
 <p>शिवजी विद्यापीठ कोल्हापूर जानमेसायतन Estd. 1962 "A" Accredited by NAAC(2021) With CGPA 3.52</p>	<p align="center">SHIVAJI UNIVERSITY, KOLHAPUR - 416004, MAHARASHTRA PHONE : EPABX – 2609000, www.unishivaji.ac.in, bos@unishivaji.ac.in शिवाजी विद्यापीठ, कोल्हापूर - ४१६००४, महाराष्ट्र दूरध्वनी - इंपीएबीएक्स - २६०९०००, अभ्यासमंडळे विभाग दूरध्वनी विभाग २३१-२६०९०९३/९४</p>	
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SU/BOS/Science/17

Date: 01/10/2022

To,
The Principal,
All Affiliated Concerned Science Colleges/Institutions
Shivaji University, Kolhapur.

Subject :- Regarding syllabi of M.Sc. & B.Sc. (NEP-2020) degree programme under the Faculty of Science and Technology as per National Education Policy 2020 .

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the syllabi and Nature of question paper of **M.Sc. & B. Sc.** under the Faculty of Science and Technology as per **National Education Policy 2020 .**

Sr. No.	Faculty of Science and Technology	Programme/ Course
1	Biotechnology & Biochemistry	M. Sc. Part- I Biotechnology, M. Sc. Part- I Biochemistry, B. Sc. Part- I Biotechnology, (Entire) B. Sc. Part- I Biochemistry, (Optional)

This syllabi and nature of question paper shall be implemented from the Academic Year 2022-2023 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in (students Online Syllabus)

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Yours faithfully,


Dy Registrar

Copy to:

1	The Dean, Faculty of Science & Technology	7	Appointment Section
2	Director, Board of Examinations and Evaluation	8	P.G.Seminar Section
3	The Chairman, Respective Board of Studies	9	Computer Centre (I.T.)
4	B.Sc. Exam	10	Affiliation Section (U.G.)
5	Eligibility Section	11	Affiliation Section (P.G.)
6	O.E. I Section	12	P.G.Admission Section

SHIVAJI UNIVERSITY, KOLHAPUR.



Accredited By NAAC with 'A' Grade

Syllabus For

B.Sc. Part - I. Biochemistry (Optional) (Level-5)

(NEP-2020 PATTERN)

SEMESTER I AND II

(Syllabus to be implemented from June, 2022 onwards.)

- ❖ Guidelines shall be as per B.Sc. Regular Program.
- ❖ Rules and Regulations shall be as per B.Sc. Regular Program except CBCS R. B. Sc. 3 Structure of Program and List of Courses.

❖ **Preamble :**

This syllabus is so designed to give a sound basis to the undergraduate students of B.Sc. Biochemistry (Optional).

The programme endeavors to provide students a broad based training in biochemistry with a solid background of basic concepts as well as exposing them to the exciting advancements in the field. In addition to theoretical knowledge, significant emphasis has been given to provide hands on experience to the students in the forefront areas of experimental biochemistry. A multidisciplinary approach has been employed to provide the best leverage to students to enable them to move into frontier areas of Biological research in the future.

Such students having sound knowledge of Biochemistry are in tremendous demand in industries, education and fundamental research, as trainee workforce. The career opportunities of these students are very wide in different sectors dealing with life sciences.

❖ **GENERAL OBJECTIVES OF THE PROGRAM**

- To offer in-depth knowledge of chemistry and biology.
- To enrich students knowledge with regard to plants, human and animal processes such as basic immunology, enzymology, microbiology etc.
- To help the students to understand dynamic activities of the biological activities.
- To inculcate the sense of scientific responsibilities and social awareness.
- To help students build-up a progressive and successful career in academia and industry.
- To make the students knowledgeable with respect to the subject and its practicable applicability.
- To promote understanding of basic and advanced concepts in

Biological sciences.

- To expose the students to various emerging areas of Biochemistry such as molecular biology, genetic engineering etc.
- To prepare students for further studies, helping in their bright career in the subject.
- To expose the students to different processes used in industries and in research field.
- To prepare the students to accept the challenges in life sciences.
- To develop skills required in various industries, research labs and in the field of human health.

