Estd. 1962
"A++" Accredited by NAAC(2021)
With CGPA 3.52

SHIVAJI UNIVERSITY, KOLHAPUR - 416004, MAHARASHTRA
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शिवाजी विद्यापीठ, कोल्हापूर - ४१६००४,महाराष्ट्र
दूरध्वनी - ईपीएबीएक्स - २६०९०००, अभ्यासमंडळे विभाग दुरध्वनी विभाग २३१–२६०९०९३/९४

SU/BOS/Science/ 158 **Date: 24 / 01 / 2023.**

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

Subject :- Regarding syllabi of B.Sc. Part I Biotechnology (Optional/Vocatioal) degree programme under the Faculty of Science and Technology as per NEP 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 **B.Sc. Part I Biotechnology (Optional/Vocatioal)** under the Faculty of Science and Technology.

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

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Choice Based Credit System with Multiple Entry and Multiple Exit options as per NEP-2020

Bachelor of Science (B. Sc. Part-I) Biotechnology (Optional/ Vocational)

Programme StructureUnder Faculty of Science And Technology

(To be implemented from August, 2022-23 onwards as per NEP 2020)

CBCS with MEME Options as per NEP-2020 to be implemented from 2022-23 onwards

R. B.Sc. 3:(A) (i) Structure of B.Sc. Programme (Semester I & II)

SEMESTER–I(Duration–6 Months)

Sr. No.	Course (Subject) Title	TEACHING SCHEME						EXAMINATION SCHEME							
		THEORY			PRACTICAL			THEORY						PRACTICAL	
								Internal		University					
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Max	Min	Hours	Max	Total Marks	Min	Hours	Max	Min
1	DSC-A	2	5	4	2	4	3.2	10	4	2	40	80	28	PRACTICAL EXAMINATION IS ANNUAL		
2	DSC-A	2						10	4	2	40					
3	DSC-A	2	5	4	2	4	3.2	10	4	2	40	80	28			
4	DSC-A	2						10	4	2	40					
5	DSC-A	2	5	4	2	4	3.2	10	4	2	40	80	28			
6	DSC-A	2						10	4	2	40					
7	DSC-A	2	5	4	2	4	3.2	10	4	2	40	80	28			
8	DSC-A	2						10	4	2	40					
9	AECC-A	4	4	3.2	-----	-----	-----	10	4	2	40	50	18			
10	SEC-I (VBC-I) Compulsory	2	Election, Democracy & Good Governance (On-line & Self-Study Mode)					-----	-----	1	50	50	18			
Total		**22**	**24**	**19.2**	**8**	**16**	**12.8**			-		500				

SEMESTER–II (Duration–6 Months)

Sr. No.	Course (Subject) Title	TEACHING SCHEME						EXAMINATION SCHEME									
		THEORY				PRACTICAL			THEORY						PRACTICAL		
								Internal		University							
		Credits	No. of lectures	Hours		Credits	No. of lectures	Hours	Max Marks	Min Marks	Hours	Max Marks	Total Marks	Min Marks	Hours	Max Marks	Min Marks
1	DSC-B	2	5	4		2	4	3.2	10	4	2	40	80	28	As per BOS Guide lines	50	18
2	DSC-B	2							10	4	2	40					
3	DSC-B	2	5	4		2	4	3.2	10	4	2	40	80	28		50	18
4	DSC-B	2							10	4	2	40					
5	DSC-B	2	5	4		2	4	3.2	10	4	2	40	80	28		50	18
6	DSC-B	2							10	4	2	40					
7	DSC-B	2	5	4		2	4	3.2	10	4	2	40	80	28		50	18
8	DSC-B	2							10	4	2	40					
9	AECC-B	4	4	3.2		-----	-----	-----	10	4	2	40	50	18		200	---
10	SEC-II (VBC-II) Compulsory	2	Constitution of India & Local Self Government (On-line & Self-Study Mode)						---	---	1	50	50	18			
Total		22	24	19.2		8	16	12.8			-		500				
Grand Total		44	48	38.4		16	32	25.6					1000				

