।। 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

25 1994 - 2019 SILVER JUBILEE YEAR

ACADEMIC (1-BOARD OF STUDIES) SECTION

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संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील प्रथम वर्षाचे CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०१९–२० पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, **दिनांक ०८ जून २०१९ रोजी संपन्न झालेल्या ४४व्या मा. विद्या परिषद बैठकीतील ऐनवेळचा विषय क्र.११/४४–२०१९** च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या **संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील प्रथम वर्षाचे** खालील विषयांचे **C.B.C.S. (Choice Based Credit System) Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०१९–२० पासून लागू करण्यात येत आहेत.

1. Agricultural Microbiology
2. Agrochemicals & Fertilizers
3. Analytical Chemistry
4. B.C.A.
5. B.Voc. (Food Processing, Preservation and Storage)
6. B.Voc. (Web Printing Technology)
7. Biochemistry
8. Bioinformatics
9. Biophysics
10. Biotechnology (Vocational)
11. Biotechonology
12. Botany
13. Chemistry
14. Computer Application (Optional)
15. Computer Science (Optional)
16. Computer Science
17. Dairy Science
18. Dyes and Drugs
19. Electronics
20. Environmental Science
21. Fishery Science
22. Food Science
23. Geology
24. Horticulture
25. Industrial Chemistry
26. Information Technology (Optional)
27. Mathematics
28. Microbiology
29. Network Technology
30. Physics
31. Software Engineering
32. Statistics
33. Zoology

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

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.: शैक्षणिक–०१/परिपत्रक/पदवी–सीबीसीएस अभ्यासक्रम/२०१९–२०/**२९२**

दिनांक : ०३.०७.२०१९.

स्वाक्षरित/–
उपकुलसचिव
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.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERCITY,
NANDED -431606, MS. INDIA
Distribution of credit for B.Sc. Biochemistry
Under Faculty of Science
B.Sc. Syllabus structure
CBSC (Choice Based Credit System)
Semester Pattern effective from June 2019
Subject: Biochemistry (Honors)

B.Sc. Biochemistry first Year (Semester-1)

Course No.	Course Title	Periods/ Week	Total Periods	Internal Evaluation	External Evaluation	Credits
	Theory Papers					
BC-I-101	Communication Skills-1	03	45	10	40	02
BC-I-102	Basic Chemistry	03	45	10	40	02
BC-I-103	Basic Microbiology	03	45	10	40	02
BC-I-104	Basic Biotechnology	03	45	10	40	02
BC-I-105	Biomolecules	03	45	10	40	02
BC-I-106	Technical Biochemistry	03	45	10	40	02
LC-I-1	Basic Chemistry	04	60	10	40	02
LC-I-2	Basic Microbiology	04	60	10	40	02
LC-I-3	Biomolecule	04	60	10	40	02
						18

SWAMI RAMANAND TEERTH MARATHWADA UNIVERCITY,
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Distribution of credit for B.Sc. Biochemistry
Under Faculty of Science

B.Sc. Syllabus structure

CBSC (Choice Based Credit System)
Semester Pattern effective from June 2019

Subject: Biochemistry (Honors)

B.Sc. Biochemistry first Year (Semester-II)

Course No.	Course Title	Periods/ Week	Total Periods	Internal Evaluation	External Evaluation	Credits
	Theory Papers					
BC-II-201	Communication Skills-II	03	45	10	40	02
BC-II-202	Inorganic & Physical Chemistry	03	45	10	40	02
BC-II-203	Development Biology	03	45	10	40	02
BC-II-204	Evolutionary Biology	03	45	10	40	02
BC-II-205	Metabolism	03	45	10	40	02
BC-II-206	Human Physiology	03	45	10	40	02
LCBC-II-1	Basic Chemistry	04	60	10	40	02
LCBC-II-2	Human Physiology	04	60	10	40	02
LCBC-II-3	Metabolism	04	60	10	40	02
						18
	1st + 2nd Semester Total Credits (18+18) =					**36**

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 RAMANAND TEERTH MARATHWADA UNIVERCITY,
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Syllabus B.Sc. Biochemistry
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CBSC (Choice Based Credit System)
Semester Pattern effective from June 2019

Subject: Biochemistry (Honors)

B.Sc. Biochemistry first Year (Semester-I)

Title of the Paper:- Communication Skills-I (BC-I-101)

Hours: 45

Objective(s): To improve the skills in correct English in writing and pronunciation

Unit-I Grammar 10

Word Classes (Open & Closed). The Sentence & its Kind, Phrase, Clause, Simple, Complex, Compound Sentences. Transformation of sentences, Tenses and Voice. Punctuation & Capitalization, Common Errors.