❖ *PROGRAM SPECIFIC OUTCOMES:*

- After completion of Biochemistry program students will be able to get exposed to strong theoretical and practical background in fundamental concepts.
- To get insights of multiple important technical areas of Biochemistry.
- To apply contextual knowledge and modern tools of biochemical research for solving problems.
- To make them able to express ideas persuasively in written and oral form to develop their leadership qualities.
- To demonstrate professional and ethical attitude with enormous responsibility to serve the society.
- It will demonstrate knowledge and learn various biological processes at cellular and molecular level and get expertise in the different techniques used in the fields of Biotechnology.
- Student will learn to design and perform experiments in the labs to demonstrate the concepts, principles and theories learnt in the classroom.

❖ Structure of Program and List of Courses are as follows:

Choice Based Credit System with Multiple Entry and Multiple Exit Options
To be implemented from the Academic Year 2022-23

First Year Bachelor of Science Biochemistry (Optional) (Level-5) Programme Structure
(NEP-2020 PATTERN)

SEMESTER – I (Duration – 6 Months)														
Courses	Sr. No.	Course Code	TEACHING SCHEME						EXAMINATION SCHEME					
			THEORY			PRACTICAL			THEORY				PRACTICAL	
			Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Hours	Max	Total Marks	Min	Hours	Max
CGPA COURSES	1	DSC-A	2	5	4	2	4	3.2	2	50	100	35	PRACTICAL EXAMINATION IS ANNUAL	
	2	DSC-A	2			2	4	3.2	2	50				
	3	DSC-A	2	5	4	2	4	3.2	2	50	100	35		
	4	DSC-A	2			2	4	3.2	2	50				
	5	DSC-A	2	5	4	2	4	3.2	2	50	100	35		
	6	DSC-A	2			2	4	3.2	2	50				
	7	DSC-A	2	5	4	2	4	3.2	2	50	100	35		
	8	DSC-A	2			2	4	3.2	2	50				
	9	AECC- A	2	4	3.2	-	-	-	2	50	50	18		
TOTAL (A)			18			8	16			450				
Non CGPA	10	SEC-1	-	-	-	2	4	4						
	11	VBC-1				1	2	2						
SEMESTER – II (Duration – 6 Months)														
CGPA COURSES	1	DSC-B	2	5	4	2	4	3.2	2	50	100	35	As per BOS Guide-lines	
	2	DSC-B	2			2	4	3.2	2	50				
	3	DSC-B	2	5	4	2	4	3.2	2	50	100	35		
	4	DSC-B	2			2	4	3.2	2	50				
	5	DSC-B	2	5	4	2	4	3.2	2	50	100	35		
	6	DSC-B	2			2	4	3.2	2	50				
	7	DSC-B	2	5	4	2	4	3.2	2	50	100	35		
	8	DSC-B	2			2	4	3.2	2	50				
	9	AECC- B	2	4	3.2	--	--	--	2	50	50	18		
TOTAL (B)			18			8				450				
TOTAL (A+B)			36			16				900				
Non CGPA	10	SEC-2	-	-	-	2	4	4						
	11	VBC-2				1	2	2						
• Student contact hours per week : 32 Hrs (Minimum)					• Total Marks for B.Sc.- I : 1100									
• Theory and Practical Lecture Duration: 48 min each					• Total Credits for B.Sc.-I (Sem I & II) : 52									
• Practical Examination will be conducted annually for 50 marks per course.														
• AECC: Ability Enhancement Compulsory Course (A & B) : English for communication														
• SEC: Skill Enhancement Course (Vocational Studies): Field Projects/ Internship/ Apprenticeship/ Community Engagement and Service. Any one from pool of courses. For SEC courses there shall be only practical examination of 50 marks. VBC: Value Based Course (NSS/NCC/Sports/Cultural, etc.)														
• Except English, there shall be combined passing for two theory courses of 50 marks each. i.e. minimum 35 marks are required for passing out of 100. There shall be separate passing for theory and practical.														
• <i>Exit option after Level 5: Students can exit with Certificate Course in Science (with the completion of courses equal to minimum of 52 credits).</i>														