- Student contact hours per week: 32 Hours (Min.)
- Theory and Practical Lectures :48 Minutes Each
- Total Marks for B.Sc.-I (Including English):1200
- Total Credits for B.Sc.-I (Semester I & II): 60
- **DSC**–Discipline Specific Core course: Select any 4 subject pairs from A1 to A38 and B1 to B38.
- **AECC**–Ability Enhancement Compulsory Course (A & B)-English
- Practical Examination will be conducted annually for 50 Marks per course (subject).
- *There shall be separate passing for internal and University theory and also for practical examinations.*
- *Except English & SEC, there shall be combined passing for two theory papers of 40 marks each, .and minimum 28 marks required for passing out of 80.*
- *SEC: Skill Enhancement Courses includes Skill Based Courses and Value Based Courses.*
- *In case of VBC-I & II there shall be 25 Multiple Choice Questions (MCQ) of 2 marks each and minimum 18 marks are recruited for passing.*

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
DSC A10	Electronics II	**DSC A30**	Biochemistry II
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	Basics of Biotechnology- I	**DSC A37**	Nanotechnology (opt) I
DSC A18	Basics of Biotechnology-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
DSC B10	Electronics IV	**DSC B30**	Biochemistry IV
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	Basics of Cell biology and Microbiology	**DSC B37**	Nanotechnology (opt) III
DSC B18	Basics of Microbiology	**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. Biotechnology (Optional/ Vocational)
Part-I: Sem-I : List of Courses

Discipline Specific Core (DSC) Courses

Course code	Name of the Course
DSC A17	Basics of Biotechnology- I
DSC A18	Basics of Biotechnology- II

B. Sc. Biotechnology (Optional/ Vocational)
Part-I: Sem-II: List of Courses

Discipline Specific Core (DSC) Courses

Course code	Name of the Course
DSC B 17	Basics of Cell biology and Microbiology
DSC B18	Basics of Microbiology

Shivaji University, Kolhapur

Revised Syllabus For Bachelor of Science Part – I : Biotechnology

1. TITLE: Biotechnology

2. YEAR OF IMPLEMENTATION:- Revised Syllabus will be implemented from June, 2022 onwards.

3. PREAMBLE:

This syllabus is framed to give sound knowledge with understanding of Biotechnology to undergraduate students at first year of three years of B.Sc. degree course.

Students learn Biotechnology as a separate subject from B.Sc. I. The goal of the syllabus is to make the study of Biotechnology popular, interesting and encouraging to the students for higher studies including research.

The new and updated syllabus is based on a basic and applied approach with vigor and depth. At the same time precaution is taken to make the syllabus comparable to the syllabi of other universities and the needs of industries and research.

The syllabus is prepared after discussion at length with number of faculty members of the subject and experts from industries and research fields.

The units of the syllabus are well defined, taking into consideration the level and capacity of students.

4. GENERAL OBJECTIVES OF THE COURSE/ PAPER:

1) To make the students knowledgeable with respect to the subject and its practicable applicability.
2) To promote understanding of basic and advanced concepts in Biotechnology.
3) To expose the students to various emerging areas of Biotechnology.
4) To prepare students for further studies, helping in their bright career in the subject.
5) To expose the students to different processes used in industries and in research field.
6) To prepare the students to accept the challenges in life sciences.
7) To develop skills required in various industries, research labs and in the field of human health.

5. Program Specific Outcomes:

- Understand basics of Biotechnology.
- Learn, design and perform experiments in the labs to demonstrate the concepts, principles and theories learnt in the classroom.
- Develop the ability to apply the knowledge acquired in classroom and laboratories to specific problems in theoretical and experimental biotechnology.
- Identify the area of interest in the academic research and development.
- Perform job in various fields like food, pharmaceutical, agriculture, health care, public services and business etc.
- Be an entrepreneur with precision, analytical mind, innovative thinking, and clarity of thought, expression and systematic approach.

Semester I

Paper- I- DSC A17 Basics of Biotechnology-I

Objectives-

- To make students aware of fundamentals of Biotechnology.
- To make Students aware of Biotechnology
- To introduce different areas in Biotechnology

Paper- I:-DSC A17 Basics of Biotechnology-I		
	Credit – I	
	Biotechnology: definition, history of biotechnology, scope & importance of biotechnology, branches of biotechnology, biotechnology in India,Commercial potentials of Biotechnology, Achievements of Biotechnology, Misuse of Biotechnology, Prevention of misuse of Biotechnology, Future of Biotechnology. **Carbohydrate**: **:-** General classification of carbohydrates, ring formation in monosaccharide, mutarotation , formation of glycosidic bond, study with respect to structure ,chemical properties, hydrolysis of disaccharides (e.g. sucrose, maltose, lactose,),oligosaccharides, polysaccharides (e.g.starch, glycogen, cellulose, peptidoglycan), biological functions of carbohydrates.	15
	Credit- II	
	Protein :-Introduction, General structure of amino acids, Structure of peptide bond, Structural classification of amino acids based on R side chain, biological functions, structural levels of protein- Primary,Secondary, Tertiary (Myoglobin), Quaternary (Hemoglobin) **Enzyme (basic concepts):-** definition , concept of Holo enzyme, Apoenzyme, Coenzyme,Cofactor,Prosthetic group, Active site, Types- extracellular, intracellular, constitutive, inducible.	15

Learning Outcomes-

Students should be able to understand

- What is Biotechnology?
- About the Biotechnology institutes in India.
- Different areas in biotechnology
- Fundamentals of Biochemistry i.e. Carbohydrates and proteins.

