

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.11))
Syllabus with effect from the Academic Year 2023-2024

Major subject

Course Code	US02MABTE01	Title of the Course	Bio molecules and Classical Genetics
Total Credits of the Course	04	Hours per Week	04

Course Objectives	<ol style="list-style-type: none"> 1. To give an overview of basic chemistry and bio molecules. 2. To understand classical genetics and maternal and extra chromosomal inheritance. 3. To study various Genetic Disorder.
-------------------	--

Course Content		
Unit-1	<p>Chemistry of life: Properties of water, Chemical bonds/ interactions: Ionic, covalent, Non-Polar, Polar, hydrogen bonds, hydrophobic interactions, Vander waal's attractive force, Acids, Bases and buffers, pH, pKa</p> <p>Carbohydrates: Structure, nomenclature and classification : Monosaccharide, disaccharides, oligosaccharides and polysaccharides, Biological functions of carbohydrates</p>	Weightage*(%) 25
Unit-2	<p>Proteins:- Structure of amino acid, levels of protein structure- primary, secondary, tertiary and quaternary. Classification of proteins. Biologically important peptides. Protein denaturation and biological roles of protein.</p> <p>Lipid: Definition and major classes of storage and structural lipids, fatty acids structure and function, essential and non essential fatty acids, Phosphoglycerides.</p>	25
Unit-3	<p>Classical Genetics: Mendel's law of inheritance- Principle of segregation and principle of independent assortment. Concept of incomplete and Co-dominance, sex linkage. Genetic interaction (Dominance, recessive, complementary Epistasis).</p> <p>Maternal effects and cytoplasmic Inheritance. Maternal effect(coiling of shell in <i>Limnaea peregra</i>), Cytoplasmic Inheritance (Kappa in <i>paramecium</i>), organellar Genetics(plastid inheritance in plants)</p>	25

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.11)
Syllabus with effect from the Academic Year 2023-2024

Unit-4	<p>Structrural changes in chromosomes: Chromosome theory of inheritance. Duplication, translocation, inversions, Aneuploidy, euploidy</p> <p>Gentic Disorder : Chromosomal diseases/syndromes: thalessemia, Down's syndrome, Turner syndrome, fragile syndrome Multifactorial disorder- Alzheimer's disease and Autism spectrum disorder. Monogenic disorder: Duchene muscular dystrophy, Sickle cell anemia,</p>	25
--------	---	----

Teaching-Assignments, Learning	Chalk Board, Power-point presentation, Quizzes Methodology Videos available on NPTEL and BISAG
--------------------------------	---

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal written/Practical examination (As per CBCS R.6.8.3)	15%
2.	Internal continuous Assessment in the form of Practical, viva –voice ,Quizzes, Seminars, Assignment, Attendance(As per CBSC R 6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Students will learn about basic chemistry and various bio molecules.
2.	They will learn about classical genetics , genetic interaction and maternal and extra chromosomal inheritance.
3.	They also acquire the knowledge about various Genetic disorder, their symptoms and causes.

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.11))
Syllabus with effect from the Academic Year 2023-2024

Suggested References:	
Sr No	References
1.	Biotechnology- Expanding Hoirizon- B D Singh
2.	Genetics- P.K. Gupta
3.	Cell biology, genetics, molecular biology, evolution and ecology- Verma & Agarwal
4.	Biochemistry- Satyanarayana
5.	Text book of Biotechnology- R C Dubey
6.	Biotechnology, Satyanarayana. U,
7.	Biotechnology and Genomics, Gupta P.K:
8.	Principle of genetics- Gardner
9.	Human genetics- Concepts and applications- Ricki Lewis

On-line resources to be used if available as reference material
On-line Resources
Relevant entries on Wikipedia and Encyclopaedia Britannica

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.11)
Syllabus with effect from the Academic Year 2023-2024

Major subject- Practical

Course Code	US02MABTE02	Title of the Course	Practical
Total Credits of the Course	04	Hours per Week	04

Course Objectives	<ol style="list-style-type: none"> 1. To impart knowledge of preparation of solution. 2. To teach qualitative and quantitative analysis of macromolecule 3. To teach Mendelian genetics with suitable examples .
-------------------	---

Course Content
Section-I
<ol style="list-style-type: none"> 1. Identification of Biological compounds. 2. Qualitative estimation of Carbohydrates (glucose , lactose, sucrose) 3. Qualitative estimation of lipids 4. Estimation of Protein by Barfoed's method 5. Estimation of sugar by Benedict's method 6. Separation and identification of amino-acid with paper chromatography.
Section-II
<ol style="list-style-type: none"> 7. Preparation of biochemical reagents.(stocks solution/ percentage solution/normality) 8. Blood grouping 9. Acidity of water 10. Alkalinity of water 11. Monohybrid and dihybrid cross with suitable examples. 12. Pedigree charts of common characters blood group, colour blindness etc. 13. Study of special types of chromosomes(salivary gland chromosome, supernumerary chromosome) 14. Presentation / seminar/ quiz.