Unit-II Vocabulary 10

Word Formation, Synonyms and Antonyms, One Word Substitutuions, Homophones & Homonyms.

Unit-III Communication Skills 10

Definition, Types of Communication, Process of Communication, Barriers to Communication, Non Verbal Communication, Principles of Effective Communication.

Unit-III Writing Skills- 10

Letter Formats, Memo Format, News Paper Advertisements, Curriculum Vitae, Personal Interview.

Unit-V 05

44 sounds of English, Consonants, Vowels and Diphthongs. Transcription of Words.

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

1. Gathering basic knowledge of communication skill.
2. Understand the different writing skill in English.
3. Know the vocabulary of English and grammar.
4. Explaining different sounds,consonents, vowels.
5. Learn the mechanism of communication process, barriers in communication

Reference Books:

1. Technical Communication- Raman & Sharma- Oxford
2. Techincal Communication: A Reader centered approach, Anderson Thomson
3. English Grammar & Composition – Pal & Suri-S.Chand
4. Course in Technical English- Somaya Publication
5. A Practical English Grammar-A.J.Thomson A.V.Martinet
6. Written Communication in English- Sarah Freeman A.V. Martinet
7. English for Practical Purpose- Patil, Valke- Mac Milan
8. Developing Communication Skills by Krishna Mohan & Meera Banerjee
9. Personality Development by Dr. T. Bharathi, Neelkamal Publications

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Subject: Biochemistry (Honors)

B.Sc. Biochemistry first Year (Semester-I)

Title of the Paper:- Basic Chemistry (BC-I-102)

Periods: 45

Objective(s):
To acquire basic knowledge of chemical bonding, organic compound &different state & laws.

Unit –I: Chemical Bonding 10

Definition, types of chemical bonding Ionic bond, covalent bond, co-ordinate bond, Metallic bond, Vander walls bonds, Hydrogen bond. Theories of bonding- Valence bond Theory, Molecular orbital Theory. Concept of Hybridization, Types of Hybridization – SP, SP2 SP^3, dSP3, d2SP3 Hybridization with suitable examples.

Unit –II: Study Of Organic Compounds 10

Empirical, structural & Molecular formula, Nomenclature & classification of Organic compounds, Determination & estimation of C,H,N& Halogens.

Unit –III: Mechanism of Organic Reactions 12

Types of reagents- Electrophiles, Nucleophiles. Electron Mobility: Inductive effect, Resonance, Hyper conjuction(With one example each) Reactive intermediates- carbocation, carbanion, free radicals, carbenes, Arynes & nitrenes.Aromaticity & Huckel Rule. Types of Reactions: Substitution, Addition, Elimination, Rearrangement, Redox Reaction.

Unit –IV: Solid State 13

- Defination of unit cells, space lattice
- Laws of crystallography- Laws of constancy of interfacial angles, Law of Rational indices, Law of symmetry.
- Symmetry elements in crystal, Determination of miller indices study of crystal structure- NaCl, KCl, CsCl.
- X-ray crystalloghphy, Derivation of Bragg's equation.

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

10. Gathering basic knowledge of chemical bonding
11. Understand the mechanism of organic reaction
12. Know the different states of compounds
13. Explaining mechanism electrophile and nucleophile
14. Learn the different type of reaction.

Reference Books:-

1. Text Book of Inorganic chemistry - Puri & Shrma
2. Concise inorganic chemistry - J.D.Lee
3. Text Book of inorganic chemistry - Guradeep Raj & Chatwal
4. Advanced Organic chemistry - Bhal & Bhal
5. Physical Chemistry - Bhal & Tuli
6. Advanced Organic Chemistry - P.L. Soni
7. Fundamentals Of Chemistry - Farooquim, Kuberkar &Wangikar

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Subject: Biochemistry (Honors)

B.Sc. Biochemistry first Year (Semester-I)

Title of the Paper:- Basic Microbiology (BC-I-103)

Periods: 45

Objective(s):
To understand basic knowledge about microorganism, history, difference between prokaryotic cell and eukaryotic cell, and different microscopy.

Unit –I 10

Scope of Microbiology: Microorganism in human affairs and industry. History of Microbiology; Contributions of Anton van Leeuwnhoek. Joseph Lister, Paul Ehrlich, Edward Jenner,Louis Pasteur, Robert Koch and Alexander Flemings. Diversity of Microorganisms: General Accounts of Bacteria, Fungi, Protozoa.

Unit –II 10

Prokaryotic Cell: Cell Wall. Distinction between cell wall of Gram positive and Gram negative Bacteria. Cell Membrane,Cytoplasm, nucleoid, endospore, flagella,pili, glycocalyx Structure of Archaea cell.