B. Sc. Part-I: Sem-I : List of Courses

Discipline Specific Core (DSC) Courses

Course code	Name of the Course	Course code	Name of the Course
B. Sc. Part-I: Sem-I DSC : A1 to A38			
DSC A1	Physics I	DSC A21	Geology I
DSC A2	Physics II	DSC A22	Geology II
DSC A3	Chemistry I	DSC A23	Seed Technology I
DSC A4	Chemistry II	DSC A24	Seed Technology II
DSC A5	Mathematics I	DSC A25	Microbiology I
DSC A6	Mathematics II	DSC A26	Microbiology II
DSC A7	Statistics I	DSC A27	Industrial Microbiology I
DSC A8	Statistics II	DSC A28	Industrial Microbiology II
DSC A9	Electronics I	DSC A29	Biochemistry I (Basics of cell biology)
DSC A10	Electronics II	DSC A30	Biochemistry II (Introduction to Amino acids and Carbohydrates.)
DSC A11	Computer Science I	DSC A31	Psychology I
DSC A12	Computer Science II	DSC A32	Psychology II
DSC A13	Botany I	DSC A33	Food Science & Quality control-I
DSC A14	Botany II	DSC A34	Food Science & Quality control-II
DSC A15	Zoology I	DSC A35	Astrophysics I
DSC A16	Zoology II	DSC A36	Astrophysics II
DSC A17	Biotechnology (Opt) I	DSC A37	Nanotechnology (opt) I
DSC A18	Biotechnology (Opt) II	DSC A38	Nanotechnology (opt) II
DSC A19	Geography I		
DSC A20	Geography II	AECC – A	English Paper – I

DSC: Discipline Specific Core Course

AECC – Ability Enhancement Compulsory Course

AECC – A – English Paper– I

Link for the pool of SEC courses from National Skills Qualification Framework (NSQF)

(You may add or delete any courses as per available facilities)

https://drive.google.com/file/d/176Vwvx4SC2ONrt69XADruzI2qnfBPI_o/view?usp=sharing

B.Sc. Part-I: Sem-II: List of Courses

Discipline Specific Core (DSC) Courses

Course code	Name of the Course	Course code	Name of the Course
B. Sc. Part-I: Sem-II DSC : B1 to B38			
DSC B1	Physics III	DSC B21	Geology III
DSC B2	Physics IV	DSC B22	Geology IV
DSC B3	Chemistry III	DSC B23	Seed Technology III
DSC B4	Chemistry IV	DSC B24	Seed Technology IV
DSC B5	Mathematics III	DSC B25	Microbiology III
DSC B6	Mathematics IV	DSC B26	Microbiology IV
DSC B7	Statistics III	DSC B27	Industrial Microbiology III
DSC B8	Statistics IV	DSC B28	Industrial Microbiology IV
DSC B9	Electronics III	DSC B29	Biochemistry III (Introduction to Lipids and Nucleic acids.)
DSC B10	Electronics IV	DSC B30	Biochemistry IV (Introduction to Proteins and Enzymes.)
DSC B11	Computer Science III	DSC B31	Psychology III
DSC B12	Computer Science IV	DSC B32	Psychology IV
DSC B13	Botany III	DSC B33	Food Science & Quality control II
DSC B14	Botany IV	DSC B34	Food Science & Quality control IV
DSC B15	Zoology III	DSC B35	Astrophysics III
DSC B16	Zoology IV	DSC B36	Astrophysics IV
DSC B17	Biotechnology (Opt) III	DSC B37	Nanotechnology (opt) III
DSC B18	Biotechnology (Opt) IV	DSC B38	Nanotechnology (opt) IV
DSC B19	Geography III		
DSC B20	Geography IV	AECC – B	English Paper – II

AECC – B – English Paper– II

B. Sc. Biochemistry (Optional) Part-I: Sem-I :

List of Courses

Discipline Specific Core (DSC) Courses

Course code	Name of the Course
DSC A29	Biochemistry I (Basics of cell biology)
DSC A30	Biochemistry II (Introduction to Amino acids and Carbohydrates.)
BHC - 101	Biochemistry Practical Course I
AECC – A	English Paper – I

