand biochemical in disease.
2. To train the students for collection and storage blood.
3. Understand the cardiovascular disease.
4. Be able to student for blood separation.

Unit 1 Introduction

Organization of clinical laboratory, Introduction to instrumentation and automation in clinical biochemistry laboratories safety regulations and first aid.General comments on specimen collection, types of specimen for biochemical analysis.Precision, accuracy, quality control, precautions and limitations.

Exercises

- Collection of blood and storage.
- Separation and storage of serum.

Unit 2 Evaluation of biochemical changes in diseases

Basic hepatic, renal and cardiovascular physiology. Biochemical symptoms associated with disease and their evaluation. Diagnostic biochemical profile.

Unit 3 Assessment of glucose metabolism in blood

Clinical significance of variations in blood glucose.Diabetes mellitus.

Exercises

•Estimation of blood glucose by glucose oxidase peroxidase method.

Unit 4 Lipid profile

Composition and functions of lipoproteins.Clinical significance of elevated lipoprotein.

Exercises

•Estimation of triglycerides.

Unit 5 Liver function tests

Exercises

•Estimation of bilirubin (direct and indirect).

Unit 6 Renal function tests and urine analysis

Use of urine strip / dipstick method for urine analysis.

Exercises • Quantitative determination of serum creatinine and urea.

Unit 7 Tests for cardiovascular diseases

Involvement of enzymes in diagnostics of heart disease including aspartate transaminase, isoenzymes of creatine kinase and lactate dehydrogenase and troponin.

Exercises • Estimation of creatine kinase MB.

SUGGESTED READINGS

1. Medical Laboratory Technology - a Procedure Manual for Routine Diagnostic Tests Vol. I (2010), Mukherjee, K.L., Tata McGraw–Hill Publishing Company Limited (New Delhi). ISBN:9780070076594 / ISBN:9780070076631

2. Medical Laboratory Technology - a Procedure Manual for Routine Diagnostic Tests VoI. II (2010), Mukherjee, K.L., Tata McGraw – Hill Publishing Company Ltd. (New Delhi), ISBN: 9780070076648.

3. Medical Biochemistry (2005) 2nd ed., Baynes, J.W. and Dominiczak, M.H., Elsevier Mosby Ltd. (Philadelphia), ISBN:0-7234-3341-0.

4. Experimental Biochemistry: A Student Companion (2005) Rao, B.S. and Deshpande, V., IK International Pvt. Ltd. (New Delhi), ISBN:81-88237-41-8.

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B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Nutritional Biochemistry

Subject Code- LCBC-V-1

Period: 45 Marks-50

Objective(s):
This course aims to give clear understanding qualitative and quantitative analysis food and their adulteration.

Course Outcome(s): The student will be able to

1. Identify food adulteration
2. To estimate dietary fiber.
3. Understand the mineral estimation.
4. To able to student for food analysis

1. Milk analysis – total solids, lactose estimation by Lane – Eynon volumetric method (specific gravity by lactometer).
2. Detection of Adulterants in food.
   Detection of probable adulteration in the following :
   A) Oil – groundnut
   B) Spices – Black pepper
   C) Clinnamomum – chilly powder.
   D) Cerals – Bajara
   E) Beverages – Tea and coffee
   F) Pulses – Gram dal flour
   G) Food products mango pulp.
3. Qualitative test for the detection of adulteration in milk and milk products.
4. Determination of activity in Curd / Paneer / Milk, - by titration method.
5. Estimation of fat (centrifugation or soxhlet method)
6. Estimation of proteins(by kjeldahl method)
7. Estimation of fibre.
8. Estimation of ash
9. Estimation of moisture
10. Estimation of ascorbic acid(titrimetric/ colorimetric method/)
11. Estimation of calcium (titrimetric method/)
12. Estimation of iron(wong's method)

References:

1. Practical Biochemistry : An Introductory Course by Fiona Frais.

2. Methods in Enzymology Vol. I by S.P.ColowickandN.O.Kaplaneds.

3. Basic Biochemical Methods 2nded by R.R.Alexander and J.M.Griffith

4. Biochemical Methods 2nd ed. by S.Sadasivam and A. Manickam.

5. Hawk's Physiological Chemistry ed. by Bernard L Oser.

6. A Textbook of Practical Biochemistry by David Plummer.

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B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Epidemic management And Immunology

Subject Code- LCBC-V-2

Period: 45 Marks-50

Objective(s):

This course aims to give clear understanding of the biochemical changes in disease, quality control, precautions and limitation..