Eukaryotic Cell: Cell Membrane,Cytoplasm. Organelles: Nucleus, Mitochondria, Endoplasmic reticulum, Ribosomes. Golgi bodies, Lysosomes and Chloroplast. External Structures-falgella, cilia and Cell Wall.

Unit –III 10

Taxonomy : Naming of microorganism. Contribution of C.Linnaeus, Taxonomy hierarchy, Whittaker's five kingdom and Carl Woese's three domain classification system. Classification of Bacteria and cyanobacteria of fungi and Protistean, Algae

Unit –IV Microscopy 10

General Principle of Microbiology: Image formation, Magnification, Numerical aperture, Resolving Power, Working distance, Focal length , Focal point. Principle, Contribution,

Working and Uses of compound microscope. Special features of : contrast, fluorescence. Dark field and Electron Microscope.

Unit-V 05

- Defination of Dye and stain.
- Classification of Stains: Acidic, Basic, Neutral
- Principle, Procedure, Mechanism of: Simple Staining. Negative Staining, Gram's staining. Acid fast staining ,Cell Wall, Capsule Staining

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

8. Gathering basic knowledge of microbiology.
9. Understand the different staining method.
10. Know the microbial taxonomy
11. Explaining diversity of microorganism
12. Learn the fluorescence technique

Reference Books:

1	Introduction to Microboilogy	: Anderson D.A.
2	Textbook of Microbiology	: Anantnarayan R.& C.KJ.Panikar
3	Industrial Micorbiology	: Casida
4	Microbiology 5th edition	: Plezar M.J., E.C.S Chan Krieg N.R.
5	General Microbiology 5th edition	: Stainer R.Y. Ingraham J.L.&Painter P.R.
6	Handbook of research	: Institution in India edited by I.B.C Staff Publication India Bibliography centre Varanasi,Year-1995.
7	Practical Microbiology	: Dr.R.C.Dubey, Dr.D.K. Maheshwari.

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Subject: Biochemistry (Honors)

B.Sc. Biochemistry first Year (Semester-I)

Title of the Paper:- Basic Biotechnology (BC-I-104)

Periods: 45

Objective(s):
To acquire basic knowledge about food, enzyme, agriculture and health biotechnology. Different type vector.

Unit I: Introduction 10

Definitions of Biotechnology, Historical account of traditional biotechnology, brewing, cheese making & silage prodiction. Recent discoveries from cell biology to biotechnology including the use of r-DNA Technology & hybridoma.

Unit II: Food & Enzyme Biotechnology 10

A: Enzyme Technology: Industrial enzymes, Immobilization of enzymes, Diagnostic enzymes, Enzyme analyser & electrode therapeutics.B: Food & Beverages: Beer, wine, Distilled spirit, Baker's yeast, Milk Products, Organic acids, SCP, SCO, Aminoacids,Vitamins & Flavonoids.

Unit III: Agriculture & Health Biotechnology 10

Health Care: Penicillin & other antobiotics, Vaccine & steroid hormone. Agriculture: Transgenic plants & animals, Microbial controls of insects, Products from animal & Plants cell culture. Waste water treatment & biodegradation: Treatment systems & Biodegradation of xenobiotics. Fuel & Chemicals: Fuel alcohol, biogas, Enhanced oil recovery, Industrial chemicals, Ethical & social impact of Biotechnology

Unit IV: Vectors and their use in Biotechnology 15

Molecular cloning, Enzymes used in molecular cloning, and use of vector in molecular cloning. Vectors: - Defination, properites for ideal vectors, types of vectors- Plasmid, Cosmid, Phagemid, BAC,YAC Prokaryotic expression vectors, Eukaryotic expression vectors, Shuttle vector.

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

13. Gathering basic knowledge of biotechnology..
14. Understand the enzyme involved in molecular cloning.
15. Know the different vector
16. Explaining event of transgenic plant.
17. Learn the mechanism rDNA technology.

Reference Books:

1. Basic Biotechnology: Bullol & Bullok
2. Basic Biotechnology: S.Ignacimuthu
3. Introduction of Biotechnology: Brown, Camball & Triest
4. Fundamentals of Biochemistry: A.C. Deb

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Subject: Biochemistry (Honors)

B.Sc. Biochemistry first Year (Semester-I)

Title of the Paper:- Bio-molecule (BC-I-105)

Periods: 45

Objective(s):
To acquire basic knowledge about structure, function of carbohydrate, protein, lipid and nucleic acid.

Unit I: Carbohydrates. 08

Introduction to carbohydrate, Classification, Properties of monosaccharide, osazone formation, mutarotation. Introduction to disaccharide (Lactose,Maltose, sucrose) and polysaccharide (Heparin, Strach, and glycogen) biological function of carbohydrate

Unit II: Lipids and Fatty acids 10

Introduction to Lipids, occurrence, Properties, Classifications of lipids. Importance of phospholipids, sphingolipid and glycerolipids. Biological function of lipids. Fatty acid, Inroduction, Nomenclature and classification of fatty acid Essential and non essential fatty acids.