DSC: Discipline Specific Core Course AECC – Ability

Enhancement Compulsory Course AECC – A – English

Paper– I

**Link for the pool of SEC courses from National Skills
Qualification Framework (NSQF)**

(You may add or delete any courses as per available facilities)

https://drive.google.com/file/d/176Vwvx4SC2ONrt69XADruzI2qnfBPI_o/view?usp=sharing

B.Sc. Biochemistry (Entire) Part-I: Sem-II: List of Courses

Discipline Specific Core (DSC) Courses

Course code	Name of the Course
DSC 29 B	Chemistry – II
DSC 30 B	Physics – II
BHC - 102	Biochemistry Practical Course II
AECC – B	English Paper – II

AECC – B – English Paper– II

Semester I Paper-I

DSC A29: Basics Of Cell Biology

Course Objectives :- Course Objectives:

- To make the student aware of basic concepts of Cell, Cell organelles.
- To make the student aware of basic concepts cytoskeleton.

Topic No.		Lectures 30
	Credit-I Introduction to Cell Biology	15
1.	Prokaryotic (archaea and eubacteria) and eukaryotic cell (animal and plant cells)	7
2.	Structure of nucleus, ER structure, organization of golgi, Lysosome, structure and function of mitochondria, chloroplast and peroxisomes.	8
	Credit-II Cell and Cell Division	15
3.	Prokaryotic and eukaryotic cell wall, cell matrix proteins. Cell-matrix interactions and cell-cell interactions. Adherence junctions, tight junctions, gap junctions	8
4.	Cell Division- Basics of Cell cycle; Mitosis, Meiosis	7
	Course Outcome: After completing the credits students should gain knowledge about: <ul style="list-style-type: none">✓ Basic concepts of Cell and sub cellular structures✓ Basic Concept of Cytoskeletal assembly	

References:-

- 1) Molecular biology of cell-Albert
- 2) Molecular biology & cell biology – Lodish et al
- 3) Cell biology –De Robertis
- 4) Cell biology-Genetics, molecular biology-P.S. Varma & Agarwal
- 5) Genes Lewin
- 6) Cell biology –Gerald karp
- 7) Practical biochemistry – Keith, Wilson and Walker
- 8) Cell Biology- C.B.Pawar

Semester I Paper-II

DSC A30: INTRODUCTION TO AMINO ACIDS AND CARBOHYDRATES

Course Objectives :- Course Objectives:

- This course introduce foundation of biochemistry
- Student will learn chemistry of water, amino acids and Carbohydrates.

Topic No.		Lectures 30
	Credit-I	15
1.	The Foundations of Biochemistry Cellular and chemical foundations of life	2
2.	Water Unique properties, weak interactions in aqueous systems, ionization of water, buffers,	3
3.	Amino acids Structure and classification, physical, chemical and optical properties of amino acids, Ninhydrin reaction	10
	Credit-II	15
3.	Carbohydrates Definition, classifications, monosaccharide, disaccharide and polysaccharide (Sugar: glucose, fructose, lactose, sucrose, maltose, starch and glycogen) Aldoses and ketoses, mutarotation, pyranose and puranose structure, glycosidic bond, formation (disaccharide), biological importance of carbohydrates Homo and hetero polysaccharide (starch and pectin) Structural and storage polysaccharide (cellulose and glycogen)	15

	Course Outcome: After completing the credits students should gain knowledge about: <ul style="list-style-type: none">✓ Basic concepts of foundation of biochemistry✓ Chemistry of Biomolecules such as amino acids and carbohydrates.	
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References:-