Course Outcome(s): The student will be able to

1. Identify Malaria parasite
2. To perform staining.
3. Exam the sputum.
4. be able to student for spraying equipments working and maintenance

1. Preparing peripheral smear for malarial parasites and staining

2. Identification of malarial parasites

3. Spraying equipments working and maintenance

4. Preparation of DDT solution, suspension

5.Technique of spraying

6. Visit to epidemic cell of municipal corporation/ DHO office.

7. Visits to NPSP / NVBDCP / RNTCP / DOTS Centre/ Leprosy unit/ ART centre.

8. Determination of Blood group and Rh factor

9. Widal test

10. RPR test

11. RA test

12. ASO test

13. CRP test

14. HBsAg test

15. Detection of Dengue NS1, IgM, IgG

16. Pregnancy test

17. Coomb' test

References:

1. Practical Biochemistry : An Introductory Course by Fiona Frais.

2. Methods in Enzymology Vol. I by S.P.ColowickandN.O.Kaplaneds.

3. Basic Biochemical Methods 2nded by R.R.Alexander and J.M.Griffith

4. Biochemical Methods 2nd ed. by S.Sadasivam and A. Manickam.

5. Hawk's Physiological Chemistry ed. by Bernard L Oser.

6. A Textbook of Practical Biochemistry by David Plummer.

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B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester-VI)

Course No	Course Title	Periods / week	Total Period	Internal Evaluation	External Evaluation	Credits
BC-VI-601	Forensic Science **OR Elective Paper Cancer Biology**	03	45	10	40	02
BC-VI-602	Pharmaceutical biochemistry **OR Elective Paper Parisitology, Virology & Mycology**	03	45	10	40	02
BC-VI-603	Enterprenrship development	03	45	10	40	02
SEC-IV	Biochemical Technique	03	45	10	40	02
LCBC-VI-1	Project& Seminar	03	45	10	40	10
						18

Note:

1. Laboratory Course includes Skill enhanced Practical as mentioned therein.

2. The Practical Examination Will be conducted at the end of year.

3. Practical in the Laboratory course papers will be conducted throughout year i.e. during first and second semester.

4. Internal evaluation includes conduction of One internal test (Theory/ Objective or Both in one paper)

5. Internal evaluation for laboratory course should be for skill enhancement based practical.

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CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Forensic Science (Section A)

Subject Code- BC-601

Period: 45 Marks-50

Objective(s):

The aim of this paper is to expose the student with the knowledge in criminal investigation,recovery and preservation of samples from a crime scene – biological, toxicological, petroleum, explosives, trace items, projectiles and bullets

Course Outcome(s): The student will be able to

1. Understand the basic concept of crime scene.
2. Know the recovery and preservation of samples
3. Understand the crime scene management.
4. Know the various divisions in FSL.
5. Know role of investigation officer

Chapter	Contents& Name of the topic	Hours
I	**Forensic science** Definition, History, Development and Scope of forensic Science in India. State and Central Forensic Science Laboratories, their structure and functioning.	**10**
II	**Physical evidences** Definition, types, class and individual characteristics, Principle of exchange, General information provided by physical evidences, Different search methods for locating physical evidences at scene of crime, Chain of Custody.	**10**
III	**Handling of physical evidences-I** Preservation, Packing, labeling, transportation and forwarding of	**10**

	the following physical evidences, Biological samples Blood, semen, Saliva, urine, vomit, fecal material, hair etc., Botanical samples- Cannabis, opium, nux vomica etc., Toxicological samples-viscera, adulterated food stuff, blood, urine, vomit etc., Post mortem samples.	
IV	**Handling of physical evidences -II** Preservation, packing, labeling, handling, transportation and forwarding of the following physical evidences: Chemical samples volatile liquids, nonvolatile liquids, flammable liquids, solid chemical etc., Ballistics samples-firearms, ammunitions, GSR etc., Fingerprint, impressions and documents, Physical samples-fiber, glass, textile, wire & cables, dust & soil etc.	**10**
V	**Experts and Institutions** Expert as per Indian Evidence Act, experts in court and there function, state and central government experts and institutions	**05**