Unit III: Amino Acid and Protein 15

Introduction to amino acid, structure, classification of protein based on polarity. Properties(physical, chemical) Titration of amino acid. Essential and non essential amino acid. Amino and sequencing (EDMan and Sangar Method) Protein Introduction to protein, classification of protein based on solubility, shape, composition and function. Peptide and bond –Structure of peptide bond. Denauration – renaturation of protein, Properties of protein. Introduction to lipoprotein, glycoprotein, Biological function of protein (Protein structure) Protein structure – Primary, secondary,/ tertiary and quaternary. Ramchandran Plot, B-turns and motif

Unit IV: Nucleic Acids 12

Introduction to nucleic acid, Difference between nucleoside, composition of DNA & RNA Structure of Nitrogen bases in DNA and RNA along with the nomenclature.

- DNA Double Helix (Watson and crick) model
- Introduction of A.B.Z. DNA
- Gene, genome and chromosome.
- Types of RNA,structure of t-RNA (clover leaf model)

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

1. Gathering basic knowledge of carbohydrate, protein, lipid and nucleic acid..
2. Understand the different structure biomolecule.
3. Know the function of biomolecule.
4. Explaining disease related biomolecule
5. Learn the different type RNA.

Reference Books:

- Biochemistry : U.Satyanarayana
- Biochemistry : Lubest stryer
- Fundamental of Biochemistry: A.C. Deb
- Textbook of Biochemistry : Jain & Jain

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Subject: Biochemistry (Honors)

B.Sc. Biochemistry first Year (Semester-I)

Title of the Paper:- Technical Biochemistry (BC-I-106)

Periods: 45

Objective(s):
To acquire basic knowledge about technique centrifugation, PH meter, Colorimeter and different solvent system.

Unit I: 10

Basic concept in techniques- Normality-Definition, Examples. Molarity- Definition, examples. Purification, Centrifugation, Filtration, Dialysis, Homogenization, Adsorption, absorption, Partition, Centrifuge- types & Application, Density Gradient Centrifugation, Sedimentation coefficient.

Unit II: 10

Properties of Light – Light spectra, wave length, Plane polarized light, optical rotation, Optical Rotatory Dispersion & Circular Dichroism, Absorbance – chromophore, Auxochrome, Colorimeter – Instrumentation, Principal, working Application, X-ray Diffraction studies

Unit III: 15

pH and Buffer : Hydrogen ion concentration, Handerson- Hasselbalch equation, Buffer- definition, Types & its Preparation, Buffers of biological importance such as carbonate-bicarbonate, phosphate, acetate,etc., Hemoglobin buffering capacity, Mechanism of action of buffers in biological system, PH meter- instrumentation and application

Unit IV: 10

Use of Different solvent system- for amino acid, Carbohydrate and Lipid separation.Types of techniques- Analytical Technique- Definition, Examples. Separation Techniques- Examples,

Application of Technical Biochemistry in Medical field, in research field & In Industrial field.

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

1. Gathering basic knowledge preparation Normality,Molarity.
2. Understand the pH meter and Balance
3. Know the handling Centifugation
4. Explaining different solvent system for biomolecule
5. Learn the application of biochemistry.

Reference Books:

- Biophysical and biochemical technique : Nath and Upadhya
- Fundamental of Biochemistry : A.C. Deb
- Textbook of Biochemistry : Jain& Jain

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Subject: Biochemistry (Honors)

Annual Pattern Practical Paper

B.Sc. Biochemistry

B.Sc. first Year (I Semester)

Title of the Paper:-Lab course- Basic Chemistry (LCBC-I-1)

Periods: 60

Objective(s):
To acquire basic knowledge about preparation of standard solution and analysis of organic compound..

1. Preparation of standard solutions(% Molar, and Normal) of acids and alkali, Stock and working solution.
2. Qualitative Analysis of organic compound, Preliminary tests, Nature, detection of elements, functional groups, M.P. and their derivatives: Salicylic acid / pthalic acid/ aniline/ Nitrobenzene,1-Napthol/2-Napthol,/Napthalene/Carbohydrates.
3. Estimate of glycine.
4. Estimate of unsaturation.
5. Estimate phenol.
6. Estimate of Amine.
7. Estimate of Acid.

Reference Books:

1. Textbook of Inorganic Qualitative Analysis : vogel's
2. Practical of physical chemistry :T.K.Chaudekar, Rajbhoj
3. Practical of physical chemistry : Jahagirdar.
4. Textbook of organic Qualitative Analysis : Hynes
5. Vogel's Textbook of Practical Organic chemistry.