Paper-II-DSC A18 Basics of Biotechnology-II

Objectives-

- To make students aware of fundamentals of Biotechnology.
- To make Students aware of Biotechnology
- To learn applicability of instruments in Biology.

Paper-II:-DSC A18 Basics of Biotechnology-II		
	Credit—I	
	Nucleic acids: Definition , Structure of nitrogenous bases ,pentose sugar and phosphoric acid .nucleosides, nucleotides, polynucleotides, Forms of DNA- A,B,D,Z. Watson and Crick's structural model of DNA, RNA: Chemical composition , structure and functions of mRNA, rRNA,tRNA. Forces stabilizing nucleic acidstructure. **Lipid :-** Definition, Classification oflipids Simple lipid- (triacylglycerols& waxes) Compound lipid- (phospholipids, sphingolipids, cerebrosides), derived – e.g.cholesterol Chemical and physical properties of lipid. Functions of lipids.	16
	Credit—II	
	A. General Principles of Microscopy – Image formation, Magnification, Numerical aperture (uses of oil immersion objective), Concept of Resolvingpower and Workingdistance. B. Ray diagram, principle and applications of– i) Compound Microscope ii) Electron Microscope- Scanning electron Microscope, Transmission Electron Microscope. **Colorimeter:-** Lambert-Beer's law principle, construction & working of Colorimeter	14

Learning Outcomes-

Students should be able to understand

- Fundamentals of Biochemistry i.e. nucleic acid and lipids.
- Structure, function and types of nucleic acids.
- Classification, structure and function of lipids.
- Basic concepts of instruments and its application.
- Students should be able to handle instruments during project.

Reference Books :-

1) Text book of biotechnology- Pradipparihar student ed. Jodpur(2004)
2) Biotechnology expanding horizons- B. D. Singh, Kalyani Publisher3) Elementsof biotechnology- P. K. Gupta, Rastogipublications.
4) Biotechnology- V. Kumarsan, Saraspublication.
5) A text book of biological chemistry- M. S.Yadav, Dominantpublishers.
6) Outline of biochemistry- Conn &Stumph
7) Principles of Biochemistry- Jeffory,Zubey
8) Biochemistry- LubertStryer
9) Textbook of Biotechnology – R. C.Dubey.
10)Biochemistry by –Lehninger.
11) Biochemistry – U. Satyanarayana

PAPER III DSC B17 : -Basics of Cell biology and Microbiology

Objectives-

- Describe some various activities of microorganisms that are beneficial to human.
- Describe prokaryotic and eukaryotic morphology, two types of cellular anatomy.
- Discuss the history of cell biology and microbiology.
- Discuss the basic aspects of pandemic diseases.

Paper-III DSC B17 :- Basics of Cell biology and Microbiology		
	Credit-I	
	History of Cell biology :- Cell biology before 19th century, cell biology in 19th century- formulation cell theory, protoplasm theory, germplasm theory, cell biology in 20th century- organism theory, Branches of Cell Biology, Scope of cell biology. **Types of cells – Prokaryotic, Eukaryotic, Plant cell & animal cell** Structure and function of Cell organelles- ultra structure of cell membrane, cytosoles, golgibodies, Endoplasmic reticulum (rough & smooth) Ribosomes, cytoskeleton structure(actin, microtubules), mitochondria, chloroplast, lysosomes, peroxisomes, Nucleus. Cell division and cell cycle- phases of cell cycle, Mitosis.	15
	Credit- II	15
	History of Microbiology :-Anton van Leeuwenhoek, Alexander Fleming, Louis Pasteur, Robert Koch, JosephLister. Introduction to types of Microorganisms – Bacteria, Algae, Fungi, Protozoa and Viruses, Beneficial and harmful activities of microorganisms,**Pandemic disease - Influenza, Covid-19**. Applied branches of Microbiology **Morphology and cytology of Bacteria** A. Morphology of Bacteria – i) Size, ii) Shape, iii)Arrangements B. Cytology of Bacteria – Structure of Typical BacterialCell. a) **Structure and functions of :** i) Cell wall ii) Cell membrane iii) Capsule and slime layer iv) Flagella v) Pili vi) Nuclear material vii) Mesosome viii) Ribosome	