Teaching-Assignments, Learning	Chalk Board, Power-point presentation, Quizzes Methodology Videos available on NPTEL and BISAG
--------------------------------	---

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.11))
Syllabus with effect from the Academic Year 2023-2024

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal written/Practical examination (As per CBCS R.6.8.3)	-
2.	Internal continuous Assessment in the form of Practical, viva –voice ,Quizzes, Seminars, Assignment,Attendance(As per CBSC R 6.8.3)	-
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Students will learn how to prepare solution.
2.	They will learn to identify various macromolecules and their estimation
3.	Student will learn mendelian genetics with suitable examples.

On-line resources to be used if available as reference material
On-line Resources
Relevant entries on Wikipedia and Encyclopaedia Britannica

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.11)
Syllabus with effect from the Academic Year 2023-2024

Minor subject

Course Code	US02MIBTE01	Title of the Course	Biomolecules
Total Credits of the Course	02	Hours per Week	02

Course Objectives	<ol style="list-style-type: none"> To give an overview of basic chemistry and bio molecules. To give overview of protein and lipid biochemistry.
-------------------	--

Course Content		
Unit-1	<p>Chemistry of life: Properties of water, Chemical bonds/ interactions: Ionic, covalent, Non-Polar, Polar, hydrogen bonds, hydrophobic interactions, Vander waal's attractive force, Acids, Bases and buffers, pH, pKa</p> <p>Carbohydrates: Structure, nomenclature and classification : Monosaccharide, disaccharides, oligosaccharides and polysaccharides, Biological functions of carbohydrates</p>	Weightage*(%) 50
Unit-2	<p>Proteins:- Structure of amino acid, levels of protein structure- primary, secondary, tertiary and quaternary. Classification of proteins. Biologically important peptides. Protein denaturation and biological roles of protein.</p> <p>Lipid: Definition and major classes of storage and structural lipids, fatty acids structure and function, essential and non essential fatty acids, Phosphoglycerides.</p>	50

Teaching-Assignments, Learning	Chalk Board, Power-point presentation, Quizzes Methodology Videos available on NPTEL and BISAG
--------------------------------	---

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal written/Practical examination (As per CBCS R.6.8.3)	15%
2.	Internal continuous Assessment in the form of Practical, viva –voice, Quizzes, Seminars, Assignment, Attendance (As per CBSC R 6.8.3)	15%
3.	University Examination	70%

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.11))
Syllabus with effect from the Academic Year 2023-2024

Course Outcomes: Having completed this course, the learner will be able to	
1.	Students will learn about basic chemistry and various bio molecules.
2.	Students will learn the importance of proteins, lipids, carbohydrate in biological life.

Suggested References:	
Sr No	References
1.	Biotechnology- Expanding Hoirizon- B D Singh
2.	Genetics- P.K. Gupta
3.	Cell biology, genetics, molecular biology, evolution and ecology- Verma & Agarwal
4.	Biochemistry- Satyanarayana
5.	Text book of Biotechnology- R C Dubey
6.	Biotechnology, Satyanarayana. U,

On-line resources to be used if available as reference material
On-line Resources
Relevant entries on Wikipedia and Encyclopaedia Britannica

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.11)
Syllabus with effect from the Academic Year 2023-2024

Major subject- Practical

Course Code	US02MIBTE02	Title of the Course	Practical
Total Credits of the Course	02	Hours per Week	02

Course Objectives	<ol style="list-style-type: none"> To impart knowledge of preparation of solution. To teach qualitative and quantitative analysis of macromolecule
-------------------	--

Course Content
Section-I
<ol style="list-style-type: none"> Identification of Biological compounds. Qualitative estimation of Carbohydrates (glucose , lactose, sucrose) Qualitative estimation of lipids Estimation of Protein by Barfoed's method Estimation of sugar by Benedict's method Separation and identification of amino-acid with paper chromatography.