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Subject: Biochemistry (Honors)

B.Sc. first Year (I Semester)

Title of the Paper: Lab course In Microbiology (LCBC-I-2)

Periods: 60

Objective(s): To acquire basic knowledge about instrument, media preparation. Streak, spread and pour plate method.

1. Determination of equipment
a) Microscope
b) Hot air oven
c) Autoclave
d) Incubator
e) p^H meter
2. Hanging drop method for motility.
3. Micrometry measurement of size of bacteria
4. Bacterial staining : Simple, Negative, Grams staining.
5. Preparation of Media
a) Nutrient broth
b) Nutrient Agar
c) Mac Conkeys broth
d) Mac Conkeys Agar
6. Isolation of micro- organism by
a) Streak plate method
b) Spread plate method
c) Pour plate method
7. Capsule staining (His and Meneval's method)
8. Flagella staining.
9. Cultivation of anaerobes – (Candle jar method)
10. Replica plate technique
11. Effect of UV as mutagenic agent and photo reactivation.
12. Alcohol production by S. cerevisae
13. Enumeration of air Microorganism by Solid & Liquid impingement method

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Subject: Biochemistry (Honors)

B.Sc. first Year (I Semester)

Title of the Paper: Laboratory course Biochemistry (LCBC-I-3)

Periods: 60

Objective(s):
To acquire basic knowledge about preparation of reagent, principal and procedure.

1. **Preparations of Different biochemical reagents**

a. Ninhydrin Reagent
b. Benedicts Reagent
c. Barfoeds Reagent
d. Biuret Reagent

2. **Qualitative test for amino acid**

a. Ninhydrin test for amino acid
b. Millions test
c. Sakaguchi test

3. Qualitative test for protein.

a. Precipitation with organic solvent
b. Precipitation with TCA
c. Precipitation with Ammonias sulphate

4. **Qualitative test for carbohydrate**

a. Molish test
b. Iodine test
c. Benedicts test
d. Barfoeds test
e. Osazone formation

5. **Qualitative test for Nucleic acid**

a. Orcinol test
b. Diphenyl amine test
c. Neumann's test

6. **Qualitative test for lipid**

a. Iodine test
b. Saponification test
c. Emulsification

7. Qualitative test for Vitamin

a. Thiamine
b. Acorbic Acid
c. Riboflavine

Reference Books :-

- An Introduction toPractical Biochemistry : David Plummer(TMH)
- Hawke's Physioligical chemistry :
- Laboratory Manual in biochemistry : J. Jayaraman

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Semester Pattern effective from June 2019

Subject: Biochemistry (Honors)

B.Sc. Biochemistry first Year (Semester-II)

Title of the Paper:- Communication Skills-II (BC-II-201)

Hours: 45

Objective: To improve the skills in correct English in writing and pronunciation

Unit I : Grammar

Word Classes (Open & Closed), Sentences – kinds- Transformation, Phrase, Clause and its kinds.

Simple, Complex & Compound sentences, (Only definition & Structure)

Tenses – Use of Verbs in the Sentences

Unit II : Vocabulary

Morphology, Synonyms & Antonyms, One Word Substituion, Homophones & Homonyms

Unit III : communication Skills

Definition & its all types, Communication Cycle & Barriers, Principles for Effective Communication,

Varieties in English (Indian, British & American.)

Unit IV : Writing Skills

Letters (Formal & Informal), Report Writing (Scientific and format), Memorandum, Curriculum vitae,

Personal Employment Interview, Group Discussion.

Phonetics : 44 sounds, consonants, vowels & Diphthongs, Transcription of words, Accent Syllable

Cluster and Intonation.

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

1. Gathering basic knowledge of development, specification of cell, competence of cell and genomic equivalence.
2. Understand the different event of fertilization
3. Know the stages of embryogenesis
4. Explaining event of morphogenesis
5. Learn the mechanism of apoptosis involved in pattern formation and PCD

Reference Books :

1. Developing of Communication Skills – Krishna Mohan & Meera Banerji
2. A Practical English Grammar A.J. Thomson – Oxford
3. Mastering English Grammar – S.H. Burton
4. Technical Communication- Raman Sharma- Oxford
5. Written Communication in English – Sarah Freeman Orient Longman Pvt. Ltd.
6. A Course in Phonetics & Spoken English – J. Sethi & P.V. Dhamija
7. Radiance- Tengse

SWAMI RAMANAND TEERTH MARATHWADA UNIVERCITY,
NANDED -431606, MS. INDIA
Syllabus B.Sc. Biochemistry
Under Faculty of Science
CBSC (Choice Based Credit System)
Semester Pattern effective from June 2019

Subject: Biochemistry (Honors)

B.Sc. Biochemistry first Year (Semester-II)

Title of the Paper:-Inorganic& Physical Chemistry(BC-II-202)

Periods: 45

Objective(s):
To acquire basic knowledge about thermodynamic. Chemical equilibrium, trace element and its toxicity.