References:

1. Introduction to Forensic Science in Crime Investigation By Dr.(Mrs.) Rukmani Krishnamurthy

2. Henry Lee's Crime Scene Handbook by Henry C Lee

3. Forensic Biology by Shrikant H. Lade

4. Crime Scene Processing and Laboratory Work Book by Patric Jones

5. Forensic Science: An Introduction to Scientific and Investigative Techniques 3rd ed. by Stuart H. James

6. Criminalistics: An Introduction to Forensic Science, 9th ed. By Richard Saferstein

7. Compute Crime and Computer Forensic by Dr. R.K. Tiwari

8. Criminal Profiling: An Introduction to a Behavioral Evidence Analysis, 3rd ed. By Brent E. Turvey

9. Forensic Science in Criminal Investigation and Trial, 4th ed. By B.R. Sharma

10. Handbook of Forensic Psychology by Dr.Veerraghavan

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B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Cancer Biology (Section B)

Subject Code- BC-601

Period: 45 Marks-50

Objective(s):

To acquire basic knowledge about stages of cancer development, chemical carcinogenesis, different type of tumor markers.

Course Outcome(s): The student will be able to

1. Gathering basic knowledge of cancer cell.
2. Understand the concept carcinogenesis.
3. Know the tumor marker
4. Know the mutation
5. Learn the mechanism of oncogene

Chapter	Contents& Name of the topic	Hours
I	Cancer cell 1. Characteristics of cancer cell 2. Types of cancer a. Benign b. Malignant 3. Metastasis 4. Tumor markers (CEA, AFP)	**10**
II	Chemical carcinogenesis I 1. Mutation - definition, significance, rates and frequency, 2. Mutagenic agents (Nicotine), 3. Molecular basis of mutagenesis, a. Induced b. Spontaneous mutations,	**10**
III	Chemical carcinogenesis II	**10**

	1. Genetic and epigenetic carcinogens, 2. Procarcinogens and cocarcinogens, 3. Promoters and initiators, 4. Testing for carcinogenicity- Ames test	
IV	Oncogenes and Radiation 1. RNA and DNA tumor viruses, 2. Retroviruses and viral oncogenes 3. Src and Ras gene, 4. Radiation - effect of ionising radiations on DNA	**15**

References:

1. Klaassen C D, Amdur M O &Doull J (1986) Casarett and Doull's Toxicology, III rd edition, Macmillan publishing company, New York. 26

2. Williams P L&Burson J L (1985) Industrial Toxicology, Van- Nostrand Reinhold, New York.

3. Hayes A W (1988) Principles and methods of toxicology, II nd edition, Raven press New York.

4. Stewart C P&Stolman A (1960) Toxicology, vol I, Academic press, New York.

5. Neurochemistry by Ferdinand Hucho, VCH Publication, 1986

6. Molecular cell Biology by Lodish, Baltimore, et al W.H. Freeman & Co. !996

7. Basic Neurochemistry by M. P. Spiegel

8. Neuroscience by Dale Purvase

9. Cancer Biology by Raymond Ruddon

10. Oncogenes Burck Liu and Larrick

11. Toxicology by Stewart and Stoleman

12. Molecular Biology of Gene by Watson

13. Molecular Biology of the Cell by Alberts Bruce, Garland Publication, 1997

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B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester VI)

Title of Paper: Pharmaceutical Biochemistry

Subject Code- BC-602 (Section-A)

Period: 45 Marks-50

Objective(s):
To acquire basic knowledge about pharmacology, biological assay, development of new drugs and effect of drug on various system.

Course Outcome(s): The student will be able to

1. Understand the basic concept of Pharmacology.
2. Know the different route of drug administer
3. Understand the different biological assay.
4. Know the drugs action of CNS.
5. Know the mechanism action of drugs.