- 1) Biochemistry – Nelson & Cox
- 2) Biochemistry - Stryer
- 3) Enzymes - Trevor Palmer
- 4) Biochemistry - Voiet & Voiet
- 5) Biochemistry - J. L. Jain
- 6) Basic Biophysics- M. Daniel
- 7) Biochemistry - Powar and Chatwal
- 8) Protein Purification- Harris and Angel
- 9) Principles of Biochemistry - T. N. Pattabriraman.
- 10) Biochemistry 3rd Edition – Hames & Hopper.
- 11) General Biochemistry – J. H. Well.
- 12) Biochemistry – J. H. Ottaway & D. K. Apps
- 13) Biochemistry – Trchan
- 14) Text Book of Biochemistry- R. A. Joshi.
- 15) Biochemistry – U. Satyanarayanan

Semester II Paper-III

DSC 30A: INTRODUCTION TO LIPIDS AND NUCLEIC ACIDS

Course Objectives :- Course Objectives:

- This course introduces chemistry of lipids and nucleic acids.
- Student will learn identification and classification of biomolecules.

Topic No.		Lectures 30
	Credit-I	15
1.	Lipids Building blocks of lipids - fatty acids, glycerol, ceramide. Storage lipids - triacyl glycerol and waxes. Structural lipids in membranes – glycerophospholipids, sphingolipids and sterols (Cholesterol) Biological functions of lipids	15
	Credit-II	15
3.	Nucleic acids Nitrogen bases, purines, pyrimidines, sugars (ribose and deoxyribos) phosphate Structure of nucleosides, nucleotides and polynucleotide formation. Nucleic acid structure – Watson-Crick model of DNA. Structure of major species of RNA - mRNA, tRNA and rRNA. Effect of acid and alkali on DNA. Other functions of nucleotides - source of energy, component of coenzymes, second messengers.	15

	Course Outcome: After completing the credits students should gain knowledge about: <ul style="list-style-type: none">✓ Basic concepts of foundation of biochemistry✓ Chemistry of Biomolecules such as lipids and nucleic acid.	
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References:-

- 1) Biochemistry – Nelson & Cox
- 2) Biochemistry - Stryer
- 3) Enzymes - Trevor Palmer
- 4) Biochemistry - Voiet & Voiet
- 5) Biochemistry - J. L. Jain
- 6) Basic Biophysics- M. Daniel
- 7) Biochemistry - Powar and Chatwal
- 8) Protein Purification- Harris and Angel
- 9) Principles of Biochemistry - T. N. Pattabiraman.
- 10) Biochemistry 3rd Edition – Hames & Hopper.
- 11) General Biochemistry – J. H. Well.
- 12) Biochemistry – J. H. Ottaway & D. K. Apps
- 13) Biochemistry – Trchan
- 14) Text Book of Biochemistry- R. A. Joshi.
- 15) Biochemistry – U. Satyanarayanan

Semester II Paper-IV

DSC 30A: Proteins, Vitamins and Enzymes

Course Objectives :- Course Objectives:

- ❖ This course introduces chemistry of Proteins, Vitamins and Enzymes.
- ❖ Student will learn identification and classification of biomolecules.

Topic No.		Lectures 30
	Credit-I	15
1.	<p>Proteins</p> <p>Formation of peptide bond, structural level of proteins, primary structure (oxytocin), secondary structure (alpha helix and beta plates e.g. keratin) tertiary structure (myoglobin), quaternary structure (hemoglobin) forces involves in stabilization of protein structure (covalent – disulphide, non- covalent- hydrogen bonds, Vander wall, ionic, hydrophobic)</p>	15
	Credit-II	15
	<p>Vitamins</p> <p>Sources, daily requirements and deficiency disorder of water and fat soluble vitamins</p>	7
	<p>Enzymes</p> <p>Define terms: Cofactor Coenzyme, Apoenzyme, Holoenzyme, Prosthetic group, endoenzyme, exoenzyme, intracellular and extracellular enzymes, constitutive and inducible enzymes</p> <p>Classification of enzymes</p> <p>Concept of catalysis: ES complex, reaction coordinate and activation of energy Concept of active site</p> <p>Lock and key model and induced fit model</p>	8
	<p>Course Outcome:</p> <p>After completing the credits students should gain knowledge about:</p> <ul style="list-style-type: none"> ✓ Basic concepts of foundation of biochemistry ✓ Chemistry of Biomolecules such as proteins ,vitamins and enzymes. 	