Unit I: Essential trace elements & its toxicity system. 10

Introduction of Trace elements, criteria for essential elements, Ultra trace metal & non- metals, toxicity & deficiency of trace elements.

Unit II: Role of Metal & non-metal ion in biological system 10

Role of metals in biological systems.

- Function of Biomineral, Biomineralisation.
- Role of Hydrolysis, Oxido- reductases, Isomerases & synthatase enzymes.
- Role of Non-metal In biological system.

Unit III: Themodynamics 10

Definition of thermodynamics, terms-system, surrounding etc. Types of systems, Intensive & extensive properties, state & path function & their differntials. Thermodynamic process, concept of Heat & Work. First law of thermodynamics- Statement, definition of internal energy & enthalpy Heat capacity, heat capacities at constant volume & pressure & their relationship, Joule's Law, joule Thomson effect, Joule Thomson coefficient & Inversion temperature.

Unit IV: Chemical Equilibrium & Phase Equilibrium 15

Chemical Equilibrium : Equilibrium constant & free energy, thermodynamics derivation of law of mass action. Reaction isotherm & isochore. Clapeyron

equation, clausius clapeyron equation , applications, Numerical on vant Hoff's isochore.

Phase Equilibrium:

Statement & meaning of the terms, phase components & degree of freedom in phase rule equation , phase equilibrium of one components systems, water & sulphur systems. Application of phase rule to Co_2 systems.

- Solid Solution: Compound formation of confruent melting point (Mn-Zn) system & incongruent melting point (Nacl-H_2O) system, freezing mixture, acetone,and dry ice melting
- Liquid- Liquid mixture – Ideal liquid mixture, Rault's & Henry's law Non- ideal systems, azeotropes Hcl- H_2O system & ethanol – water.

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

1. Gathering basic knowledge of thermodynamic
2. Understand the different phase of equilibrium.
3. Know the different trace element.
4. Explaining role metal and non metal
5. Learn the solid solution

Reference Books :

1. **Principle of physical chemistry : Puri & Sharma**
2. **Elementals of physical chemistry : T.W. Atkin**
3. **Essential of physical chemistry : Bhal & Tuli**
4. **Concepts of chemistry : Farooqui,Kuberkar & Naikwade**

SWAMI RAMANAND 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 2019
Subject: Biochemistry (Honors)
B.Sc Biochemistry First Year (Semester-II)
Title of the Paper: Developmental Biology (BC-II-203)

Period: 45

Objective(s):
To acquire basic knowledge about stages of development, fertilization, gametogenesis, embryogenesis, morphogenesis, metamorphosis and apoptosis.

Unit 1 10

Basic , Concept of development, potency, commitment, specification, induction, competence, determination and differentiation, morphogenetic gradients, cell fate, cell lineages, stem Cell, genomic equivivelence, imprinting, mutants and transgenic in analysis of development.

Unit-II 15

Gametogenesis, fertilization, and early development , Production of gametes, embryo sac development and double fertilization in plants, Zygote formation, cleavage, blastula formation, embryonic fields, gastrulation and formation of germ layers in animals, embryogenesis, establishment of symmetry in plants , seed formation and germination.

Unit-III 10

Morphogenesis and organogenesis in animals, axes and pattern formation in Drosophila, amphibian and chick, larval formation, metamorphosis

Unit-IV 10

Programmed cell death (apoptosis and autophagy), aging and senescence,

References:

Development Biology by freshney
Development Biology by Gilbert
Development Biology by Lewis wolport
The Shape 0f life by Rudolfalerafff
Essential development Biology by J.M.W.slack

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

15. Gathering basic knowledge of development, specification of cell, competence of cell and genomic equivalence.
16. Understand the different event of fertilization
17. Know the stages of embryogenesis
18. Explaining event of morphogenesis
19. Learn the mechanism of apoptosis involved in pattern formation and PCD

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Syllabus B.Sc. Biochemistry
Under Faculty of Science
CBSC (Choice Based Credit System)
Semester Pattern effective from June 2019

Subject: Biochemistry (Honors)

B.Sc. Biochemistry first Year (Semester-II)

Title of the Paper:- Evolutionary biology (BC-II-204)

Periods: 45

Objective(s):
To acquire basic knowledge about origin of life, evidence evolution, theories of evolution, concept of species.

