Mohanlal Sukhadia University

Udaipur

Department of Biotechnology

Syllabus and Scheme of Examination

For

B.Sc. CBCS Programme with Biotechnology

B.Sc. Biotechnology (CBCS)

Total Seats: 60*
(All Seats are Self Finance Seats)

***Eligibility**: Those students who passed 10+2 school examination (Biology Group) with a minimum of 50% marks**. The candidates from outside the state of Rajasthan should possess a minimum of 60% marks to seek admission. Candidates with Agriculture / Horticulture / Biotechnology at 10+2 level will be considered, provided that they also had Chemistry as an optional subject at 10+2 level.

Department of Biotechnology

Mohanlal Sukhadia University

Syllabus and Scheme of Examination

For

B.Sc. CBCS Program Biotechnology

Type of course	Course code	Title of the Course	L-T-P/Week	No. of credits	University exam	Internal assessment	Total
Semester I							
Core course 1	B1CT01BOT01	Botany-I	3-1-0	4	80	20	100
Core course 2	B1 CT02BT01	Biotechnology-I	3-1-0	4	80	20	100
Core course 3	B1 CT03CHE01	Chemistry-I	3-1-0	4	80	20	100
Ability Enhancement Compulsory Course (AECC)	B1AECC01EC	English Communication	1-0-2	2	80	20	100
Core course practical 1	B1CP01BOT01	Practical Botany-I	0-0-4	2	80	20	100
Core course practical 2	B1 CP02BT01	Practical Biotechnology-I	0-0-4	2	80	20	100
Core course practical 3	B1 CP03CHE01	Practical Chemistry-I	0-0-4	2	80	20	100
				20	**560**	**140**	**700**
Semester II							
Core course 4	B2CT04BOT02	Botany-II	3-1-0	4	80	20	100
Core course 5	B2CT05BT02	Biotechnology-II	3-1-0	4	80	20	100
Core course 6	B2CT06CHE02	Chemistry-II	3-1-0	4	80	20	100
Ability Enhancement Compulsory Course (AECC)	B2AECC02EC	Environmental Science	1-0-2	2	80	20	100
Core course practical 4	B2CP04BOT02	Practical Botany-II	0-0-4	2	80	20	100
Core course practical 5	B2 CP05BT02	Practical Biotechnology-II	0-0-4	2	80	20	100
Core course practical 6	B2 CP06CHE02	Practical Chemistry-II	0-0-4	2	80	20	100
				20	**560**	**140**	**700**
Semester III							
Core course 7	B3CT07BOT03	Botany-III	3-1-0	4	80	20	100
Core course 8	B3CT08BT03	Biotechnology-III	3-1-0	4	80	20	100
Core course 9	B3CT09CHE03	Chemistry-III	3-1-0	4	80	20	100

SEC-I	B3SEC01	Any 1 from given list	1-0-2	2	80	20	100
Core course practical 7	B3CP07BOT03	Botany-III	0-0-4	2	80	20	100
Core course practical 8	B3CP08BT03	Biotechnology-III	0-0-4	2	80	20	100
Core course practical 9	B3CP09CHE03	Chemistry-III	0-0-4	2	80	20	100
				20	**560**	**140**	**700**
Semester IV							
Core course 10	B4CT10BOT04	Botany-IV	3-1-0	4	80	20	100
Core course 11	B4CT11BT04	Biotechnology- IV	3-1-0	4	80	20	100
Core course 12	B4CT12CHE04	Chemistry- IV	3-1-0	4	80	20	100
SEC-II	B4SEC02	Any 1 from given list	1-0-2	2	80	20	100
Core course practical 10	B4CP10BOT04	Botany- IV	0-0-4	2	80	20	100
Core course practical 11	B4CP11BT04	Biotechnology- IV	0-0-4	2	80	20	100
Core course practical 12	B4CP12CHE04	Chemistry- IV	0-0-4	2	80	20	100
				20	**560**	**140**	**700**
Semester V							
DSE 1	B5ET01BOT01	Botany-I	3-1-0	4	80	20	100
DSE 2	B5ET02BT01	Biotechnology- I	3-1-0	4	80	20	100
DSE 3	B5ET03CHE01	Chemistry- I	3-1-0	4	80	20	100
SEC-III	B5SEC03	Any 1 from given list	1-0-2	2	80	20	100
DSE Practical 1	B5EP01BOT01	Botany-I	0-0-4	2	80	20	100
DSE Practical 2	B5EP02BT01	Biotechnology- I	0-0-4	2	80	20	100
DSE Practical 3	B5EP03CHE01	Chemistry- I	0-0-4	2	80	20	100
				20	**560**	**140**	**700**
Semester VI							
DSE 4	B6ET04BOT02	Botany-II	3-1-0	4	80	20	100
DSE 5	B6ET05BT02	Biotechnology- II	3-1-0	4	80	20	100
DSE 6	B6ET06CHE02	Chemistry- II	3-1-0	4	80	20	100
SEC-IV	B6SEC04	Any 1 from given list	1-0-2	2	80	20	100
DSE Practical 4	B6EP04BOT02	Botany-II	0-0-4	2	80	20	100
DSE Practical 5	B6EP05BT02	Biotechnology- II	0-0-4	2	80	20	100
DSE Practical 6	B6EP06CHE02	Chemistry- II	0-0-4	2	80	20	100
				20	**560**	**140**	**700**
GRAND TOTAL				**120**	**3360**	**840**	**4200**
				TOTAL CREDIT = 120			