Chapter	Contents& Name of the topic	Hours
I	General pharmacology, Source, Nature and nominaculture of drug, Dosage form route of administration, factor affecting dosage and drug action absorption, distribution metabolism and execration of drug adverse drug reaction	**10**
II	Biological assay and development of new drug, section and application of bioassay principal and method of bioassay, evaluation of drug, preclinical evaluation, therapeutic index, physic-chemical properties of drug ionization, hydrogen bonding, chelation.	**10**
III	Study of effect of drug on various system like action of drug on CNS, General overview alcohol and alcoholism, depression amine hypothesis drug dependence, Drug acting on CVS. Pharmacotherpy of hypertension, vaccine and antsera antibiotic. Drug acting on respiratory system	**10**
IV	**Production of Natural Drugs :** Anticancer Drugs from Microorganisms Anticancer Drugs from Plants	**10**

	Podophyllotoxins Vinblastine. Taxol Camptothecin Mechanism of Action Herb-Drug Interactions	

References:

1. Biochemistry – Zubey.

2. Biochemistry – Stryer.

3. Principal of microbiology- prescott

4. Fundamental of biochemistry- Voet and Voet

5. Pharmaceutical Biochemistry ByLehinger

6. Moo-Young M. ed. (1985) Comprehensive Biotechnology vol: III & IV. Pergamon press. N.Y.

7.Rehm H.J and Reed G eds. (1985) Biotechnology vol: III – VIII. VCH, Basel.

8.Ratledge C and Kristiansen B eds. (2001) Basic Biotechnology 2nd ed. Cambridge Univ. Press. Cambridge.

9.Klegerman, M.E and Groves M.J. (1992) Pharmaceutical Biotechnology: Fundamentals and Essentials. Interpharm Press Ltd. Buffalo Grove IL

10. Reed G. Ed. Prescott and Dunn's Industrial Microbiology .4th edition CBS Pub. New Delhi.

11. Culture of Animal Cells by Ian Freshney.

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B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester VI)

Title of Paper: Parasitology,Virology and Mycology

Subject Code- BC-602 (Section-B)

Period: 45 Marks-50

Objective(s):

To acquire basic knowledge about pharmacology, biological assay, development of new drugs and effect of drug on various system.

Course Outcome(s): The student will be able to

1. Understand the basic concept of Pharmacology.
2. Know the different route of drug administer
3. Understand the different biological assay.
4. Know the drugs action of CNS.
5. Know the mechanism action of drugs.

Chapter	Contents& Name of the topic	Hours
I	PARASITOLOGY 1.1 Morphology, Life-Cycle, Pathogenicity and Laboratory diagnosis of protozoa such as :- (a) E. histolytica and E. coli, (b) Giardia, (c) Trichomonas, (d) Toxoplasma, (e) Plasmodia and Lieshmania	**10**
II	Morphology, Life-Cycle, Pathogenicity and Laboratory diagnosis of following helminths and nematodes :- (a) Hook worm, Round worm, Whip worm, Thread worm, Pin worm. (b) Tapeworm and Echinococcus (c) Wucheriabancrofti and B. malayi	**10**
III	MYCOLOGY 2.1 Morphology and classification of pathogenic fungi 2.2 Morphology and laboratory diagnosis of fungi causing superficial mycosis 2.3 Morphology and laboratory diagnosis of fungi causing deep mycosis 2.4 Morphology and laboratory diagnosis of fungi causing systemic mycosis 2.5 Morphology and laboratory diagnosis of fungi causing opportunistic fungal infections	**10**
IV	VIROLOGY 3.1 Classification, general properties of viruses 3.2 Cultivation and propagation of human viruses 3.3 Bacteriophage and its significance.	**10**
V	Morphology, pathogenicity and laboratory diagnosis of hepatitis	**05**

	viruses 3.5 Morphology, pathogenicity and laboratory diagnosis of HIV / AIDS virus. 3.6 Oncogenic viruses	

References:

1. Parasitology –K. D. Chatterji
2. Medical Mycology – J. W. Rippon.
3. Medical Virology- D. O. White & F. Fenner
4. Text book of Human Virology- R. B. Bleshe, et. Al
5. Mycology for clinical Laboratory- G. M. More & D. M. Jacio

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CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester VI)

Title of Paper: Entrepreneurship Development

Subject Code- BC-603

Period: 45 Marks-50

Objective(s):
To acquire basic knowledge about entrepreneurship development, requirement of entrepreneurship and assessing the market.

Course Outcome(s): The student will be able to

1. Understand the basic concept of Entrepreneurship.
2. Know the different type of Entrepreneurship
3. Understand the Information gathering techniques.
4. Know the Analysis of Survey data.
5. Know the SWOT analysis.