Unit I: 10

Theories of the origin of life special creation, spontaneous generation abiotic synthesis of organic monomers and polymers, experiment of Milar's & Urey

Unit II: 13

Theories of Evolution- Lamarck Darwin theory, concept of variation, adaption, struggle fitness & natural selection, Mendelism, Evidence of Evolution- palentology, Anatomy embryology

Unit III: 12

Population Genetics – Population, Gene pool, Gene frequency, Hardy – Eeinberg law, migration and random genetics drift. Allopatricity, Sympartricity, Co-evolution

Unit IV: 10

Concept of species- Morphological, biological & Evolutionary concept. Evolution of Prokaryotic & Eukaryotes mutation theory by Hugo de Veries.

Reference Book

- Cell biology Molecular Biology, Evolution & Genetics by Verma & Agrawal.
- Evolution of Vertebrates – Colbert
- Evolution – Lull

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

1. Gathering basic knowledge of originof life.
2. Understand the different event of evolution
3. Know the stages of evolution
4. Explaining event species
5. Learn the mechanism of theories of evolution.

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Semester Pattern effective from June 2019

Subject: Biochemistry (Honors)

B.Sc. Biochemistry first Year (Semester-II)

Title of the Paper:- Metabolism (BC-II-205)

Periods: 45

Objective(s):
To acquire basic knowledge about stages of carbohydrate, protein, lipid metabolism and disease related inborn error of metabolism.

Unit I : a) Introduction to Metabolism 12

General features of metabolism, experimental approaches to study metabolism use of intact organism, bacterial mutants, tissue slices, stable and radioactive isotopes.

Unit I : b) Carbohydrate Metabolism

Reaction and energetic of glycolysis, Alcoholic & Latic acid, Fermentation. Entry of Fructose, Galaclose Mannose etc. Reaction of TCA cycle. Gluconeogenesis. Glycogenesis and glycogenolysis reaction and Physiological significance of pentose phosphate pathway, Regulation of glycolysis , TCA cycle.

Unit II : Electron Transport chain and Oxidative Phosphorylation 07

Structure of Mitochondria, Sequence of electron carriers, site of ATP production, Inhibitors of electron transport chain. Hypothesis of mitochondrial oxidative phosphorylation.(Basic concept).Inhibition and uncouplers of oxidative phosphorylation. Transport reducing potentials into mitochondria.

Unit III : Lipids Metabolism 12

Introduction hydrolysis of triacyglycerol transport of fatty acids into mitochondria, oxidation of satured fatty acid. ATP yield from fatty acid oxidation. Biosynthesis of satured and unsaturated fatty acid. Metabolism

of ketone bodies oxidation of unsaturated and odd chain fatty acids. Biosynthesis of triglycerides and important phospholipids glyeolipid, sphingolipids and cholesterol. Regulation of cholesterol metabolism.

Unit IV : Amino acid Metabolism **12**

General reaction of amino acid metabolism transmination oxidative deamination and decarboxylation. Urea cycle, Glycogenic and ketogenic amino acids

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

1. Gathering basic knowledge of metabolism.
2. Understand the different step in metabolisn
3. Know the stages of animo acid metabolism
4. Explaining event of glycogenesis and glucogenesis
5. Learn the mechanism cholesterol metabolism.

Reference Books:

- Fundamentals of Biochemistry : Donald voet, j.g. voet & pran
- Biochemistry : Geffrey L.Zubay
- Biochemistry : Lubert Stryer, W.H. Freeman & Co.

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B.Sc. Syllabus
CBSC (Choice Based Credit System)
Semester Pattern effective from June 2019
Subject: Biochemistry (Honors)

B.Sc. Biochemistry First Year (Semester II)

Title of the Paper: Human Physiology (BC II – 206)

Periods:45

Objective(s):
To acquire basic knowledge about digestive system, circulatory, respiratory, nervous, excretion and osmoregulation.

Unit-I Digestive System 08

Generalized structure of digestive tract and associated digestive gland. Function of different parts peristalsis, regulation of olive, gastric, pancreatic Intestinal and bile secretion. Absorption-(Carbohydrate, protein , lipid minerals and vitamin) transport and excretion of nutrients.

Unit-II Circulatory System 08

Anatomy of heart, Histology of artery, vein and capillary, Blood – composition of blood. Histology of blood cell, blood group. Function of blood. Lymphatic system.

Unit-III Respiratory System 08

Structure and function of lung, trachea bronchiole. Mechanism of respiration – role of intercostals muscle, diaphragm during inhalation and exhalation. Gases exchange CO2 and O2 Bohr's effect.