Core Course Theory

S.No.	Type of course	Semester	Course code	Title of the Course
1.	Core course 1	I	B1CT01BOT01	Botany-I
2.	Core course 2	I	B1 CT02BT01	Biotechnology-I
3.	Core course 3	I	B1 CT03CHE01	Chemistry-I
4.	Core course 4	II	B2CT04BOT02	Botany-II
5.	Core course 5	II	B2CT05BT02	Biotechnology-II
6.	Core course 6	II	B2CT06CHE02	Chemistry-II
7.	Core course 7	III	B3CT07BOT03	Botany-III
8.	Core course 8	III	B3CT08BT03	Biotechnology-III
9.	Core course 9	III	B3CT09CHE03	Chemistry-III
10.	Core course 10	IV	B4CT10BOT04	Botany-IV
11.	Core course 11	IV	B4CT11BT04	Biotechnology-IV
12.	Core course 12	IV	B4CT12CHE04	Chemistry-IV

Core Course practical

1.	Core course 1	I	B1CP01BOT01	Botany-I
2.	Core course 2	I	B1 CP02BT01	Biotechnology-I
3.	Core course 3	I	B1 CP03CHE01	Chemistry-I
4.	Core course 4	II	B2CP04BOT02	Botany-II
5.	Core course 5	II	B2CP05BT02	Biotechnology-II
6.	Core course 6	II	B2CP06CHE02	Chemistry-II
7.	Core course 7	III	B3CP07BOT03	Botany-III
8.	Core course 8	III	B3CP08BT03	Biotechnology-III
9.	Core course 9	III	B3CP09CHE03	Chemistry-III
10.	Core course 10	IV	B4CP10BOT04	Botany-IV
11.	Core course 11	IV	B4CP11BT04	Biotechnology-IV
12.	Core course 12	IV	B4CP12CHE04	Chemistry-IV

Discipline Specific Electives Theory

S.NO.	Type of course	Semester	Course code	Title of the Course
1.	DSE 1	V	B5ET01BOT01	Botany-I
2.	DSE 2	V	B5ET02BT01	Biotechnology- I
3.	DSE 3	V	B5ET03CHE01	Chemistry- I
4.	DSE 4	VI	B6ET04BOT02	Botany-II
5.	DSE 5	VI	B6ET05BT02	Biotechnology- II
6.	DSE 6	VI	B6ET06CHE02	Chemistry- II

Discipline Specific Electives Practical

S.NO.	Type of course	Semester	Course code	Title of the Course
1.	DSE 1	V	B5EP01BOT01	Botany-I
2.	DSE 2	V	B5EP02BT01	Biotechnology- I
3.	DSE 3	V	B5EP03CHE01	Chemistry- I
4.	DSE 4	VI	B6EP04BOT02	Botany-II
5.	DSE 5	VI	B6EP05BT02	Biotechnology- II
6.	DSE 6	VI	B6EP06CHE02	Chemistry- II

Skill Enhancement Courses (Any four)

Botany	Biotechnology	Chemistry
1. Biofertilizers	1. Probiotic Technology	1. IT Skills for Chemists
2. Herbal Technology	2. Animal Cell Sciences	2. Basic Analytical Chemistry
3. Nursery and Gardening	3. Microbiological Analysis of Air and Water	3. Chemical Technology & Society
4. Floriculture	4. Techniques in Biotechnology	4. Chemoinformatics
5. Medicinal Botany	5. Techniques in Plant Tissue Culture	5. Business Skills for Chemists
6. Plant Diversity and Human Welfare		6. Intellectual Property Rights
7. Ethnobotany		7. Analytical Clinical Biochemistry
8. Mushroom Culture Technology		8. Green Methods in Chemistry
		9. Pharmaceutical Chemistry
		10. Chemistry of Cosmetics & Perfumes
		11. Pesticide Chemistry
		12. Fuel Chemistry