Teaching-Assignments, Learning	Chalk Board, Power-point presentation, Quizzes Methodology Videos available on NPTEL and BISAG
--------------------------------	---

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal written/Practical examination (As per CBCS R.6.8.3)	-
2.	Internal continuous Assessment in the form of Practical, viva –voice ,Quizzes, Seminars, Assignment,Attendance(As per CBSC R 6.8.3)	-
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Students will learn how to prepare solution.
2.	They will learn to identify various macromolecules and their estimation

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.11))
Syllabus with effect from the Academic Year 2023-2024

On-line resources to be used if available as reference material
On-line Resources
Relevant entries on Wikipedia and Encyclopaedia Britannica

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.11))
Syllabus with effect from the Academic Year 2023-2024

B.Sc. Biotechnology Semester II
Interdisciplinary subject

Course Code	US02IDBTE01	Title of the Course	Introduction to genetics & chromosomes
Total Credits of the Course	02	Hours per Week	02

Course Objectives	<ol style="list-style-type: none"> 1. To understand classical genetics and maternal and extra chromosomal inheritance. 2. To study various Genetic Disorder.
-------------------	--

Course Content		
Unit-1	<p>Classical Genetics: Mendel's law of inheritance- Principle of segregation and principle of independent assortment. Concept of incomplete and Co-dominance, sex linkage. Genetic interaction (Dominance, recessive, complementary Epistasis).</p> <p>Maternal effects and cytoplasmic Inheritance. Maternal effect(coiling of shell in <i>Limnaea peregra</i>), Cytoplasmic Inheritance (κ in paramecium), organellar Genetics(plastid inheritance in plants)</p>	Weightage*(%) 50
Unit-2	<p>Structrural changes in chromosomes: Chromosome theory of inheritance.Duplication, translocation, inversions, Aneuploidy, euploidy</p> <p>Gentic Disorder : Chromosomal diseases/syndromes: thalessemia, Down's syndrome, Turner syndrome, fragile syndrome Multifactorial disorder- Alzheimer's disease and Autism spectrum disorder. Monogenic disorder: Duchene muscular dystrophy, Sickle cell anemia,</p>	50

Teaching-Assignments, Learning	Chalk Board, Power-point presentation, Quizzes Methodology Videos available on NPTEL and BISAG
--------------------------------	---

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.11)
Syllabus with effect from the Academic Year 2023-2024

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal written/Practical examination (As per CBCS R.6.8.3)	15%
2.	Internal continuous Assessment in the form of Practical, viva –voice ,Quizzes, Seminars, Assignment,Attendance(As per CBSC R 6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	They will learn about classical genetics , genetic interaction and maternal and extra chromosomal inheritance.
2.	They also acquire the knowledge about various Genetic disorder, their symptoms and causes.

Suggested References:	
Sr No	References
1.	Biotechnology- Expanding Hoirizon- B D Singh
2.	Genetics- P.K. Gupta
3.	Cell biology, genetics, molecular biology, evolution and ecology- Verma & Agarwal
4.	Biotechnology and Genomics, Gupta P.K.:
5.	Principle of genetics- Gardner
6.	Human genetics- Concepts and applications- Ricki Lewis

On-line resources to be used if available as reference material	
On-line Resources	
Relevant entries on Wikipedia and Encyclopaedia Britannica	

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.11)
Syllabus with effect from the Academic Year 2023-2024

B.Sc. Biotechnology Semester II
Interdisciplinary subject- Practical

Course Code	US02IDBTE02	Title of the Course	Practical
Total Credits of the Course	02	Hours per Week	02

Course Objectives	<ol style="list-style-type: none"> 1. To impart knowledge of preparation of solution. 2. To teach Mendelian genetics with suitable examples .
-------------------	---

Course Content
<ol style="list-style-type: none"> 1. Preparation of biochemical reagents.(stocks solution/ percentage solution/normality) 2. Blood grouping 3. Acidity of water 4. Alkalinity of water 5. Monohybrid and dihybrid cross with suitable examples. 6. Pedigree charts of common characters blood group, colour blindness etc. 7. Study of special types of chromosomes(salivary gland chromosome, supernumerary chromosome) 8. Presentation / seminar/ quiz.

Teaching-Assignments, Learning	Chalk Board, Power-point presentation, Quizzes Methodology Videos available on NPTEL and BISAG
--------------------------------	---

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal written/Practical examination (As per CBCS R.6.8.3)	-
2.	Internal continuous Assessment in the form of Practical, viva –voice ,Quizzes, Seminars, Assignment,Attendance(As per CBSC R 6.8.3)	-
3.	University Examination	100%

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.11))
Syllabus with effect from the Academic Year 2023-2024

Course Outcomes: Having completed this course, the learner will be able to	
1.	Students will learn how to prepare solution.
2.	Student will learn mendelian genetics with suitable examples.

On-line resources to be used if available as reference material	
On-line Resources	
Relevant entries on Wikipedia and Encyclopaedia Britannica	

|