Unit-IV Excretion and Osmoregulation 08

Anatomy of kidney. Structure of a typical uriniferous tubule. Mechanism of ultrafiltration, Urine formation and acidification of Urine. Counter current mechanism. Haemodialysis. Significance of excretion and osmoregulation

Unit-V Nervous System 08

Brain- anatomy and function of different parts of brain. Structure of a typical neuron. Transport and conduction of reflex and reflex arcs. Mechanism of synaptic transmission. Neurotransmitters. Structure and function of neuromuscular functions. Neuro muscular Junction. Acetyl cholinesterase.

Unit-VI Reproductive System 08

Male Reproductive System and physiological role of testis. Female reproductive system and physiology role of ovary. Spermatogenesis, menstrual cycle ovarian & uterine cycle.

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

.

1. Gathering basic knowledge of digestive system, circulatory, respiratory, nervous, excretion and osmoregulation.
2. Understand the structure and function of system.
3. Know the stages of spermatogenesis.
4. Explaining event of excreation and osmoregulation
5. Learn the mechanism of acetyl cholinesterase.

Reference Books :

1. Human physiology Vol. II & I.C.C. - Chatterjee.
2. Text Book of Medical Physiology - Guyton
3. Text Book of Human Biochemistry - G.P.Talwar
4. Biochemistry - U.Satayanarayana & U.Chakrapani book

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Semester Pattern effective from June 2019

Subject: Biochemistry (Honors)

Annual Pattern Practical Paper

B.Sc. Biochemistry

B.Sc. first Year (II Semester)

Title of the Paper:-Lab course- Basic Chemistry (LCBC-II-1)

Periods: 60

Objective(s):
To acquire basic knowledge about preparation of buffer solution and qualitative analysis of inorganic radical.

1. Preparation of buffer solutions of known pH and molarity using pH meter (Bicarbonate/ phosphate/ acetate)
2. Prepare standard Na_2CO_3 Solution. Standardize the given Hcl solution and estimate the amount of NaOH in the given solution
3. Qualitative Analysis of Inorganic radicals(Two Acidic & Two basic radicals)
4. To Study kinetics of cooling of H_2O.
5. Determination of Viscosity of liquid by Ostwald'sViscometer
6. To Determine Surface tension of a given liquid by stalagno meter method
7. To Study Critical solution Temperature(CST) Of Phenol water system
8. Determination of Heat of Reaction of Displacement of copper by zinc

Reference Books:

6. Textbook of Inorganic Qualitative Analysis : vogel's
7. Practical of physical chemistry :T.K.Chaudekar, Rajbhoj
8. Practical of physical chemistry : Jahagirdar.
9. Textbook of organic Qualitative Analysis : Hynes
10. Vogel's Textbook of Practical Organic chemistry.

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Semester Pattern effective from June 2019

Subject: Biochemistry (Honors)

Annual Pattern Practical Paper

B.Sc. Biochemistry

B.Sc. first Year (II Semester)

Title of the Paper:-Lab course- Human physiology (LCBC-II-2)

Periods: 60

Objective(s):

To acquire basic knowledge about histological specimen and preservation of blood serum and plasma.

1. Identification of histological specimen – liver, adrenal, pancreas, thyroid, testis and ovary.
2. Preparation and preservation of blood serum and plasma.
3. Preparation of blood smear and DLC (Importance in various disease conditions.)
4. Enumeration of RBC's and WBC's determining health status.
5. Bleeding time and Clotting time.
6. Determination of blood groups (A, B, AB, O and Rh) and it's significance.

Reference Books :

5. Human physiology Vol. II & I.C.C. - Chatterjee.
6. Text Book of Medical Physiology - Guyton
7. Text Book of Human Biochemistry - G.P.Talwar
8. Biochemistry - U.Satayanarayana & U.Chakrapani book

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Semester Pattern effective from June 2019

Subject: Biochemistry (Honors)

Annual Pattern Practical Paper

B.Sc. Biochemistry

B.Sc. first Year (II Semester)

Title of the Paper:-Lab course- Metabolism (LCBC-II-3)

Periods: 60

Objective(s):

To acquire basic principal of separation and estimation of biomolecule.

1. Separation and Identification of amino acids by paper chromatography.
2. Separation and Identification of sugars by paper chromatography.
3. Separation of Plant pigment on starch column.
4. Determination of Lambda max of $COCl_2$ verification of Beer-Lambert's and determination of molar absorption coefficient.
5. Estimation of proteins by Biuret method.
6. Estimation of Proteins by Lawreys method
7. Estimation of maltose by DNSA methods.
8. Separation of triglycerides (Oils) on TLC.
9. Estimation of Amino acids.
10. Demonstration on spectrophotometer.

Reference Books:

1.Practical of biochemistry : Palmer
2.Practical of physical bio chemistry :T.K.Chaudekar,
3.Practical of physical biochemistry : Jahagirdar
4.Textbook of organic Qualitative Analysis : Hynes