Ability Enhancement Course

S.NO.	Type of course	Semester	Course code	Title of the Course
1.	Ability Enhancement Compulsory Course (AECC)	I	B1AECC01EC	English Communication
2.	Ability Enhancement Compulsory Course (AECC)	II	B2AECC02EC	Environmental Science

NOTE:

1. In the 5^{th} or 6^{th} semester students also have an alternative option of taking one in-house minor research project within the department or in sister departments of this University in lieu of one DSE. Such students will also have to submit a dissertation report as per the prescribed format for the training. (Annexure 1)
2. The total credits and marks for minor research project will be the same as for any other DSE and Evaluation of the minor research project will be done as per the prescribed scheme. (Annexure 1)
3. The total contact hrs. for minor research project will be 8 hrs./week. The student who opts for industrial training will have submit a duly signed and sealed certificate from the mentor and competent authority in the prescribed format (Annexure 2)
4. Students can choose skill courses from the list provided in the syllabi of B. Sc. CBCS Biotechnology, M.Sc. Biotechnology, M. Sc. Botany, M. Sc. Microbiology or any other subject from the faculty of Science. The student also has the choice of choosing any general skill courses offered by College of Science
5. Students can also earn extra credits by taking addition skill courses during entire program period.

ANNEXURE 1

MARKING SCHEME FOR MINOR RESEARCH PROJECT

B. Sc. Biotechnology semester V/VI

S. No.		Maximum Marks	Marks Obtained
1	**Dissertation Report** a. Review of Literature b. Methodology c. Outcome	 15 10 15	
2	Seminar	25	
3	Viva – voce	15	
4	Continuous Assessment	20	
	TOTAL MARKS	**100**	

ANNEXURE 2

CONTINUOUS ASSESSMENT SHEET

B. Sc. Biotechnology semester V/VI : Minor Research Project

Name of Student's :

Technical Competence	Maximum Marks	Minimum Marks
• Review of Literature	5	
• Experimental Design & Skills	5	
• Data Interpretation/ Result Analysis	5	
• Attendance	5	
GRAND TOTAL	**20**	

Remark on professional competence (or deficiency) of the trainee and overall performance.

Name :

Designation : E-mail…….

Ph. No.

Organization:

Date: Signature with seal

Details of Courses

Core Courses –Botany

1. Biodiversity (Microbes, Algae, Fungi and Archegoniate)
2. Plant Ecology and Taxonomy
3. Plant Anatomy and Embryology
4. Plant Physiology and Metabolism

Core Courses: Biotechnology

1. Introduction to Microbiology
2. Animal Biotechnology
3. Plant Biotechnology
4. Recombinant DNA Technology

Core Courses-Chemistry

1. Atomic Structure, Bonding, General Organic Chemistry & Aliphatic Hydrocarbons
2. Chemical Energetics, Equilibria & Functional Group Organic Chemistry-I
3. Conductance, Electrochemistry & Functional Group Organic Chemistry-II
4. Chemistry of s- and p-block elements, States of matter and Chemical Kinetics

Discipline Specific Electives-Botany (Any two)

1. Economic Botany and Biotechnology
2. Cell and Molecular Biology
3. Analytical Techniques in Plant Sciences
4. Bioinformatics
5. Research Methodology
6. Dissertation

Discipline Specific Electives: Biotechnology (Any two)

1. Environmental Biotechnology
2. Applied Plant Biotechnology
3. Microbial Technology
4. Immunology and Enzymology
5. Project

Discipline Specific Electives-Chemistry (Any two)

1. Applications of Computers in Chemistry
2. Analytical Methods in Chemistry
3. Molecular Modelling & Drug Design
4. Novel Inorganic Solids
5. Polymer Chemistry
6. Research Methodology for Chemistry
7. Green Chemistry
8. Industrial Chemicals & Environment
9. Inorganic Materials of Industrial Importance
10. Instrumental Methods of Chemical Analysis
11. Chemistry of d-block elements, Quantum Chemistry and Spectroscopy
12. Organometallics, Bioinorganic chemistry, Polynuclear hydrocarbons and UV, IR Spectroscopy
13. Molecules of Life
14. Dissertation

Ability Enhancement Compulsory Courses

1. English/MIL Communication

2. Environmental Science

Skill Enhancement Courses (Any four)