Learning outcomes-

Students should gain knowledge about

- Cytology of prokaryotic and eukaryotic cell structure and function and differences between these cells.
- Basic aspects of pandemic diseases

PAPER IV DSC B18 Basics of Microbiology

Objectives-

- Discuss principles of physical and chemical methods used in control of microorganisms and apply the understanding to the prevention and control of infectious diseases.
- Appropriate laboratory and techniques to the isolation, staining, identification and control of microorganisms.
- Define the science of microbiology and describe some of general methods used in study of microorganisms.

PAPER IV DSC B18 Basics of Microbiology		
	Credit-I	
	Culture media- Definition of culture media, Common components of media and their functions- Peptone, Yeast extract, NaCl, Agar and Sugar, Types: non living media- natural, synthetic, semi-synthetic & differential, enriched, enrichment & selective, living media. Methods for isolation of pure cultures- Streak plate, pour plate, spread plate. **Microbial nutrition** A. Microbial Nutrition 1) Nutritional requirements of microorganisms: Water; Micronutrients, Macronutrients- Carbon and Energy source; Oxygen and Hydrogen; Nitrogen, Sulphur and Phosphorous 2) Nutritional types of microorganism based on carbon and energysources. Autotrophs- Photoautotrophs andChemoautorphs, Heterotrophs- Photoheterotrophs and Chemoheterotrophs.	15
	Credit- II **Concept of Sterilization:-** Methods of sterilization **a) Physical agents:** i) temperature-dry heat, moist heat ii)Radiation-U.V, Gamma radiation iii) Bacteria proof filter- membranefilter. **b) Chemical agents:-**Phenol & Phenolic compounds, Alcohol,Heavy metals(e.g.mercury). **c) Gaseous agents-** Ethylene oxide,formaldehyde. **Stains and staining procedures-** A. Definition of dye andstain B. Classification of stains – Acidic, Basic andNeutral C. Principle, Procedure, Mechanism and application ofstaining procedures i) Simplestaining ii) Negativestaining iii) Differential staining: Gram staining and Acid faststaining.	15

Learning Outcomes-

Students should gain knowledge about

- Nutritional requirements of microorganism.
- Basic components of nutrient medium and their role.
- Methods of sterilization by various agents.
- Classification of stains, principles and procedures of staining microorganisms.

Reference books:-

1. Cell and molecular biology-Arumugham
2. Cell and molecular biology- DeRobertis
3. Cytology genetics and evolution- Agrwal andVarma
4. Cell biology- C. B. Pawar
5. Fundamentals of Microbiology- Frobisher
6. Microbiology-Pelczar.
7. General Microbiology-Stanier.
8. Text book of Microbiology- Ananthnarayan&Panikar.
9. Cell-Cooper.

Practical syllabus

(Practical Examination to be conducted annually)

I) Lab. Exercises in Cell Biology andMicrobiology-

Sr No	Name of The Experiment
1	Use, care and study of Compound Microscope
2	Demonstration of some lab equipments:- Autoclave, Hot air Oven, Incubator, LAF, Centrifuge, Colorimeter, Water bath, Colony Counter, Water distillation unit.
3	Microscopic Examination of Bacteria 1. Monochromestaining 2. NegativeStaining 3. Gram'sStaining 4. Hanging drop technique-Motility.
4	Preparation of Culture media -Peptone water,Nutrient broth and Nutrient Agar -MacConkey's Agar Sabroud's Agar Starch Agar Milk Agar
5.	Isolation, colony characters ,Gram's staining and motility of Bacteria isolated from- - Air-(solid impactiontechnique) - Water- (dilution and spreading platetechnique.)
6.	Enumeration of Bacteria from soil by total viable count- Pour plate technique.
7.	Mounting and identification of mould- *Penicillium, Aspergillus*
8.	Detection of enzyme activity- Amylase and Caseinase.
9.	Study of Mitosis.
10.	Isolation of Chloroplast.