References:-

- 1) Biochemistry – Nelson & Cox
- 2) Biochemistry - Stryer
- 3) Enzymes - Trevor Palmer
- 4) Biochemistry - Voiet & Voiet
- 5) Biochemistry - J. L. Jain
- 6) Basic Biophysics- M. Daniel
- 7) Biochemistry - Powar and Chatwal
- 8) Protein Purification- Harris and Angel
- 9) Principles of Biochemistry - T. N. Pattabriraman.
- 10) Biochemistry 3rd Edition – Hames & Hopper.
- 11) General Biochemistry – J. H. Well.
- 12) Biochemistry – J. H. Ottaway & D. K. Apps
- 13) Biochemistry – Trchan
- 14) Text Book of Biochemistry- R. A. Joshi.
- 15) Biochemistry – U. Satyanarayan.

List of minimum Equipments		
Sr. No.	Name Of Equipment	Minimum quantity
1)	Hot air oven	1
2)	Incubator	1
3)	Autoclave	1
4)	Refrigerator	1
5)	Compound microscopes (10, 40 &100X))	10/ batch
6)	Digital balance	2
7)	pH meter	1
8)	Centrifuge	1
9)	Conductivity meter	1
10)	Colorimeter	1
11)	Distilled Water Plant	1
12)	Laminar air flow cabinet	1
13)	Colony counter	1
14)	Water bath	2
15)	Refractometer	1
16)	Spectrophotometer	1
17)	Paper Electrophoresis unit	1
18)	Haemocytometer	1
19)	U.V. chamber	1
Laboratory Facility		
1)	Arrangements for gas supply and fitting of two burners per table.	
2)	One working table of 6' x 2½' for two students.	
3)	One separate sterilization room attach to the laboratory (10' x 15')	
4)	At least one wash basin for a group of five students	
5)	One separate instrument room attached to lab (10' x 15')	
6)	One laboratory for one batch including working tables (6' x 2½') per two students for one batch	
7)	Store room (10' x 15')	
8)	Computer laboratory min 20 computers with required configuration to conduct	

**Equivalence of the Pre-revised (CBCS) and revised course (CBCS)
B.Sc. I BIOCHEMISTRY (CBCS STRUCTURE)**

Practical Course I (BHC 101)

Sr. No.	Name of the Practical	Practicals 20 L
1.	Fundamentals of Biochemical analysis. Control and Accuracy.	1
2.	Calibration of glassware's (pipette, burette, volumetric flasks etc.) and its importance.	1
3.	Preparation of standard solutions (% , Molar, Molal and Normal) of acids and alkali, stock and working solutions.	1
4	Preparations of buffer solutions of known pH and molarity using pH meter (Bicarbonate/phosphate/acetate).	1 (Minor expt)
	VOLUMETRIC EXPERIMENTS	
5	Estimation of glycine by formal titration	1
6	Estimation of Vitamin C from lemon juice/tablet by 2,6, Dichlorophenol indophenols method	1
7	Estimation of lactose in milk by Benedict's method.	1
	ISOLATIONS OF BIOLOGICAL SAMPLES	
8	Isolation and characterization of starch from potatoes.	1
9	Isolation and characterization of albumin from egg.	1
10	Isolation and characterization of casein from milk	1
	<p>Course outcome:</p> <ul style="list-style-type: none"> ❖ At the end of this module, student is expected to know simple applied chemistry and Biochemistry techniques for detection of common yet important analytes. ❖ Models should bring clarity in concepts of conformations of biomolecules. ❖ Standardization and calibration of pH meter. Models should bring clarity in concepts of conformations of biomolecules. 	