Botany

1. Biofertilizers
2. Herbal Technology
3. Nursery and Gardening
4. Floriculture
5. Medicinal Botany
6. Plant Diversity and Human Welfare
7. Ethnobotany
8. Mushroom Culture Technology

Biotechnology

1. Probiotic Technology
2. Animal Cell Sciences
3. Microbiological Analysis of Air and Water
4. Techniques in Biotechnology

5. Techniques in Plant Tissue Culture

Chemistry

1. IT Skills for Chemists
2. Basic Analytical Chemistry
3. Chemical Technology & Society
4. Chemoinformatics
5. Business Skills for Chemists
6. Intellectual Property Rights
7. Analytical Clinical Biochemistry
8. Green Methods in Chemistry
9. Pharmaceutical Chemistry
10. Chemistry of Cosmetics & Perfumes
11. Pesticide Chemistry
12. Fuel Chemistry

Scheme of B.Sc. Programme (Life Sciences)/ B.Sc. Medical under CBCS

SEMESTER	COURSE OPTED	COURSE NAME	Credits
I	**Ability Enhancement Compulsory Course-I**	English communications/ Environmental Science	2
	Core course Botany I	Biodiversity (Microbes, Algae, Fungi and Archegoniate)	4
	Core Course Botany I Practical	Biodiversity-Practical	2
	Core course Biotechnology I	Introduction to Microbiology	4
	Core Course Biotechnology I Practical	Introduction to Microbiology	2
	Core course Chemistry I	Atomic Structure, Bonding, General Organic Chemistry Aliphatic & Hydrocarbons	4
	Core Course Chemistry I Practical	Atomic Structure, Bonding, General Organic Chemistry & Aliphatic Hydrocarbons -Lab	2

II	**Ability Enhancement Compulsory Course-II**	English communications/ Environmental Science	2
	Core course Botany II	Plant Ecology and Taxonomy	4
	Core Course Botany -II Practical	Plant Ecology and Taxonomy- Practical	2
	Core course Biotechnology II	Animal Biotechnology	4
	Core Course Biotechnology II Practical	Animal Biotechnology Practical	2
	Core course Chemistry II	Chemical Energetics, Equilibria & Functional Group Organic Chemistry-I	4
	Core Course Chemistry II Practical	Chemical Energetics, Equilibria &	2

			Functional Group Organic Chemistry-I -Lab	
III	**Core course Botany III**		Anatomy and Embryology of Angiosperms	4
	Core Course Botany -III Practical		Anatomy and Embryology of Angiosperms- Practical	2
	Core course Biotechnology III		Plant Biotechnology`	4
	Core Course Biotechnology Practical	**III**	Plant Biotechnology Practical	2
	Core course Chemistry III		Conductance, Electrochemistry & Functional Group Organic Chemistry- II	4
	Core Course Chemistry Practical	**III**	Conductance, Electrochemistry & Functional Group Organic Chemistry- II- Lab	2
	Skill Enhancement Course-I		SEC-I	2
IV	**Core course Botany IV**		Plant Physiology and Metabolism	4
	Core Botany	**–IV**	Plant Physiology And metabolism Practical	2

	Core course Biotechnology IV	Recombinant DNA Technology	4
	Core Course Biotechnology IV Practical	Recombinant DNA technology	2
	Core course Chemistry IV	Chemistry of s- And p-block elements of matter and States Chemical Kinetics	4
	Core Course Chemistry IV Practical	Chemistry of s- and p- block elements, States of matter and Chemical Kinetics-Lab	2
	Skill Enhancement Course-II	SEC-II	2
V	**Discipline Specific Elective Botany –I**	DSE Botany 1	4
	Discipline Specific Elective Botany I Practical		2
	Discipline Specific Elective Biotechnology I	DSE Biotechnology I	4
	Discipline Specific Elective Biotechnology I Practical		2
	Discipline Specific Elective Chemistry I	DSE Chemistry I	4
	Discipline Specific Elective Chemistry I Practical		2
	Skill Enhancement Course -III	SEC-III	2

VI	**Discipline Specific Elective Botany –II**	DSE Botany II	4
	Discipline Specific Elective Botany II Practical		2
	Discipline Specific Elective Biotechnology II	DSE Biotechnology II	4
	Discipline Specific Elective Biotechnology II Practical		2
	Discipline Specific Elective Chemistry III	DSE Chemistry II	4
	iscipline Specific Elective Chemistry III Practical		2
	Skill Enhancement Course –IV	SEC-IV	2
			Total: 120