II)Lab.Execrecises in Biochemistry

Sr No	Name of The Experiment
1	Preparation of Buffers
2	Preparation of Molar and Normal solutions - Molar solution ofSucrose - Normal solutions of alkali- NaOH and Acid-HCl
3	Study of Lambert-Beer's Law by Copper ammonia complex method.
4	Estimation of Glucose by DNSA Method(Graphical)
5.	Estimation of Protein- Casein by Biuret Method.(Graphical)
6.	Determination of Acid Value of Given oil sample.
7.	Isolation of Starch from Potato
8.	Isolation of Casein from Milk
9.	Estimation of DNA by Diphenyl Amine method.(by calculation)
10.	Estimation of RNA by Orcinol Method. (by calculation)
11.	Estimation of Reducing Sugar By Benedict's Method.

Practical outcome-

1. The students will get detailed and comprehensive knowledge on the various practical aspects of microscopy, microbial taxonomy, and basic microbial culture techniques.
2. The students will be able to analyze biochemically different biological samples.
3. Students will get practical knowledge regarding preparation of biochemically important buffers, estimating the biomolecules in a given sample by using standard analytical techniques.

Books recommended for Practicals

1) Stains and Staining procedures by Desai andDesai.
2) Introduction to Practical Biochemistry by D. Plummer, J Wiley andSons.
3) Bacteriological techniques by F. J.Baker.
4) Introduction to Microbial techniques byGunasekaran.
5) Biochemical methods by Sadashivan and D.Manickam.
6) Laboratory methods in Biochemistry by J.Jayaraman.
7) Experimental Microbiology – Patel &Patel

List of minimum equipments-

1) Hot air oven -1
2) Incubator -1
3) Autoclave -1
4) Refrigerator -1
5) Medical microscopes - 10 nos. for onebatch
6) Chemical balance -2
7) pH meter -1
8) Centrifuge -1
9) Colorimeter -1
10) Distilled Water Plant -1
11) Laminar air flow cabinet -1
12) Colony counter -1
13) Water bath -1
14) Arrangements for gas supply and fitting of two burners pertable.
15) One working table of 6' x 2½' for twostudents.
16) One separate sterilization room attach to the laboratory (10' x15')
17) At least one wash basin for a group of fivestudents
18) One separate instrument room attached to lab (10' x15')
19) One laboratory for one batch including working tables (6' x 2½') per two studentsfor onebatch
20) Store room (10' x15')

Practical Examination

(A) The practical examination will be conducted on two consecutive days for threehours per day per batch of the practicalexamination.

(B) Each candidate must produce a certificate from the Head of the Department inher/his college, stating that he/she has completed in a satisfactory manner the practical course on lines laid down from time to time by Academic Council on the recommendationsof Board of Studies and that the journal has been properly maintained. Every candidate must have recorded his/her observations in the laboratory journal and have written a report on each exercise performed. Every journal is to be checked and signed periodically by a member of teaching staff and certified by the Head of the Department at the end of the year. Candidates must produce their journals at the time of practical examinations.

Note:- At least 80% Practicals should be covered in practical examination.

- **OTHER FEATURES :**

(A) LIBRARY:

References and Text Books, Journals and Periodicals, Reference Books.– List Attached

(B) LABORATORY SAFETY EQUIPMENTS :

1) Fireextinguisher
2) First aidkit
3) Fumigationchamber
4) Stabilized powersupply
5) Insulated wiring for electricsupply.
6) Good valves & regulators for gassupply.
7) Operational manuals forinstruments.
8) Emergencyexits

EQUIVALENCE IN ACCORDANCE WITH TITLES AND CONTENTS OF PAPERS- (FOR REVISED SYLLABUS)

Sr.No.	Title of Old paper	Title of New paper
1	Paper I DSC A17 Basics of Biotechnology I	Paper I DSC A17 Basics of Biotechnology I
2	Paper II DSC A18 Basics of Biotechnology II	Paper II DSC A18 Basics of Biotechnology II
3	Paper III DSC B17 Basics of Cell biology and Microbiology	Paper III DSC B17 Basics of Cell biology and Microbiology
4	PAPER I VDSC B18 Basics of Microbiology	PAPER I VDSC B18 Basics of Microbiology

Nature of Question Paper for B.Sc. Part – I, II & III (40 + 10 Pattern) according to Revised Structure as Per NEP – 2020 to be implemented from academic year 2022-23

Maximum Marks: 40

Duration: 2 hrs

Q. 1 Select the most correct alternate from the following [8]

i) to viii) MCQ one mark each with four options

A)

B)

C)

D)

Q.2 Attempt any TWO of the following [16]

A)

B)

C)

Q. 3 Attempt any FOUR of the following [16]

a)

b)

c)

d)

e)

f)

---xxx---