**Equivalence of the Pre-revised (CBCS) and revised course (CBCS)
B.Sc. I BIOCHEMISTRY (CBCS STRUCTURE)**

Practical Course II (BCH 102)

Sr. No.	Name of the Practical	Practicals 20 L
	SEPARATION METHODS	
1	Paper chromatographic separation & identification of amino acids from binary mixture.	1
2	Paper chromatographic separation & identification of carbohydrates from binary mixture.	1
3	Uptake of Na ions by cation exchange resin	1
	COLOURIMETRIC ESTIMATIONS	
4	Verification of Beer Lambert's law and estimation of copper sulphate.	1
5	Estimation of protein by biuret method	1
6	Estimation of creatinine in urine	1
7	Estimation of DNA by diphenylamine method	1
	QUALITATIVE TESTS AND DETECTIONS(Minor expts)	
8	Detection of Carbohydrates – Xylose, Glucose, Fructose, Sucrose, Maltose, Starch.	3
9	Detection of amino acids – Ninhydrin, xanthoproteic, sodium nitroprusside, Pauly's diazo test.	1
10	Qualitative test of enzyme (amylase/invertase/urease)	1
	<p>Course outcome:</p> <ul style="list-style-type: none"> ❖ At the end of this module, student is expected to know simple applied chemistry and Biochemistry techniques for detection of common yet important analytes. ❖ Models should bring clarity in concepts of various biochemical test used in routine analysis. ❖ Students learn basic analytical methods such as chromatography. 	

Suggested readings:-

- 1) A text book of biological chemistry- M. S.Yadav, Dominant publishers.
- 2) Biophysics- Patabhi & Gautam Narosa publishing house
- 3) Outline of biochemistry- Conn & Stumph
- 4) Principles of Biochemistry- Jeffory, Zubey
- 5) Biochemistry- Lubert Stryer
- 6) Biochemistry (Concepts and Applications)-BurtonE.tropp Brooks/ Cle publishing company
- 7) Principles of Biochemistry-White, Handler and Smith.
- 8) Biochemistry-O.P.Agrawal.
- 9) Text book of Biochemistry-West, Todd and Manson.
- 10) Text book of Biochemistry and Human Physiology-G.P.Talwar.
- 11) Review of physiological chemistry-H.A.Harper.
- 12) Hawk's physiological chemistry- Oser.
- 13) Introduction to Chromatography theory and practice -Shrivastava.
- 14) Chromatography- B.K.Sharma.
- 15) Biochemistry- S.C. Rastogi.
- 16) Text book of Biochemistry-R.C. Dubey.
- 17) Text book Biochemistry- A.V.S.S.Ramarao.
- 18) Biochemistry-J.H. Weil.
- 19) Fundamentals of Biochemistry-Voet, Voet & Pratt.
- 20) Fundamentals of Biochemistry-J.L.Jain.
- 21) Biochemistry-U.Satyanarayan.
- 22) Theory and Problems in Biochemistry-P.W.Kuchel and Ralston.
- 23) Nutritional Biochemistry-Dr.S.Ramkrishna & dr.S.Vyankatrao.
- 24) Cell and molecular biology-P.K.Gupta.
- 25) Biotechnology-B.D.Singh.
- 26) Biotechnology-M.P.Arora.

Nature of Question Paper

Nature of Question Paper for all (Theory) papers U.G. Courses under Faculty of Science.

Nature of Question Paper		
Q.No.1	Multiple Choice based objective type question (four options for each question be given)	10Marks
Q.No. 2	Attempt any two of the following (out of three)	20 Marks
Q.No. 3	Short notes (4 out of 6)	20 Marks
		50 Marks

Nature of question paper:

Annual Practical Examination

A) Every candidate must produce a certificate from the Head of the Department in his college, stating that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council on the recommendations of the Board of Studies and that the laboratory Journal has been properly maintained. Every candidate must have recorded his/her observations in the Laboratory journal and written a report on each exercise performed. Every journal is to be signed periodically by a member of the teaching staff and certified by the Head of the Department at the end of the year. Candidates are to produce their journals at the practical examination and such journals will be taken into account by the examiners in assigning marks.

B) The practical examination will be of 6 hours duration and conducted in a day for BHC 101 and BHC 102 (3 hours)

Distribution of Marks for Practical Examination:

1. A) Major experiment 15 marks
B) Major experiment
15 marks
2. A) Minor experiment 05 marks
B) Minor experiment 05 marks
3. A) Journal 05 marks
B) Viva-voce 05 marks

Total Marks: 50 marks

Note: Experiments may be arranged as per convenience of the examiner.