Chapter	Contents& Name of the topic	Hours
I	**Foundation Of entrepreneurship Development** Introduction to Entrepreneurship Development, Concept of Entrepreneurship, Types of Entrepreneurship, Entrepreneurship as a career, The changing role of the Entrepreneur.	10
II	**Requirement of entrepreneurship** Attributes Required for Entrepreneurship, Growth of Entrepreneurship in India Concept and function of woman Entrepreneurship	10
III	**Entrepreneurship motivation and process of Entrepreneurship** What is motivation, Motivation theories, Motivation factors,4 C's of Entrepreneurship	10

IV	**Assessing the Market** Information gathering techniques, Principle of Market Survey, Analysis of Survey data Resource Mobilization	**05**
V	**Entrepreneurship Programme, SWOT analysis and budget** SWOT analysis, Types of budget, Contents of project report, Objectives of Entrepreneurship programme, Industrial project – Meaning types of projects , project cycle , Identification, formation, Appraisal, Implementation, Monitoring and evaluation	**10**

References:

1 Hand Book for New Entrepreneurs Bhatt, EDI faculty,

2 Entrepreneurship and Venture Management Chifford M and Back M B Mc

3 Entrepreneurship G.BabuRao, TTTI (SR) Hyderabad – 29

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CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester VI)

Title of Paper: Biochemical Technique (Section-A)

Subject Code- SEC IV

Period: 45 Marks-50

Objective(s):
This course aims to give clear understanding the growth of microorganism, CFU, Enzyme kinetic and SOP.

Course Outcome(s): The student will be able to

1. Understand the basic concept SOP.
2. To train the students for enzyme kinetic.
3. Understand the Sonography techniques.
4. Be able to student for biological product production

1. Study the growth of various microorganisms like bacteria, yeast and fungi
2. Determination of CFU
3. Enzyme kinetics
4. Synthesis and preparation of paracetamol
5. MTT and XTT assay
6. Vinegar production
7. Study of various animal models used for research purpose
8. Preparation of SOP
9. Demonstration of CT-SCAN
10. Demonstration of Sonography

Reference Book:

1. Physical biochemistry – Frifielder. D, W.H.Freeman and Co. New York, 1983
2. Analytical biochemistry – Holmes and H.Peck, academic press, New York.
3. Biophysical technique – Wilson and Goulding, ELBS edition, latest edition.
4. Biophysical chemistry (principle and technique) – Upadhyaya and Upadhayaya and Nath Himalaya Pub. Nagpur, latest edition
5. Biochemistry – Zubey.

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Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester VI)

Title of Paper: Biochemical Technique (Section-B)

Subject Code- SEC IV

Period: 45 Marks-50

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Objective(s):

This course aims to give clear understanding purification and characterization of protein.

Unit 1

Purification and characterization of a protein from a complex mixture (native or heterologously expressed) involving the following methods/techniques

Exercises

- Preparation of the sample.
- Ion-exchange chromatography.
- Gel filtration chromatography.
- Affinity chromatography.
- Electrophoresis.

Unit 2

Demonstration of High Performance Liquid Chromatography (HPLC)

SUGGESTED READINGS

1. Physical Biochemistry: Principles and Applications (2010) 2nd ed., Sheehan, D., Wiley Blackwell (West Sussex), ISBN:978-0-470-85602-4 / ISBN:978-0-470-85603-1.

2. Physical Biochemistry: Applications to Biochemistry and Molecular Biology (1982) 2nd ed., Freifelder, D., W.H. Freeman and Company (New York), ISBN:0-7167-1315-2 / ISBN:0-7167-1444-2.

3. An Introduction to Practical Biochemistry (1998) 3rd ed., Plummer D. T., Tata McGraw Hill Education Pvt. Ltd. (New Delhi), ISBN:13: 978-0-07-099487-4 / ISBN:10: 0-07- 099487-0

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Distribution of credits for B.Sc Biochemistry

Under Faculty of Science

B.Sc Syllabus structure

CBCS (Choice Based Credit System)

Semester Pattern effective from June-2021

Subject: Biochemistry (Honour's)

B.Sc Biochemistry Third Year (Semester V)

Title of Paper: Project and Seminar

Subject Code- LCBC-VI-1

Marks- 200